

TENTH
EDITION



SPENCER A. RATHUS

PSYCHOLOGY

Concepts and Connections

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PSYCHOLOGY

For Lois, Jill, Allyn, Jordan, and Taylor

Tenth Edition



SPENCER A. RATHUS

PSYCHOLOGY

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About the Author



Numerous personal experiences enter into Spencer Rathus's textbooks. He was the first member of his family to go to college and found college textbooks to be cold and intimidating. When his opportunity arrived to write college textbooks, he wanted them to be different—warm and encouraging, especially to students who were also the first generation in their families to be entering college.

Rathus's first professional experience was teaching high school English. Part of the task of the high school teacher is to motivate students. Through this experience he learned the importance of humor and personal stories, which later became part of his textbook approach. Rathus wrote poetry and novels while he was an English teacher—and some of the poetry was published in poetry journals. The novels never saw the light of day—which Rathus admits has saved him from a great deal of embarrassment.

Rathus earned his Ph.D. in psychology and then entered clinical practice and teaching. He has published research articles in journals such as *Behavior Therapy*, *Journal of Clinical Psychology*, *Behaviour Research and Therapy*, *Journal of Behavior Therapy and Experimental*

Psychiatry, *Adolescence*, and *Criminology*. His research interests lie in the areas of human growth and development, psychological disorders, methods of therapy, and psychological assessment.

Rathus has since poured his energies into writing textbooks in introductory psychology, developmental psychology, the psychology of adjustment, human sexuality, and abnormal psychology. He has taught at Northeastern University, St. John's University, New York University, and The College of New Jersey. His professional activities include service on the American Psychological Association Task Force on Diversity Issues at the Precollege and Undergraduate Levels of Education in Psychology, and on the Advisory Panel, American Psychological Association, Board of Educational Affairs (BEA) Task Force on Undergraduate Psychology Major Competencies.

Rathus is proud of his family. His wife, Lois Fichner-Rathus, is a successful textbook author and a professor of art history at The College of New Jersey. His daughter Allyn graduated from New York University's M.A. program in educational theatre and is a teacher in New York City. His daughter Jordan is enrolled in an M.F.A. program, with specialization in video art. Rathus's youngest daughter, Taylor, is a musical theatre major at NYU, has performed professionally, and can dance the pants off of both her parents. Rathus's eldest daughter, Jill, is a psychologist and teaches at C. W. Post College of Long Island University.



Brief Contents

Chapter 1	What Is Psychology? 2
Chapter 2	Sorting Truth from Fiction in Psychology: Critical Thinking and Research Methods 28
Chapter 3	Biology and Psychology 62
Chapter 4	Sensation and Perception 106
Chapter 5	Consciousness 150
Chapter 6	Learning 188
Chapter 7	Memory: Remembrance of Things Past—and Future 222
Chapter 8	Thinking, Language, and Intelligence 262
Chapter 9	Motivation and Emotion 304
Chapter 10	The Voyage Through the Life Span: Childhood 340
Chapter 11	The Voyage Through the Life Span: Adolescence and Adulthood 382
Chapter 12	Personality: Theory and Measurement 422
Chapter 13	Gender and Sexuality 456
Chapter 14	Stress, Health, and Coping 498
Chapter 15	Psychological Disorders 532
Chapter 16	Methods of Therapy 570
Chapter 17	Social Psychology 614
Appendix	Answer Keys to Self-Assessments and Active Reviews A–1

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Chapter 1 What Is Psychology? 2



Psychology as a Science 4

Controversy in Psychology: WHAT DO PSYCHOLOGISTS MEAN BY “CONTROLLING” BEHAVIOR AND MENTAL PROCESSES? 5

What Psychologists Do: Something for Everyone? 5

- Fields of Psychology: From the Clinic to the Colosseum 5

Where Psychology Comes From: A History 9

IN PROFILE Aristotle 9

- Structuralism: The Elements of Experience 10

IN PROFILE Wilhelm Wundt 10

- Functionalism: Making Psychology a Habit 10

IN PROFILE William James 11

- Behaviorism: Practicing Psychology in Public 11

IN PROFILE John B. Watson 12

- Gestalt Psychology: Making Psychology Whole 13
- Psychoanalysis: Digging Beneath the Surface 14

CONCEPT REVIEW: Historic Schools of Psychology 15

How Today’s Psychologists View Behavior and Mental Processes 16

- The Evolutionary and Biological Perspectives: It’s Only Natural 16
- The Cognitive Perspective: Keeping Psychology “in Mind” 17
- The Humanistic–Existential Perspective: The Search for Meaning 17
- The Psychodynamic Perspective: Still Digging 18
- Perspectives on Learning: From the Behavioral to the Cognitive 18
- The Sociocultural Perspective: How Do You Complete the Sentence “I Am . . .”? 18

Gender, Ethnicity, and Psychology: Real People in the Real World 20

- Women in Psychology: Opening the Floodgates 20

IN PROFILE Mary Whiton Calkins 21

- Ethnicity and Psychology 21

IN PROFILE Kenneth B. Clark and Mamie Phipps Clark 22

LIFE CONNECTIONS: Getting Ready to Work in Psychology 24

Recite—An Active Summary 26

Key Terms 27

Active Learning Resources 27

Chapter 2 Sorting Truth from Fiction in Psychology: Critical Thinking and Research Methods 28



Thinking Like a Psychologist 30

- Principles of Critical Thinking 31

A CLOSER LOOK—REAL LIFE: THINKING CRITICALLY ABOUT PSYCHOLOGICAL ADVICE ON THE INTERNET: ARE THERE ANY QUICK FIXES? 32

How Psychologists Study Behavior and Mental Processes 33

- The Scientific Method: Putting Ideas to the Test 33
- Samples and Populations: Hitting the Target Population 34

- Methods of Observation: The Better to See You With 35

SELF-ASSESSMENT: DARE YOU SAY WHAT YOU THINK? THE SOCIAL-DESIRABILITY SCALE 36

IN PROFILE Sir Francis Galton 39

- Correlation: On How Things Go Together—or Not 41
- The Experimental Method: Trying Things Out 42

CONCEPT REVIEW: Research Methods 45

Statistics: How Psychologists Handle Data 46

- Descriptive Statistics 47
- Measures of Variability 49
- The Normal Curve 51
- Inferential Statistics 52

Ethical Issues in Psychological Research and Practice 54

- Research with Humans 54
- Research with Animals 56

LIFE CONNECTIONS: Critical Thinking, Science, and Pseudoscience 58

Recite—An Active Summary 60

Key Terms 61

Active Learning Resources 61

Chapter 3 Biology and Psychology 62



IN PROFILE Charles Darwin 64

Evolution and Evolutionary Psychology: “Survivor” Is More Than Just a TV Show 65

- Doing What Comes Naturally 66
- Evolutionary Psychology 66

Heredity: The Nature of Nature 67

- Genetics and Behavioral Genetics 67
- Genes and Chromosomes: The Building Blocks of Heredity 68

A CLOSER LOOK—RESEARCH: ARE YOU A HUMAN OR A MOUSE (OR A CHIMP OR A CARROT)? SOME FASCINATING FACTS ABOUT GENES 70

- Kinship Studies: Is the Behavior of Relatives Related? 70
- Genetic–Environmental Correlation: The Interaction of Nature and Nurture 72

The Nervous System: On Being Wired 73

- Neurons: Into the Fabulous Forest 74
- IN PROFILE** Santiago Ramón y Cajal 76
- The Neural Impulse: Let Us “Sing the Body Electric” 76
- Neurotransmitters: The Chemical Keys to Communication 78
- The Parts of the Nervous System 81

The Brain: The Star of the Human Nervous System 84

- Seeing the Brain Through the Eyes of the Psychologist 84

- A Voyage Through the Brain: Revealing the Central Processing Unit 85
- The Cerebral Cortex: The “Bark” That Reasons 89

A CLOSER LOOK—RESEARCH: MIRROR, MIRROR, IN THE BRAIN: WHO’S THE FAIREST IMITATOR OF THEM ALL? 91

IN PROFILE Paul Broca 92

- Left Brain, Right Brain? 93
- Handedness: Is Being Right-Handed Right? 93
- Split-Brain Experiments: How Many Brains Do You Have? 94

The Endocrine System: Chemicals in the Bloodstream 95

- The Hypothalamus: Master of the Master Gland 96
- The Pituitary Gland: The Pea-Sized Governor 96

CONCEPT REVIEW: The Endocrine System 96

- The Pineal Gland 97
- The Thyroid Gland: The Body’s Accelerator 97
- The Adrenal Glands: Coping with Stress 97
- The Testes and the Ovaries 97

LIFE CONNECTIONS: Coping with PMS 100

Recite—An Active Summary 102

Key Terms 104

Active Learning Resources 105

Chapter 4 Sensation and Perception 106



Sensation and Perception: Your Tickets of Admission to the World Outside 108

- Absolute Threshold: So, Is It There or Not? 108
- IN PROFILE** Gustav Theodor Fechner 109
- Subliminal Stimulation 109
- Difference Threshold: Is It the Same, or Is It Different? 110
- IN PROFILE** Ernst Heinrich Weber 111
- Signal-Detection Theory: Is Being Bright Enough? 111
- Feature Detectors in the Brain: Firing on Cue 111
- Sensory Adaptation: Where Did It Go? 112

Vision: Letting the Sun Shine In 113

- Light: How Dazzling? 113
- The Eye: The Better to See You With 114
- Color Vision: Creating an Inner World of Color 116
- Theories of Color Vision: How Colorful? 118
- Controversy in Psychology:** WHAT HAPPENS IN THE EYE AND IN THE BRAIN WHEN LIGHTS WITH DIFFERENT WAVELENGTHS STIMULATE THE RETINA? HOW MANY KINDS OF COLOR RECEPTORS ARE THERE? 119
- Color-Blindness 120

Visual Perception: How Perceptive? 120

- Perceptual Organization: Getting It Together 121
- Perception of Motion: Life on the Move 123
- Depth Perception: How Far Is Far? 124
- CONCEPT REVIEW:** Monocular Cues for Depth Perception 126
- Perceptual Constancies: Keeping the World a Stable Place 127
- Visual Illusions: Is Seeing Believing? 128

Hearing: Making Sense of Sound 129

- A CLOSER LOOK—REAL LIFE:** HOW DID THE ANIMALS KNOW THE TSUNAMI WAS COMING? 130
- Pitch and Loudness 130
- The Ear: The Better to Hear You With 131
- Locating Sounds—Up, Down, and Around 132
- A CLOSER LOOK—REAL LIFE:** IPODS ON CAMPUS: THE SOUNDS OF OBLIVION? 133
- Perception of Loudness and Pitch 133
- Deafness: Navigating a World of Silence 133
- Controversy in Psychology:** HOW DO WE EXPLAIN PITCH PERCEPTION? WHAT HAPPENS WHEN THE BASILAR MEMBRANE RUNS OUT OF PLACES TO VIBRATE? WHAT HAPPENS WHEN IT CANNOT VIBRATE FAST ENOUGH? 134

The Chemical Senses: Smell and Taste 135

- Smell: Sampling Molecules in the Air 135
- Taste: Yes, You've Got Taste 135
- A CLOSER LOOK—RESEARCH:** ADVANCES IN SCIENCE? THE CASE OF THE AROMATIC T-SHIRTS 136

The Skin Senses (Yes, It Does) 137

- Touch and Pressure: Making Contact 137
- Temperature: Sometimes Everything Is Relative 138
- Pain 138

Kinesthesia and the Vestibular Sense 140

- Kinesthesia: How Moving? 140
- The Vestibular Sense: How Upright? 141

Extrasensory Perception: Is There Perception Without Sensation? 141

- CONCEPT REVIEW:** The Senses 142
- LIFE CONNECTIONS:** Pain, Pain, Go Away—Don't Come Again Another Day 144

Recite—An Active Summary 146

Key Terms 148

Active Learning Resources 149

Chapter 5 Consciousness 150



The Many Meanings of Consciousness 151

- Consciousness as Awareness 151
- Conscious, Preconscious, Unconscious, and Nonconscious 152
- Consciousness as Personal Unity: The Sense of Self 153
- Consciousness as the Waking State 153

Sleep and Dreams: Other Worlds Within? 153

- Biological and Circadian Rhythms 153
- The Stages of Sleep: How Do We Sleep? 154
- The Functions of Sleep: Why Do We Sleep? 156
- Dreams: What Is the “Stuff” of Dreams? 157

A CLOSER LOOK—DIVERSITY: DREAMS ACROSS CULTURES: FROM FORESTS TO RAIN SHOWERS TO “THE DREAMING” 158

- Sleep Disorders 159

A CLOSER LOOK—REAL LIFE: MYTHS ABOUT GETTING TO SLEEP THAT CAN KEEP YOU UP AT NIGHT 160

Altering Consciousness Through Hypnosis, Meditation, and Biofeedback 163

- Hypnosis: On Being Entranced 163
- IN PROFILE** Franz Anton Mesmer 163
- Controversy in Psychology:** HOW DO PSYCHOLOGISTS EXPLAIN HYPNOSIS? 165
- Meditation: On Letting the World Fade Away 165
- Biofeedback: On Getting in Touch with the Untouchable 166

Altering Consciousness Through Drugs 168

- Substance Abuse and Dependence: Crossing the Line 168

- Causal Factors in Substance Abuse and Dependence 170
- Depressants 170

SELF-ASSESSMENT: DO YOU HAVE A PROBLEM WITH ALCOHOL? 172

Controversy in Psychology: IS A DRINK A DAY GOOD FOR YOU? 173

- Stimulants 174

A CLOSER LOOK—REAL LIFE: DEPENDENCE ON COCAINE? DENIAL AT WORK 176

- Hallucinogenics 178

Controversy in Psychology: IS MARIJUANA HARMFUL? SHOULD IT BE AVAILABLE AS A MEDICINE? 179

CONCEPT REVIEW: Psychoactive Drugs and Their Effects 180

LIFE CONNECTIONS: Getting to Sleep—and Elsewhere—Without Drugs 182

SELF-ASSESSMENT: SLEEP QUIZ: ARE YOU GETTING YOUR Z'S? 182

Recite—An Active Summary 186

Key Terms 187

Active Learning Resources 187

Chapter 6 Learning 188



Learning: Experience and Change 189

Classical Conditioning: Learning What Is Linked to What 190

- IN PROFILE** Ivan Petrovich Pavlov 191
- Stimuli and Responses in Classical Conditioning 191
- Taste Aversion: Are All Stimuli Created Equal? 191
- Extinction and Spontaneous Recovery 193
- Generalization and Discrimination 195
- Higher Order Conditioning 196
- IN PROFILE** “Little Albert” 196
- Preparedness and the Conditioning of Fear 197
- Applications of Classical Conditioning 197

Operant Conditioning: Learning What Does What to What 200

- Edward L. Thorndike and the Law of Effect 200
- IN PROFILE** Burrhus Frederic Skinner 201
- B. F. Skinner and Reinforcement 201
- Methods of Operant Conditioning 202
- Types of Reinforcers 203
- Extinction and Spontaneous Recovery in Operant Conditioning 204

- Reinforcers Versus Rewards and Punishments 205
- Discriminative Stimuli: Do You Step on the Accelerator When the Light Is Green or Red? 206
- Schedules of Reinforcement: How Often? Under What Conditions? 207
- Shaping 208
- Applications of Operant Conditioning 209
- A CLOSER LOOK—REAL LIFE:** ROBO RATS? USING OPERANT CONDITIONING TO TEACH RATS HOW TO SEARCH FOR SURVIVORS OF DISASTERS 210

Cognitive Factors in Learning 211

- Latent Learning: Forming Cognitive Maps 211
- A CLOSER LOOK—RESEARCH:** CONTINGENCY THEORY 212
- Observational Learning: Monkey See, Monkey May Choose to Do? 212
- CONCEPT REVIEW:** Kinds of Learning 213
- LIFE CONNECTIONS:** Violence in the Media and Aggression 216

Recite—An Active Summary 219

Key Terms 220

Active Learning Resources 221

Chapter 7 Memory: Remembrance of Things Past—and Future 222



SELF-ASSESSMENT: FIVE CHALLENGES TO YOUR MEMORY 224

Kinds of Memory: Pressing the “Rewind” and “Fast-Forward” Buttons 224

- Explicit Memory: When Memory Is Out in the Open 225
- Implicit Memory: When Remembering Is Doing 225
- Retrospective Memory Versus Prospective Memory 226

A CLOSER LOOK—RESEARCH: WILL YOU REMEMBER YOUR PSYCHOLOGY GRADE IN 2061? 227

CONCEPT REVIEW: The Relationships among the Various Kinds of Memories 229

Processes of Memory: Processing Information in Our Most Personal Computers 229

- Encoding: The Memory’s “Transformer” 230
- Storage: The Memory’s “Save” Function 230
- Retrieval: The Memory’s “Find” Function 230

Stages of Memory: Making Sense of the Short and the Long of It 231

- Sensory Memory: Flashes on the Mental Monitor 232
- Short-Term Memory: Keeping Things “in Mind” 234

- Long-Term Memory: Your Memory’s “Hard Drive” 237

Controversy in Psychology: CAN WE TRUST EYEWITNESS TESTIMONY? 240

IN PROFILE Elizabeth Loftus 241

Forgetting: Will You Remember How We Forget? 246

IN PROFILE Hermann Ebbinghaus 247

- Memory Tasks Used in Measuring Forgetting 247
- Interference Theory 249

- Repression: Ejecting the Unwanted from Consciousness 249

Controversy in Psychology: DO PEOPLE REALLY RECOVER REPRESSED MEMORIES OF CHILDHOOD SEXUAL ABUSE, OR ARE THESE “MEMORIES” IMPLANTED BY INTERVIEWERS? 250

- Infantile Amnesia: Why Can’t Johnny Remember? 251
- Anterograde and Retrograde Amnesia 251

The Biology of Memory: The Brain as a Living Time Machine 253

- Neural Activity and Memory: “Better Living Through Chemistry” 253
- Brain Structures and Memory 254

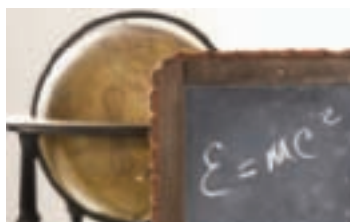
LIFE CONNECTIONS: Using the Psychology of Memory to Enhance Your Memory 256

Recite—An Active Summary 259

Key Terms 261

Active Learning Resources 261

Chapter 8 Thinking, Language, and Intelligence 262



Thinking 263

- Concepts: The Building Blocks of Thinking 264
- Problem Solving: Getting from Here to There 265

SELF-ASSESSMENT: PUZZLES, PROBLEMS, AND JUST PLAIN FUN 267

- Judgment and Decision Making 271

Language 275

- Going Ape Over Language? 275
- What Is Language? 276
- Language and Cognition: Do We Need Words to Think? 277
- Language and Culture 277
- Language Development: The 2-Year Explosion 278

A CLOSER LOOK—RESEARCH: “MOTHERESE”—OF “YUMMY-YUMMY” AND “KITTY CATS” 279

- Nature and Nurture in Language Development: Why Houseplants Don’t Talk 280

IN PROFILE Noam Chomsky 281

Intelligence 282

- Theories of Intelligence 282

A CLOSER LOOK—RESEARCH: EMOTIONAL AND SOCIAL INTELLIGENCE 285

- Creativity and Intelligence 286

CONCEPT REVIEW: Theories of Intelligence 286

SELF-ASSESSMENT: THE REMOTE ASSOCIATES TEST 287

- The Measurement of Intelligence 288 **xiii**

IN PROFILE Alfred Binet 288

- Differences in Intellectual Functioning 292

IN PROFILE Claude Steele 292

- Nature and Nurture in Intelligence: Where Does Intelligence Come From? 296

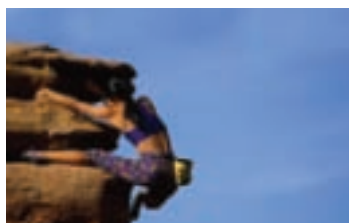
LIFE CONNECTIONS: Enhancing Intellectual Functioning 300

Recite—An Active Summary 302

Key Terms 303

Active Learning Resources 303

Chapter 9 Motivation and Emotion 304



The Psychology of Motivation: The Whys of Why 306

Theories of Motivation: Which Why Is Which? 307

- The Evolutionary Perspective: The Fish, the Spiders, and the Bees 307
- Drive-Reductionism and Homeostasis: “Steady, Steady . . .” 307
- The Search for Stimulation: Is Downtime a Downer? 308
- Humanistic Theory: “I’ve Got to Be Me”? 308

SELF-ASSESSMENT: THE SENSATION-SEEKING SCALE 309

Hunger: Do You Go by “Tummy-Time”? 311

- Biological Influences on Hunger 311
- Psychological Influences on Hunger 311
- Eating Disorders: Is It True That “You Can Never Be Too Rich or Too Thin”? 311

A CLOSER LOOK—REAL LIFE: ANOREXIA NERVOSA—IN RACHEL’S OWN WORDS 313

SELF-ASSESSMENT: EATING DISORDERS QUIZ 317

Aggression: Of Australopithecines, Humans, Robins, and Testosterone 318

- Biology, Chemistry, and Aggression 319
- Psychological Aspects of Aggression 319

A CLOSER LOOK—DIVERSITY: CROSS-CULTURAL ASPECTS OF AGGRESSION 320

Controversy in Psychology: THE CATHARSIS CONTROVERSY 321

- Situational Factors and Aggression 322

Achievement Motivation: “Just Do It”? 323

- What Flavor Is Your Achievement Motivation? 323

Emotion: Adding Color to Life 324

- The Expression of Emotions: The Smile Seen Round the World? 325
- “Is Evvvvrybody Happy?” An Excursion into Positive Psychology 326
- The Facial-Feedback Hypothesis: Does Smiling Make You Happy? 328
- Theories of Emotion: “How Do You Feel?” 329

Controversy in Psychology: JUST WHAT DO LIE DETECTORS DETECT? 332

LIFE CONNECTIONS: Obesity: A Serious and Pervasive Problem 334

Recite—An Active Summary 338

Key Terms 339

Active Learning Resources 339

Chapter 10 The Voyage Through the Life Span: Childhood 340



How Psychologists Study Human Development 342

- Longitudinal Studies 342
- Cross-Sectional Studies 342

Prenatal Development: The Beginning of Our Life Story 344

- Environmental Influences on Prenatal Development 345

CONCEPT REVIEW: Risks of Various Agents to the Embryo and Fetus 350

A CLOSER LOOK—REAL LIFE: POSTPARTUM DEPRESSION 354

In the New World 354

- Reflexes: Entering the World Prewired 355

A CLOSER LOOK—DIVERSITY: ALLEVIATING PROTEIN-ENERGY MALNUTRITION (PEM) 355

- Sensory Capabilities 356
- Sleeping and Waking 357
- A CLOSER LOOK—RESEARCH: SUDDEN INFANT DEATH SYNDROME (SIDS) 358**
- Crying 358

Physical Development: The Drama Continues 360

- Brain Development 360
- Motor Development 361
- Controversy in Psychology: IS DEVELOPMENT CONTINUOUS OR DISCONTINUOUS? 362**
- Perceptual Development: On Not Going off the Deep End 362

Cognitive Development: On the Edge of Reason? 363

- Jean Piaget's Cognitive–Developmental Theory 363
- CONCEPT REVIEW: Piaget's Stages of Cognitive Development 364**

- IN PROFILE Jean Piaget 365**
- Lev Vygotsky's Sociocultural Theory 369
- Lawrence Kohlberg's Theory of Moral Development 370
- IN PROFILE Lawrence Kohlberg 370**

Social and Emotional Development 372

- Erik Erikson's Stages of Psychosocial Development 372
- Attachment: Ties That Bind 373
- Parenting Styles: Strictly Speaking? 375
- Child Abuse: Broken Bonds 377
- LIFE CONNECTIONS: Day Care: Blessing, Headache, or Both? 378**

Recite—An Active Summary 380

Key Terms 381

Active Learning Resources 381

Chapter 11 The Voyage Through the Life Span: Adolescence and Adulthood 382



Adolescence 384

- Physical Development: Fanning the Flames 384
- Cognitive Development: The Age of Reason? 387
- Controversy in Psychology: ARE THERE GENDER DIFFERENCES IN MORAL DEVELOPMENT? 390**
- Social and Emotional Development: Storm and Stress, Smooth Sailing, or Both? 390
- A CLOSER LOOK—REAL LIFE: SOCIAL NETWORKING ONLINE 393**
- CONCEPT REVIEW: James Marcia's Four Identity Statuses 394**
- A CLOSER LOOK—DIVERSITY: ETHNICITY AND THE DEVELOPMENT OF IDENTITY 395**

Emerging Adulthood 397

Early Adulthood 399

- Physical Development 399
- Cognitive Development 400
- Social and Emotional Development 401

Middle Adulthood 402

- Physical Development 402

- Cognitive Development 402
- Social and Emotional Development 403
- Controversy in Psychology: DO PARENTS EXPERIENCE AN "EMPTY-NEST SYNDROME" WHEN THE YOUNGEST CHILD LEAVES HOME? 404**

Late Adulthood 407

- Physical Development 408
- A CLOSER LOOK—DIVERSITY: AGING, GENDER, AND ETHNICITY 410**
- Cognitive Development 411
- SELF-ASSESSMENT: HOW LONG WILL YOU LIVE? THE LIFE-EXPECTANCY SCALE 412**
- Social and Emotional Development 413

On Death and Dying 415

- Grief and Bereavement 416
- "Lying Down to Pleasant Dreams ..." 416
- LIFE CONNECTIONS: Lifestyles of the Rich and Famous—and the Rest of Us 418**

Recite—An Active Summary 420

Key Terms 421

Active Learning Resources 421

Chapter 12 Personality: Theory and Measurement 422



IN PROFILE Sigmund Freud 424

The Psychodynamic Perspective: Excavating the Iceberg 424

- Sigmund Freud's Theory of Psychosexual Development 424

A CLOSER LOOK—REAL LIFE: WHO'S REALLY "NUMBER ONE"? ON "BASKING IN REFLECTED GLORY" 427

- Neo-Freudians 428

IN PROFILE Erik Erikson 430

- Evaluation of the Psychodynamic Perspective 430

The Trait Perspective: The Five-Dimensional Universe 431

- From Hippocrates to the Present 432
- Hans Eysenck's Trait Theory: A Two-Dimensional View 432
- The "Big Five": The Five-Factor Model 432
- Biology and Traits 434

A CLOSER LOOK—RESEARCH: VIRTUOUS TRAITS—POSITIVE PSYCHOLOGY AND TRAIT THEORY 434

- Evaluation of the Trait Perspective 436

Learning-Theory Perspectives: All the Things You Do 436

- Behaviorism: On Being Easy in One's Harness? 436
- Social-Cognitive Theory: Is Determinism a Two-Way Street? 437

SELF-ASSESSMENT: WILL YOU BE A HIT OR A MISS? THE EXPECTANCY FOR SUCCESS SCALE 439

- Evaluation of the Learning Perspective 440

The Humanistic–Existential Perspective: How Becoming? 441

- Abraham Maslow and the Challenge of Self-Actualization 441
- Carl Rogers's Self Theory 441

SELF-ASSESSMENT: DO YOU STRIVE TO BE ALL THAT YOU CAN BE? 442

- Evaluation of the Humanistic–Existential Perspective 443

A CLOSER LOOK—REAL LIFE: ENHANCING SELF-ESTEEM 444

The Sociocultural Perspective: Personality in Context 445

- Individualism versus Collectivism: Who Am I (in This Cultural Setting)? 446
- Acculturation, Adjustment, and Self-Esteem: Just How Much Acculturation Is Enough? 447
- Evaluation of the Sociocultural Perspective 447

Measurement of Personality 447

CONCEPT REVIEW: Perspectives on Personality 448

- Objective Tests 448
- Projective Tests 451

LIFE CONNECTIONS: Using Psychological Tests to Find a Career That Fits 452

Recite—An Active Summary 454

Key Terms 455

Active Learning Resources 455

Chapter 13 Gender and Sexuality 456



Gender Stereotypes: What Does It Mean to Be Female or to Be Male? 459

IN PROFILE Sandra Lipsitz Bem 459

Gender Differences 460

- Gender Differences in Cognitive Skills 460
- Gender Differences in Personality 462
- Gender Differences in Social Behavior 463
- Gender Differences in Mate Selection 463

Gender-Typing: On Becoming a Woman or a Man 464

- Nature and Gender-Typing 464
- Nurture and Gender-Typing 466

CONCEPT REVIEW: Nature, Nurture, and Gender-Typing 468

Sexual Motivation and Sexual Orientation: Pressing the START Button and Finding Direction 470

- Hormones and Sexual Motivation: Adding Fuel to the Fire 470

Controversy in Psychology: IS THE HUMAN SEX DRIVE AFFECTED BY PHEROMONES? 471

- Sexual Orientation: Which Way Is Love? 471

IN PROFILE Charlotte J. Patterson 472

A CLOSER LOOK—DIVERSITY: ETHNICITY AND SEXUAL ORIENTATION 474

Interpersonal Attraction: On Liking and Loving 476

- Physical Appearance: How Important Is Looking Good? 476
- The Attraction-Similarity Hypothesis: Do “Opposites Attract” or Do “Birds of a Feather Flock Together”? 477

A CLOSER LOOK—RESEARCH: WHEN IT COMES TO SEX, RED MAY MEAN “GO” 478

- Other Factors in Attraction: Reciprocity and the Nearness of You? 479
- Love: The Emotion That Launched a Thousand Ships? 479

SELF-ASSESSMENT: STERNBERG’S TRIANGULAR LOVE SCALE 481

The Four S’s: Sexual Response, Sexual Behavior, Sexual Dysfunctions, and Sex Therapy 482

- The Sexual Response Cycle 482
- Some Surveys of Sexual Behavior: Peering into Private Lives 484
- Sexual Dysfunctions 486
- Sex Therapy 487

Sexual Coercion: Confounding Sex and Aggression 488

Controversy in Psychology: WHY DO MEN RAPE WOMEN? 489

SELF-ASSESSMENT: CULTURAL MYTHS THAT CREATE A CLIMATE THAT SUPPORTS RAPE 490

LIFE CONNECTIONS: Preventing HIV/AIDS and Other Sexually Transmitted Infections 492

Recite—An Active Summary 495

Key Terms 497

Active Learning Resources 497

Chapter 14 Stress, Health, and Coping 498



Stress: What It Is, Where It Comes From 500

- Daily Hassles: The Stress of Everyday Life 501
- Life Changes: Variety May Be the Spice of Life, but Does Too Much Spice Leave a Bad Taste? 502
- Hassles, Life Changes, and Health Problems 502
- Conflict: Darned if You Do, Darned if You Don’t 503

Controversy in Psychology: JUST HOW ARE DAILY HASSLES AND LIFE CHANGES CONNECTED WITH HEALTH PROBLEMS? 504

A CLOSER LOOK—RESEARCH: STRESS IN AMERICA 506

- Irrational Beliefs: Ten Doorways to Distress 506
- The Type A Behavior Pattern: Burning Out from Within? 508

SELF-ASSESSMENT: ARE YOU TYPE A OR TYPE B? 509

Psychological Moderators of Stress 510

- Self-Efficacy Expectations: “The Little Engine That Could” 510
- Psychological Hardiness: Tough Enough? 510
- Sense of Humor: “A Merry Heart Doeth Good Like a Medicine” 511

- Predictability and Control: “If I Can Stop the Roller Coaster, I Don’t Want to Get Off” 511

SELF-ASSESSMENT: THE LOCUS OF CONTROL SCALE 512

- Social Support: On Being in It Together 513

Stress and the Body: The War Within 514

- The General Adaptation Syndrome 514
- **Controversy in Psychology:** “FIGHT OR FLIGHT” OR “TEND AND BEFRIEND”? DO MEN AND WOMEN RESPOND DIFFERENTLY TO STRESS? 516
- Effects of Stress on the Immune System 517

Psychology and Health 518

CONCEPT REVIEW: Biopsychosocial Factors in Heart Disease and Cancer 519

- Headaches: When Stress Presses and Pounds 520
- Coronary Heart Disease: Taking Stress to Heart 521
- Cancer: Swerving Off Course 523

LIFE CONNECTIONS: Preventing and Coping with Stress: Headaches, Heart Disease, and Cancer 526

Recite—An Active Summary 530

Key Terms 531

Active Learning Resources 531

Chapter 15 Psychological Disorders 532



What Are Psychological Disorders? 533

- Perspectives on Psychological Disorders 535
- Classifying Psychological Disorders 537
- Prevalence of Psychological Disorders 537

Anxiety Disorders: Real-Life “Fear Factors”? 538

- Types of Anxiety Disorders 539
- Origins of Anxiety Disorders 543

IN PROFILE Little Hans 543

Dissociative Disorders: Splitting Consciousness 545

- Types of Dissociative Disorders 545
- Origins of Dissociative Disorders 546

Somatoform Disorders: When the Body Expresses Stress 547

- Types of Somatoform Disorders 548
 - Origins of Somatoform Disorders 548
- Controversy in Psychology:** ARE SOMATOFORM DISORDERS THE SPECIAL PROVINCE OF WOMEN? 549

Mood Disorders: Up, Down, and Around 549

- Types of Mood Disorders 459
- SELF-ASSESSMENT:** ARE YOU DEPRESSED? 550
- Origins of Mood Disorders 551

Schizophrenia: When Thinking Runs Astray 553

- Symptoms of Schizophrenia 554
- A CLOSER LOOK—REAL LIFE:** WHEN THE “FATTY ACID” PLACES SODA OFF LIMITS 555
- Types of Schizophrenia 555
 - Origins of Schizophrenia 556

Personality Disorders: Making Oneself or Others Miserable 560

- Types of Personality Disorders 560
- Controversy in Psychology:** SHOULD WE BAN THE INSANITY PLEA? 560
- Origins of Personality Disorders 562
- CONCEPT REVIEW:** Psychological Disorders 564
- LIFE CONNECTIONS:** Preventing Suicide 566

Recite—An Active Summary 568

Key Terms 569

Active Learning Resources 569

Chapter 16 Methods of Therapy 570



What Is Psychotherapy? 573

- The History of Therapies 573

Psychodynamic Therapies: Digging Deep Within 575

- Traditional Psychoanalysis: “Where Id Was, There Shall Ego Be” 575
- Modern Psychodynamic Approaches 578

Humanistic Therapies: Strengthening the Self 579

- Client-Centered Therapy: Removing Roadblocks to Self-Actualization 579
- IN PROFILE** Carl Rogers 579
- Gestalt Therapy: Getting It Together 580

Behavior Therapy: Adjustment Is What You Do 582

- Fear-Reduction Methods 582
- Aversive Conditioning 584
- Operant-Conditioning Procedures 584
- Self-Control Methods 586

Cognitive Therapies: Adjustment Is What You Think (and Do) 587

- Aaron Beck’s Cognitive Therapy: Correcting Cognitive Errors 587

A CLOSER LOOK—REAL LIFE: PSYCHOTHERAPY ONLINE: ON THE ELECTRONIC NEARNESS OF YOU 588

IN PROFILE Aaron Beck and Albert Ellis 589

- Albert Ellis’s Rational-Emotive Behavior Therapy: Overcoming “Musts” and “Shoulds” 589
- Cognitive-Behavior Therapy 590

Group Therapies: On Being in It Together 591

- Couple Therapy 592
- Family Therapy 592
- Self-Help and Support Groups 593

Does Psychotherapy Work? 594

- Problems in Conducting Research on Psychotherapy 594
- Analyses of the Effectiveness of Psychotherapy 595

- Evidence-Based Practices 596
- Ethnicity and Psychotherapy 597

Biological Therapies 598

- Drug Therapy: In Search of the Magic Pill? 598
- Electroconvulsive Therapy 600

Controversy in Psychology: SHOULD HEALTH PROFESSIONALS USE ELECTROCONVULSIVE THERAPY? 600

- Psychosurgery 601
- Does Biological Therapy Work? 601

A CLOSER LOOK—RESEARCH: EYE-MOVEMENT DESENSITIZATION AND REPROCESSING 601

A CLOSER LOOK—RESEARCH: CONTEMPORARY PSYCHOSURGERY FOR TREATMENT-RESISTANT OBSESSIVE–COMPULSIVE DISORDER AND DEPRESSION 602

CONCEPT REVIEW: Methods of Therapy 604

LIFE CONNECTIONS: Alleviating Depression: Getting Out of the Dumps 605

SELF-ASSESSMENT: DO YOU SPEAK YOUR MIND OR DO YOU WIMP OUT? THE ASSERTIVENESS SCHEDULE 609

Recite—An Active Summary 610

Key Terms 612

Active Learning Resources 612

Chapter 17 Social Psychology 614



Attitudes: “The Good, the Bad, and the Ugly” 616

- The A–B Problem: Do We Act in Accord with Our Beliefs? 617
- Origins of Attitudes 618
- Changing Attitudes Through Persuasion: How Persuasive? 619

A CLOSER LOOK—RESEARCH: THE FOOT-IN-THE-DOOR TECHNIQUE 622

- Changing Attitudes and Behavior by Means of Cognitive Dissonance: “I Think, Therefore I Am ... Consistent”? 622

Prejudice: A Particularly Troublesome Attitude 623

- Discrimination 624
- Sources of Prejudice 625

Social Perception: Looking Out, Looking Within 626

- Primacy and Recency Effects: The Importance of First Impressions 626
- Attribution Theory: You’re Free to Choose, but I’m Caught in the Middle? 627

A CLOSER LOOK—REAL LIFE: WHO ARE THE SUICIDE TERRORISTS? A CASE OF THE FUNDAMENTAL ATTRIBUTION ERROR? 628

- Body Language: The Body Speaks 630

Social Influence: Are You an Individual or One of the Crowd? 632

- Obedience to Authority: Does Might Make Right? 632

A CLOSER LOOK—RESEARCH: ON THE MILGRAM EXPERIMENTS: IN THEIR OWN WORDS 635

- Conformity: Do Many Make Right? 637

Group Behavior: Is a Camel a Horse Made by a Committee? 639

- Social Facilitation: Monkey See, Monkey Do Faster? 640
- Group Decision Making 640
- Polarization and the “Risky Shift” 641
- Groupthink: When Smart People Think as One, Bad Decisions May Follow 642
- Mob Behavior and Deindividuation: The “Beast with Many Heads” 643
- Altruism and the Bystander Effect: Some Watch While Others Die 644

LIFE CONNECTIONS: Combating Prejudice 648

Recite—An Active Summary 649

Key Terms 651

Active Learning Resources 651

Appendix Answer Keys to Self-Assessments and Active Reviews A-I

Answer Keys to Self-Assessments A-I
Answer Keys to Active Reviews A-4

References R-I

Glossary G-I

Author Index I-I

Subject Index I-II

Credits C-I

Features

IN PROFILE

- Aristotle 9
- Wilhelm Wundt 10
- William James 11
- John B. Watson 12
- Mary Whiton Calkins 21
- Kenneth B. Clark and Mamie Phipps Clark 22
- Sir Francis Galton 39
- Charles Darwin 64
- Santiago Ramón y Cajal 76
- Paul Broca 92
- Gustav Theodor Fechner 109
- Ernst Heinrich Weber 111
- Franz Anton Mesmer 163
- Ivan Petrovich Pavlov 191
- “Little Albert” 196
- Burrhus Frederic Skinner 201
- Elizabeth Loftus 241
- Hermann Ebbinghaus 247
- Noam Chomsky 281
- Alfred Binet 288
- Claude Steele 292
- Jean Piaget 365
- Lawrence Kohlberg 370
- Sigmund Freud 424
- Erik Erikson 430
- Sandra Lipsitz Bem 459
- Charlotte J. Patterson 472
- Little Hans 543
- Carl Rogers 579
- Aaron Beck and Albert Ellis 589
- iPods on Campus: The Sounds of Oblivion? 133
- Dreams across Cultures: From Forests to Rain Showers to “The Dreaming” 158
- Myths about Getting to Sleep That Can Keep You Up at Night 160
- Dependence on Cocaine? Denial at Work 176
- Robo Rats? Using Operant Conditioning to Teach Rats How to Search for Survivors of Disasters 210
- Contingency Theory 212
- Will You Remember Your Psychology Grade in 2061? 227
- “Motherese”—Of “Yummy-Yummy” and “Kitty Cats” 279
- Emotional and Social Intelligence 285
- Anorexia Nervosa: In Rachel’s Own Words 313
- Cross-Cultural Aspects of Aggression 320
- Postpartum Depression 354
- Alleviating Protein-Energy Malnutrition (PEM) 355
- Sudden Infant Death Syndrome (SIDS) 358
- Social Networking Online 393
- Ethnicity and the Development of Identity 395
- Aging, Gender, and Ethnicity 410
- Who’s Really “Number One”? On “Basking in Reflected Glory” 427
- Virtuous Traits—Positive Psychology and Trait Theory 434
- Enhancing Self-Esteem 444
- Ethnicity and Sexual Orientation 474
- When It Comes to Sex, Red May Mean “Go” 478
- Stress in America 506
- When the “Fatty Acid” Places Soda Off Limits 555
- Psychotherapy Online: On the Electronic Nearness of You 588
- Contemporary Psychosurgery for Treatment-Resistant Obsessive–Compulsive Disorder and Depression 602
- Eye-Movement Desensitization and Reprocessing 601
- The Foot-in-the-Door Technique 622
- Who Are the Suicide Terrorists? A Case of the Fundamental Attribution Error? 628
- On the Milgram Experiment: In Their Own Words 635

A CLOSER LOOK

- Thinking Critically about Psychological Advice on the Internet: Are There Any Quick Fixes? 32
- Are You a Human or a Mouse (or a Chimp or a Carrot)? Some Fascinating Facts about Genes 70
- Mirror, Mirror, in the Brain: Who’s the Fairest Imitator of Them All? 91
- How Did the Animals Know the Tsunami Was Coming? 130

CONCEPT REVIEW

- Historic Schools of Psychology 15
- Research Methods 45
- The Endocrine System 96
- Monocular Cues for Depth Perception 126
- The Senses 142
- Psychoactive Drugs and Their Effects 180
- Kinds of Learning 213
- The Relationships among the Various Kinds of Memories 229
- Theories of Intelligence 286
- Risks of Various Agents to the Embryo and Fetus 350
- Piaget's Stages of Cognitive Development 364
- James Marcia's Four Identity Statuses 394
- Perspectives on Personality 448
- Nature, Nurture, and Gender-Typing 468
- Biopsychosocial Factors in Heart Disease and Cancer 519
- Psychological Disorders 564
- Methods of Therapy 604

SELF-ASSESSMENT

- Dare You Say What You Think? The Social-Desirability Scale 36
- Do You Have a Problem with Alcohol? 172
- Sleep Quiz: Are You Getting Your Z's? 182
- Five Challenges to Your Memory 224
- Puzzles, Problems, and Just Plain Fun 267
- The Remote Associates Test 287
- The Sensation-Seeking Scale 309
- Eating Disorders Quiz 317
- How Long Will You Live? The Life-Expectancy Scale 412
- Will You Be a Hit or a Miss? The Expectancy for Success Scale 439
- Do You Strive to Be All That You Can Be? 442
- Sternberg's Triangular Love Scale 481
- Cultural Myths That Create a Climate That Supports Rape 490
- Are You Type A or Type B? 509

- The Locus of Control Scale 512
- Are You Depressed? 550
- Do You Speak Your Mind or Do You Wimp Out? The Assertiveness Schedule 609

CONTROVERSY IN PSYCHOLOGY

- What Do Psychologists Mean by "Controlling" Behavior and Mental Processes? 5
- What Happens in the Eye and in the Brain When Lights with Different Wavelengths Stimulate the Retina? How Many Kinds of Color Receptors Are There? 119
- How Do We Explain Pitch Perception? What Happens When the Basilar Membrane Runs Out of Places to Vibrate? What Happens When It Cannot Vibrate Fast Enough? 134
- How Do Psychologists Explain Hypnosis? 165
- Is a Drink a Day Good for You? 173
- Is Marijuana Harmful? Should It Be Available as a Medicine? 179
- Can We Trust Eyewitness Testimony? 240
- Do People Really Recover Repressed Memories of Childhood Sexual Abuse, or Are These "Memories" Implanted by Interviewers? 250
- The Catharsis Controversy 321
- Just What Do Lie Detectors Detect? 332
- Is Development Continuous or Discontinuous? 362
- Are There Gender Differences in Moral Development? 390
- Do Parents Experience an "Empty-Nest Syndrome" when the Youngest Child Leaves Home? 404
- Is the Human Sex Drive Affected by Pheromones? 471
- Why Do Men Rape Women? 489
- Just How Are Daily Hassles and Life Changes Connected with Health Problems? 504
- "Fight or Flight" or "Tend and Befriend"? Do Men and Women Respond Differently to Stress? 516
- Are Somatoform Disorders the Special Province of Women? 549
- Should We Ban the Insanity Plea? 560
- Should Health Professionals Use Electroconvulsive Therapy? 600

My favorite psychology professor told the class, “You probably judge how well you did in the course by your grade. I judge how well *I* did in the course in terms of how many additional psychology courses you take.”

Now, it’s my turn. Users of this textbook will judge what they have obtained from it in various ways. I will consider myself to have been successful if it inspires students to take additional courses in psychology.

I had several goals in writing this introductory textbook: They include painting psychology as the rigorous science it is, teaching students how to think critically, and introducing students to the various fields of psychology and the concepts they investigate. But it was also essential to me to inspire students with the subject matter. Thus, I have tried to use a warm, engaging writing style, including humor and personal anecdotes. I also believe it is important to show students how psychology connects with important issues in their own lives. Psychology is not just “out there.” Its many concepts provide information and ideas that all students can apply for their own benefit and that of those whom they care about.

PSYCHOLOGY: CONCEPTS AND CONNECTIONS—MORE THAN JUST A TITLE

All academic disciplines have their own concepts, and psychology is no exception. One of the key tasks of any introductory course is to acquaint students with the basic concepts of the discipline. Students of introductory psychology are probably not surprised that concepts such as *intelligence*, *personality*, *stress*, *mental illness* (which we refer to as *psychological disorders*), and *psychotherapy* are important to the discipline. They may be surprised to learn that psychologists debate whether some familiar concepts, such as *psychoanalysis*, have a place—other than a historical place—in psychology as a science. Students are unlikely to be surprised that the concepts of *personality* and *learning* and *memory* are found in psychology, but they may find that these concepts—as defined and used by psychologists—are not quite what they thought they were. Students may also be somewhat surprised that the very concept they had of the field of psychology—of what psychology *is*—probably makes up less than half of what they will find in this textbook.

All this is very good. Psychology consists of things that are familiar and things that are new. One of the purposes of this course is to set the record straight, to show students what does and what does not belong within the science of psychology.

THINKING CRITICALLY—IN LIFE AND IN THE CLASSROOM

Another goal of this course is to show that psychologists, like other scientists, are both skeptical and open-minded. They thrive on debate. They do not even necessarily agree on the definitions of the topics they discuss. For example, there is no one definition of *psychology* that all psychologists agree on. When we approach the topic of learning, we will similarly see that experts in that field disagree about how to define *learning*. Later, we will see that psychologists disagree as to what *intelligence* is and as to whether there is one kind of general intelligence or there are several “intelligences.” As if this were not enough, we will see that there is also major controversy over the origins of intelligence.

Again, all of this is very good. Scientific debate should not be confused with pointless argument. Honest debate helps psychologists—and students—come ever closer to the truth. Students will of course memorize standard definitions; however, it is more important that they come away from this course with an understanding of the true scientific nature of psychology and of the controversies within psychology.

Critical thinking is the key to understanding these controversies—and also the key to productive citizenship. I believe too many individuals blindly follow the demands of the media and authority figures, and it is my goal to help students hone their critical thinking skills so that they can evaluate the arguments they hear in the media and from authority figures. In fact, I have incorporated numerous Critical Thinking exercises throughout the text to encourage students to think critically about the content of the text and the real-life situations they encounter every day.

Because of the value of critical thinking, the new edition of *Psychology: Concepts and Connections* has a chapter devoted to critical thinking: Chapter 2 is titled “Sorting Truth and Fiction in Psychology: Critical Thinking and Research Methods.” In addition, the Learning Connections sections in every chapter contain a Critical Thinking item. Here is a sampling:

- From Chapter 1, “What Is Psychology?”: Do you believe that the richness and complexity of human behavior can be explained as the summation of so many instances of learning? Explain.
- From Chapter 3, “Biology and Psychology”: Why was Darwin reluctant to publish his theory of evolution? Do you believe that this textbook, and other textbooks, should present the theory of evolution?

- From Chapter 8, “Thinking, Language, and Intelligence”: Critical thinkers pay attention to the definition of terms. Do the talents of dancers, gymnasts, artists, and musicians strike you as kinds of intelligences? Why or why not?
- From Chapter 15, “Psychological Disorders”: When does a psychological problem become a “psychological disorder”? Is the border clearly defined?
- From Chapter 17, “Social Psychology”: Critical thinkers do not overgeneralize. Most people would probably agree that it is good for children to be obedient. But is it always good for children—and for adults—to be obedient? As an individual, how can you determine whether it is good for *you* to be obedient? How do you define the limits?

Come into this course as you will. Leave this course as a skeptic. Believe nothing about psychology until you have had an opportunity to see and evaluate the evidence—for yourself.

MAKING LIFE CONNECTIONS

One of the wonderful things about psychology is how the topics in the field relate to your daily life. These connections are pointed out throughout the text and also in a special section at the end of every chapter.

Given that the second chapter is about psychology as a science—“Sorting Truth and Fiction in Psychology: Critical Thinking and Research Methods”—the Life Connections section focuses on distinguishing between true sciences such as psychology, chemistry, and physics, and false sciences (called *pseudosciences*) such as astrology.

Consider two more examples of Life Connections. Chapter 4 is about “Sensation and Perception”—how people make sense (excuse the pun) of the world in which they dwell. The Life Connections section in that chapter—“Pain, Pain, Go Away—Don’t Come Again Another Day”—is about what we can do to alleviate pain. After reading this section, you may go to the psychology cabinet as well as the medicine cabinet for relief.

Chapter 9 is about the closely related topics of “Motivation and Emotion.” The chapter presents one of our most pressing motives—the hunger drive. The chapter’s Life Connections section discusses obesity, which for many creates a perpetual battle with the hunger drive. It explores reasons why too many people in the United States overeat and offers concrete advice on what to do about it.

MAKING LEARNING CONNECTIONS

My emphasis on making connections is also reflected in the book’s pedagogical package. Psychology is a robust science with a lengthy research tradition; therefore, there is a good deal of subject matter in *Psychology: Concepts and Connections*. The book’s pedagogy is designed to help students

understand the concepts presented so they *take away* more of that knowledge from the book. *Psychology: Concepts and Connections* fully integrates the PQ4R method in every chapter to help students learn and retain the subject matter.

PQ4R—A Complete Pedagogical Package

PQ4R is the acronym for Preview, Question, Read, Reflect, Review, and Recite, a method that is related to the work of educational psychologist Francis P. Robinson. PQ4R is more than the standard built-in study guide. It goes well beyond the few pages of questions and exercises that are found at the ends of the chapters of many textbooks. It is an integral part of every chapter. It begins and ends each chapter, and it accompanies the student page by page.

Student do not passively soak up the subject matter as sponges soak up water. The PQ4R method stimulates students to *actively* engage the subject matter. It encourages students to become *proactive* rather than *reactive*.

CHAPTER PREVIEWS

Previewing the material helps shape students’ expectations. It enables them to create mental templates or “advance organizers” into which they categorize the subject matter. Each chapter of *Psychology: Concepts and Connections* previews the subject matter with

- an outline of **Major Topics**,
- a list of **Features**,
- and a **Truth or Fiction?** section.

The *Truth or Fiction?* items stimulate students to delve into the subject matter by challenging folklore and common sense (which is often common nonsense).

Following is a sampling of *Truth or Fiction?* items from various chapters:

- Your genetic code overlaps 25% with that of a carrot.
- Fear can give you indigestion.
- A single brain cell can send out hundreds of messages each second—and manage to catch some rest in between.
- It may be easier for you to recall the name of your first-grade teacher than the name of someone you just met at a party.
- If you study with the stereo on, you would probably do better to take the test with the stereo on.
- Opposites attract.
- A man shot the president of the United States in front of millions of television witnesses, yet was found not guilty by a court of law.
- In the Middle Ages, innocent people were drowned to prove that they were not possessed by the Devil.
- It is abnormal to feel anxious.

QUESTION

Devising questions about the subject matter, before reading it in detail, is another feature of the PQ4R method. Writing questions gives students goals: They attend class or read the text *so they can answer the questions*. Questions are placed in all primary sections of the text to help students use the PQ4R method most effectively. The questions are numbered, and they are repeated, along with their numbers, in the summaries at the end of each chapter. When students see a question, they can read the following material to answer that question. If they wish, they can also write the questions and answers in their notebooks, as recommended by Robinson.

READ

Reading is the first R in the PQ4R method. Although students will have to read for themselves, they are not alone. The text helps them by providing

- **previews** that help them organize the material and stimulate students by challenging common knowledge and folklore;
- presentation of the subject matter in clear, stimulating prose;
- a **running glossary** that defines key terms in the margin of the text, near where the terms appear in the text; and
- development of **concepts** in an orderly fashion so that new concepts build on previously presented concepts.

I have chosen to use a personal writing style. It speaks directly to students and employs humor and personal anecdotes designed to motivate and stimulate them.

REVIEW

The second R in PQ4R stands for *Review*. Regular reviews of the subject matter help students learn. Therefore, Reviews are incorporated into Learning Connections sections that follow all major sections in the text.

Learning Connections contain three types of items that foster active learning, retention, and critical thinking. The *Active Review* is the first type of item. It is called an *Active Review* because it is presented in a fill-in-the-blank format that asks students to *produce*, not simply *recognize*, the answer. The fill-in blanks are numbered and the answers are provided in the Appendix. For example, the *Active Review* on “The Endocrine System” in the chapter on “Biology and Psychology” reads as follows:

Active Review: (31) The _____ secretes hormones that regulate the pituitary gland. (32) The pituitary hormone _____ regulates maternal behavior in lower animals and stimulates production of milk in women. (33) The thyroid hormone _____ affects the metabolism. (34) Epinephrine is secreted by the adrenal _____ and is involved in emotional arousal.

Because reviewing the subject matter is so important and because of the value of visual cues in learning, *Concept Reviews* are also found throughout the text. Concept Reviews are presented in dynamic layouts that readily communicate the

key concepts and the relationships among concepts. Here is a sampling of the Concept Reviews found throughout the text:

- Chapter 1: Historic Schools of Psychology
- Chapter 3: The Endocrine System
- Chapter 7: The Relationships among the Various Kinds of Memories
- Chapter 12: Perspectives on Personality
- Chapter 15: Psychological Disorders

REFLECT

Students learn more effectively when they *Reflect* (the third R in PQ4R) on, or relate to, what they are learning. Psychologists who study learning and memory refer to reflection on subject matter as *elaborative rehearsal*. One way for students to reflect on a subject is to *relate* it to things they already know about, whether that be academic material or events in their own lives. Reflecting on, or relating to, the material makes it meaningful and easier to remember. It also makes it more likely that students will be able to *apply* the information to their own lives. Through effective reflection, students can embed material firmly in their memory so that rote repetition is unnecessary.

Because reflecting on the material is intertwined with relating to it, the second kind of item in each Learning Connections section is termed *Reflect and Relate*. Here is the Reflect and Relate item from Chapter 3’s Learning Connections section on the endocrine system:

Reflect and Relate: Have you heard that adolescents are “hormonal” or affected by “glands”? If so, which glands would they be?

The following *Reflect and Relate* items are found in Chapter 8, “Thinking, Language, and Intelligence”:

Reflect and Relate: Have you ever known someone to claim that a pet could “speak” or “understand” English or another language? Did the pet really speak? Did the pet understand language? What was the nature of the evidence? What is your conclusion?

Reflect and Relate: When did you form an impression of how intelligent you are? Has this impression helped you or hurt you? Explain.

A number of mini-experiments are part of the Reflect and Relate feature and are also found elsewhere throughout the text. Psychologists have found that one important avenue to learning is doing. Mini-experiments offer hands-on opportunities for students to enhance their mastery of the subject matter.

Here is a mini-experiment from the section on persuasion in Chapter 17 on “Social Psychology”:

Keep a log of radio or TV commercials you hear or see for a few days. Which ones grab your attention? Why? Which ones do you believe? Why? Which ones tempted you to consider buying or trying a product? Why?

Mini-experiments and other applied materials are cataloged in the index on the inside back cover of the book.

RECITE

The PQ4R method recommends that students *Recite* the answers to the questions aloud. Reciting answers aloud helps students remember them by means of repetition, by stimulating students to produce concepts and ideas they have learned, and by associating them with spoken words and gestures.

Recite sections are found at the end of each chapter. They help students summarize the material, but they are active summaries. For this reason, the sections are termed **Recite—An Active Summary**. They are written in question-and-answer format. To provide a sense of closure, the active summaries repeat the questions found within the chapters, and they are numbered. The answers are concise but include most of the key terms found in the text.



Students can also access interactive versions of the Learning Connections (including drag-and-drop fill-in Active Reviews) and the PQ4R method of studying on the companion book website. These web resources are indicated in the book by an icon like the one you see here. On the companion website, students will also find quizzing as well as interactive versions of the Concept Reviews and animated versions of key figures called Power Visuals.

FEATURES

Psychology: Concepts and Connections includes a number of features that are intended to motivate students, enhance learning, and foster critical thinking. These include Controversies in Psychology, emphasis on the evolutionary perspective, emphasis on diversity, A Closer Look features, Self-Assessments, and In Profile features.

Controversies in Psychology

The field of psychology does not shy away from controversy, and neither does *Psychology: Concepts and Connections*. Psychologists welcome controversy as a vehicle for enhancing knowledge and stimulating critical thinking. Therefore, Controversy in Psychology features are found throughout the text.

Some of the controversies exist between psychologists from various schools of psychology. For example, a controversy in Chapter 1, “What Is Psychology?” is titled “What Do Psychologists Mean by ‘Controlling’ Behavior and Mental Processes?” The goals of a science are the description, explanation, prediction, and control of the events that it studies. But in Chapter 1, we learn that psychologists are committed to a belief in the dignity of human beings and that human dignity demands that people be free to make their own decisions and choose their own behavior. Psychologists seek to understand the factors that influence behavior and to “control” behavior by applying this knowledge for the public good—for example, to help individuals cope with anxiety and depression, help athletes reach peak performance, assist law enforcement agencies in the prevention of terrorist acts, and help school systems

xxvi

optimize conditions for learning. In Chapter 16, “Methods of Therapy,” we discuss the controversy over the use of electroconvulsive therapy (ECT) with severely depressed patients who do not respond to other forms of treatment. We note that many professionals are distressed by passing an electric current through the head of a patient but that ECT may be a useful “last resort” when nothing else works.

Emphasis on the Evolutionary Perspective

Psychology today recognizes the influence of evolution not only on physical traits but also on behavior and mental processes. *Psychology: Concepts and Connections* addresses the impact of the evolutionary perspective throughout the text, as cataloged, in part, by the Evolutionary Psychology index provided on the inside back cover of this book. The evolutionary perspective receives the full emphasis it deserves in the current edition, while still providing thorough coverage of other traditional and contemporary perspectives. Following are examples of coverage of evolution:

- Chapter 3: Begins with the section “Evolution and Evolutionary Psychology: ‘Survivor’ Is More Than Just a TV Show.”
- Chapter 4: The evolutionary perspective on how pain and the location of taste buds are adaptive and promote survival.
- Chapter 6: Discussion of the evolutionary value of taste aversions and the likelihood that we may be “biologically prepared” to develop fears of certain objects and situations, such as fears of snakes and heights.
- Chapter 9: Discussion of evolution and instinct, stimulus motives, aggression, and universal recognition of facial expressions.
- Chapter 13: Discussion of the possible roles of evolution in gender-typing, gender differences in mate selection, gender differences in pursuit of casual sexual relationships, and sexual aggression.
- Chapter 14: Discussion of gender differences in response to threats—such as the (predominantly male?) tendency for “fight or flight” compared with the (predominantly female?) tendency to “tend and befriend.”
- Chapter 17: Discussion of the evolutionary benefits of altruism and self-sacrifice.

Emphasis on Diversity

Although the profession of psychology focuses mainly on the individual’s behavior and mental processes, we often cannot understand people’s behavior and mental processes without reference to their diversity—their ethnic background, gender, socioeconomic status, age, and other factors. When we consider perspectives other than our own, it’s important that we understand the role of a culture’s beliefs, values, and attitudes in behavior and mental processes. Acknowledging that people from diverse cultures

behave and think in different ways—and studying why they do so—enrich the science of psychology.

You will find reference to human diversity integrated within the main body of the text. For example, a study in Chapter 3, “Biology and Psychology,” discusses the relationships between perception of people of different races and activity in the limbic system of the brain. A section of Chapter 15, “Psychological Disorders,” discusses possible reasons for the greater incidence of depression among women than men. These topics are catalogued in the Diversity index on the inside back cover of this text. Some discussions of human diversity are also found in A Closer Look features, which we describe next.

Closer Looks at Research, Diversity, and Real Life

A Closer Look boxes pursue certain topics in greater depth. These features are grouped according to the themes of research, diversity, and real-life applications. Chapter 3’s “A Closer Look—Research: Are You a Human or a Mouse (or a Chimp or a Carrot)? Some Fascinating Facts about Genes” points out that the human genetic code overlaps a surprising amount with organisms such as chimpanzees (our closest living relatives) and mice. A number of these boxes underscore the indispensability of human diversity within the field of psychology. For example, Chapter 11’s “A Closer Look—Diversity: Aging, Gender, and Ethnicity” discusses why women tend to outlive men and why people from some ethnic groups outlive people from other ethnic groups. Chapter 12’s “A Closer Look—Real Life: Enhancing Self-Esteem” presents ways in which readers can learn to feel better about themselves.

Self-Assessments

Self-Assessments are another way in which the text connects with students. The Self-Assessments stimulate student interest by helping them satisfy their curiosity about themselves and enhance the relevance of the text to their lives. Following is a sampling of the Self-Assessments found in the text.

- Chapter 2: Dare You Say What You Think? The Social-Desirability Scale
- Chapter 5: Sleep Quiz: Are You Getting Your Z’s?
- Chapter 8: The Remote Associates Test (a self-test of creativity)
- Chapter 12: Do You Strive to Be All That You Can Be? (a self-test of whether one is a self-actualizer)
- Chapter 14: The Locus of Control Scale
- Chapter 16: Do You Speak Your Mind or Do You Wimp Out? The Assertiveness Schedule

These boxes are catalogued, along with other applied topics, in the Applications index on the inside back cover of this book. Students can also access interactive versions of these Self-Assessments on their student companion website.

In Profile Features

The In Profiles feature people of importance to the history and practice of psychology as flesh-and-blood human beings. For example, Ivan Pavlov, the Russian biologist who discovered classical conditioning, took one of a pair of his wife’s favorite shoes with him on a trip. She feared the shoe had been lost, only to discover that Ivan had taken it as a remembrance of her. Charles Darwin, the originator of the modern theory of evolution, kept his theory a secret for 20 years because he feared it would bring scorn upon his family. He published it only when he learned that another scientist was about to publish a similar theory of evolution. Mary Whiton Calkins refused the doctoral degree that was offered her by Radcliffe, Harvard’s “sister” college. She had completed her work at Harvard at a time before Harvard formally accepted women students, and she refused to accept a degree that did not fully recognize her accomplishments. Psychiatrist Aaron Beck assisted in surgical operations as a way of overcoming his own fear of blood. And so it goes. Scientists are people, and when we learn about them as people, we see that they are in many ways like us—driven by emotion as well as intellect.

A MAJOR REVISION

Psychology: Concepts and Connections is quite new, a major revision. There are two new chapters, and every revised chapter has undergone major updating. Following is a sampling of what is new in each chapter.

Chapter 1: What Is Psychology?

Chapter 1 has a new chapter-opening vignette, new coverage on forensic psychologists, new coverage on the role of women in psychology, and a new Life Connections feature: “Getting Ready to Work in Psychology.” It has also been thoroughly updated and revised throughout.

New Chapter 2: Sorting Truth and Fiction in Psychology: Critical Thinking and Research Methods

The new chapter covers critical thinking, research methods, statistics, and ethical issues in psychological research and practice. There is also a new A Closer Look—Real Life feature titled “Thinking Critically about Psychological Advice on the Internet: Are There Any Quick Fixes?”

Chapter 3: Biology and Psychology

This chapter (Chapter 2 in the previous edition) has been thoroughly updated and revised and contains expanded coverage of evolutionary psychology. There is a new In Profile feature on Santiago Ramón y Cajal, and there is a new A Closer Look—Research feature titled “Mirror, Mirror, in the Brain: Who’s the Fairest Imitator of Them All?”

Chapter 4: Sensation and Perception

This chapter includes updates throughout, a new chapter-opening vignette, new coverage of subliminal stimulation, and two new A Closer Look features: A Closer Look—Real Life on “iPods on Campus: The Sounds of Oblivion?” and A Closer Look—Research: “Advances in Science? The Case of the Aromatic T-Shirts.”

Chapter 5: Consciousness

This chapter has been thoroughly updated and revised and includes a new chapter-opening vignette, coverage of hypersomnia, and three new features: A Closer Look—Real Life on “Myths about Getting to Sleep That Can Keep You Up at Night,” a Self-Assessment titled “Do You Have a Problem with Alcohol?” and A Closer Look—Real Life: “Dependence on Cocaine? Denial at Work.”

Chapter 6: Learning

This chapter includes a new chapter-opening vignette, new coverage of biological preparedness and the conditioning of fear, and new coverage of mirror neurons and observational learning. It has been updated throughout. There are also two new In Profile features on Ivan Pavlov and “Little Albert.”

Chapter 7: Memory: Remembrance of Things Past—and Future

This chapter has been thoroughly updated and revised and includes a new A Closer Look—Research feature titled “Will You Remember Your Psychology Grade in 2061?”

Chapter 8: Thinking, Language, and Intelligence

This chapter combines Chapters 8 and 9 in the previous edition. It has been updated throughout and includes a new chapter-opening vignette, expanded coverage of the genetic aspects of intellectual functioning, and two new A Closer Look features—Research features on “Emotional Intelligence and Social Intelligence” and “Motherese—Of ‘Yummy Yummy’ and ‘Kitty Cats.’”

Chapter 9: Motivation and Emotion

This chapter (Chapter 10 in the previous edition) has been thoroughly updated throughout and includes a new chapter-opening vignette and a new Self-Assessment, the “Eating Disorders Quiz.”

Chapter 10: The Voyage Through the Life Span: Childhood

This chapter (Chapter 3 in the previous edition) includes a new section on research methods in developmental psychology,

many updates, and three new A Closer Look features: a Real Life feature on “Postpartum Depression,” a Diversity feature on “Alleviating Protein-Energy Malnutrition (PEM),” and a Research feature on “Sudden Infant Death Syndrome (SIDS).”

New Chapter 11: The Voyage Through the Life Span: Adolescence and Adulthood

This new chapter contains expanded coverage of pubertal changes, new coverage of brain development in adolescence, new coverage of identity statuses, expanded coverage of adolescent sexuality, a new A Closer Look—Real Life feature on “Social Networking Online,” expanded coverage of emerging adulthood, expanded coverage of physical development in adulthood, and new coverage of William Perry’s and Gisella Labouvie-Vief’s views on cognitive development in early adulthood. There is new coverage of postformal thinking, new discussion of developments in crystallized intelligence and fluid intelligence in middle adulthood, new discussion of personality themes in college-educated women, new coverage of relationships in middle adulthood, including being in the “sandwich generation,” expanded coverage of theories of aging, new coverage of grief and bereavement, and a new Life Connections section on “Lifestyles of the Rich and Famous—and the Rest of Us.”

Chapter 12: Personality: Theory and Measurement

This chapter (Chapter 11 in the previous edition) includes a new chapter-opening vignette, updating throughout, expanded coverage of the five-factor (“Big Five”) model of personality, new coverage of the reliability and validity of personality tests, and a new Life Connections section on “Using Psychological Tests to Find a Career That Fits.”

Chapter 13: Gender and Sexuality

This chapter (Chapter 12 in the previous edition) has been thoroughly updated throughout and includes new Closer Look features on diversity (“Ethnicity and Sexual Orientation”) and research (“When It Comes to Sex, Red May Mean ‘Go’”), as well as a new In Profile feature on Charlotte J. Patterson.

Chapter 14: Stress, Health, and Coping

This chapter (Chapter 13 in the previous edition) includes a revised chapter-opening vignette that addresses both Hurricane Katrina and the recent earthquake in Haiti. In addition to generally updated coverage, there is new coverage of the ongoing study of “Stress in America” by the American Psychological Association and new coverage of problem-focused coping versus emotion-focused coping.

Chapter 15: Psychological Disorders

Chapter 15 (Chapter 14 in the previous edition) includes coverage of new research throughout, such as updated research

on the biological correlates of various disorders, including genetics, evolution, biochemistry, and physiology. There is a new section on perspective/models of psychological disorders. There is also new discussion of the reliability and validity of psychiatric diagnoses. There are several new case studies, for example, on panic disorder, generalized anxiety disorder, obsessive–compulsive disorder, bipolar disorder, and paranoid schizophrenia. A new In Profile relates the historically fascinating case of “Little Hans.”

Chapter 16: Methods of Therapy

This chapter (Chapter 15 in the previous edition) includes new research throughout on the uses and effectiveness of psychotherapy and of psychotherapy versus biological therapies. There is expanded coverage of cognitive–behavior therapy and new coverage of the behavior-therapy method of flooding, of self-help and support groups, and of evidence-based practices. The chapter has new features, including A Closer Look—Real Life on “Psychotherapy Online: On the Electronic Nearness of You” and A Closer Look—Research on “Contemporary Psychosurgery for Treatment-Resistant Obsessive–Compulsive Disorder and Depression.”

Chapter 17: Social Psychology

Chapter 17 (Chapter 16 in the previous edition) has updating throughout, as in reporting the results of recent research on obedience to authority. The chapter-opening vignette is also updated. The discussion of attitudes is expanded to include attitude changes following September 11, 2001. Coverage of attitude change through central and peripheral routes of persuasion and through cognitive dissonance is expanded. There is a new major section on prejudice, including the effect of names on prejudice and automatic prejudice. There is a new Closer Look feature on the Milgram experiments, in which participating psychologists report their experiences in their own words. The section on groupthink is completely revised, focusing on the group decision to invade Iraq and similar decisions.

ANCILLARIES

Psychology: Concepts and Connections is accompanied by a wide array of supplements prepared for both the instructor and the student. Many are available free to professors or students. Others can be packaged with this text at a discount. For more information on any of the listed resources, please call the Cengage Learning™ Academic Resource Center at 800-423-0563.

For the Instructor

INSTRUCTOR'S RESOURCE MANUAL

Written by Kelly Bouas Henry of Missouri Western State University, this manual contains chapter-specific lecture outlines

and annotated lists of suggested readings, films, and websites. The manual has suggested student activities and projects for each chapter. These activities include ideas for in class and out of class, for large lecture classes and small discussion sections. In addition, the *Instructor's Resource Manual* includes general teaching strategies, references, and other helpful materials, such as handout masters.

TEST BANK

Written by Debra Schwiesow of Creighton University, the Test Bank consists of 2,000 multiple-choice questions, over 300 fill-in questions, over 150 true–false questions, and essay questions for each chapter, all with page references. Each multiple-choice item is labeled with question type (factual, application, or conceptual) and level of difficulty. The Test Bank also includes a midterm exam and a final exam.

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For the Student

STUDY GUIDE

Written by Lisa Valentino of Seminole County Community College, the *Study Guide* is designed to promote active learning through a guided review of the important principles and concepts in the text. The *Study Guide* is closely aligned with the PQ4R learning model found in the text. The materials for each chapter include a chapter summary and a comprehensive multiple-choice self-test, as well as critical thinking and Internet exercises that challenge students to think about and to apply what they have learned.

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Supplementary Books

There are several other supplementary books that offer help to students.

CHALLENGING YOUR PRECONCEPTIONS: THINKING CRITICALLY ABOUT PSYCHOLOGY, SECOND EDITION

This paperbound book (ISBN: 0-534-26739-4), written by Randolph Smith, helps students strengthen their critical thinking skills. Psychological issues such as hypnosis and repressed memory, statistical seduction, the validity of pop psychology, and other topics are used to illustrate the principles of critical thinking.

WRITING PAPERS IN PSYCHOLOGY: A STUDENT GUIDE

The seventh edition of *Writing Papers in Psychology* (ISBN: 0-534-53331-0), by Ralph L. Rosnow and Mimi Rosnow,

is a valuable “how-to” manual for writing term papers and research reports. This new edition has been updated to reflect the latest APA guidelines. The book covers each task with examples, hints, and two complete writing samples. Citation ethics, how to locate information, and new research technologies are also covered.

COLLEGE SURVIVAL GUIDE: HINTS AND REFERENCES TO AID COLLEGE STUDENTS

This fourth edition of Bruce Rowe's *College Survival Guide* (ISBN: 0-534-35569-2) is designed to help students succeed. Rowe provides valuable tips on how to finance an education, how to manage time, how to study for and take exams, and more. Other sections focus on maintaining concentration, credit by examination, use of the credit/no credit option, cooperative education programs, and the importance of a liberal arts education.

CROSS-CULTURAL PERSPECTIVES IN PSYCHOLOGY

How well do the concepts of psychology apply to various cultures? What can we learn about human behavior from cultures different from our own? These questions lie behind a collection of original articles written by William F. Price and Rich Crapo. The fourth edition of *Cross-Cultural Perspectives in Psychology* (ISBN: 0-534-54653-6) contains articles on North American ethnic groups as well as cultures from around the world.

CULTURE AND PSYCHOLOGY: PEOPLE AROUND THE WORLD, SECOND EDITION

David Matsumoto's unique book (ISBN: 0-534-35436-X) discusses similarities and differences in research findings in the United States and other cultures. By doing so, it helps students see psychology and their own behavior from a broader, more culturally aware perspective.

PSYCHOLOGY RESOURCES ON THE WORLD WIDE WEB

This handy guide is designed to serve as a directory for students who may be conducting research via the Internet. The author, Edward P. Kardas, presents an up-to-date, comprehensive book that is organized topically (similar to the organization of a typical introductory psychology text) and includes a chapter on how to perform research on the web (ISBN: 0-534-35941-8).

PSYCHOLOGY: CAREERS FOR THE TWENTY-FIRST CENTURY

This 30-page pamphlet describes the field of psychology, as well as how to prepare for a career in psychology. This is available through an agreement with the American Psychological Association and includes a discussion of career options and resources.

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—*Spence Rathus*

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PSYCHOLOGY

1

What Is Psychology?



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MAJOR TOPICS

Psychology as a Science
What Psychologists Do:
Something for Everyone?
Where Psychology Comes
From: A History
How Today's Psychologists
View Behavior and Mental
Processes
Gender, Ethnicity, and
Psychology: Real People in
the Real World

FEATURES

Controversy in Psychology: What Do Psychologists Mean by "Controlling" Behavior and Mental Processes?
In Profile: Aristotle
In Profile: Wilhelm Wundt
In Profile: William James
In Profile: John B. Watson
Concept Review: Historic Schools of Psychology
In Profile: Mary Whiton Calkins
In Profile: Kenneth B. Clark and Mamie Phipps Clark
Life Connections: Getting Ready to Work in Psychology

TRUTH OR FICTION?

T F Psychologists attempt to control people's behavior and mental processes.

T F Psychologists can prescribe medicine.

T F More than 2,000 years ago, Aristotle wrote a book on psychology with contents similar to the book you are now holding.

T F The ancient Greek philosopher Socrates suggested a research method that is still used in psychology.

T F As psychologist Wilhelm Wundt lay on his deathbed, his main concern was to analyze the experience of dying.

T F Men receive the majority of doctoral degrees in psychology.

T F Even though she had worked to complete all the degree requirements, the first female president of the American Psychological Association turned down the doctoral degree that was offered to her.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

There is a riot of dogs in my home, including Nadine, the Chihuahua queen who rules the roost, and Jackson, the toy poodle who now and then protests that fact. I have trained them well. For example, they bark madly when someone comes to the door, but after I pretty much ineffectively reprimand them for 5 minutes, they quiet down. Then I usually add a biscuit as a reward.

Jackson is subtle. One day, I spotted him and Nadine chewing bones on the living room sofa. Humans sometimes think that the grass is always greener on the other side of the fence, and Jackson always seems to think that the other dog's bone looks tastier. He got up from the sofa and sniffed his way toward Nadine's bone, but having 4 pounds and 5 years of ferocity on him, Nadine growled protectively and Jackson deferred. After a few additional attempted approaches, Jackson apparently tried a stratagem based on another fact of dog life: The bone that is getting away is more attractive than the bone one possesses. That is, Jackson nosed his own bone toward the edge of the sofa. The movement of the other bone shook Nadine out of her bone-chew trance, and she eyed it closely. Now the bone fell off the edge of the world—the sofa—and Nadine, after a chew-pause, got up to investigate. Jackson, who had been observing, snatched Nadine's bone and leapt with it to the nearby chair before she was even aware of the crime.

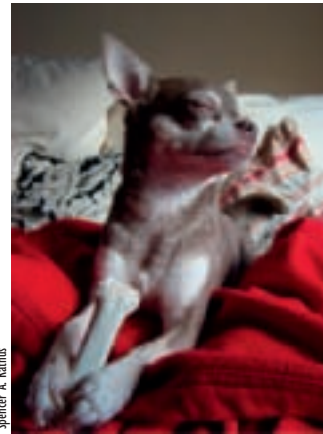
Jackson was long in chew-bliss before Nadine, deciding against the jump to the floor, turned around to return to her bone. Seeing the bone was gone, she looked Jackson's way.

Perhaps I should have let the drama play out, but I'm a psychologist and not a canine EMT. So I conducted a mini-experiment. I restored everything to as it had been. I took Nadine's bone from Jackson with only a minor protest (I outweighed him considerably) and gave it back to her. She very quickly became reabsorbed in its delights. I picked up Jackson's bone from the floor, the one he perceived to be of lesser value, and restored it to him on the sofa. Did Jackson now resign himself to the bone he'd been given?

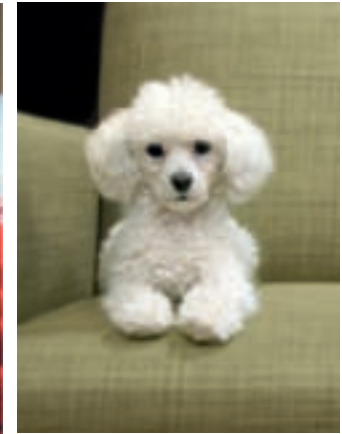
Not by a long drop. Jackson paused for a while and then once again nosed his bone toward the edge of the sofa. Attentive to Jackson's movement, Nadine darted over to his bone before it fell, snatched it, and leapt to another chair, safe with her prize. She stole it right from under his nose. Or did she?

If I were not a psychologist, I might just have enjoyed the family pets, checked the status of my friends on Facebook, and picked up on my ruminations from before the incident—namely, whether I should go out and get a double-shot espresso skim-latte. But being a psychologist, I was faced with countless questions about Jackson and Nadine:

- When I gave them a biscuit after the fracas by the door, was I rewarding them for quieting down or for barking, or for doing both, in sequence? In fact, which was more important—my behavior toward them or the biscuit? And what role do rewards serve? Do they work for both dogs and humans? Are rewards a



Queen Nadine



Jackson

mechanical way of changing behavior? Do they let dogs and people know when we are pleased with their behavior? Or is a biscuit sometimes just a biscuit?

- Was Jackson, who was about 5 pounds and not a year old, with ridiculous ears that tended to flop over inside out, really capable of planning to distract Nadine so that he could retrieve her bone? Was he, like the infant in the high chair who repeatedly drops food onto the floor with a giggle, more interested in observing the effects of pushing the bone onto the floor? Was his capture of Nadine's bone just a coincidence? And after all, how could one know what a dog "thinks," if it thinks at all? Yet thinking, in humans, is a key topic in psychology—how we reflect on the past and the future, how we make plans, and how we regulate our behavior to achieve them.
- Who were these quarreling animals anyhow? They were the same species as wolves, *Canis lupus*, yet they had been selectively bred for physical traits and for temperament, over some 15,000 years, to yield the silly results in my home. What were the origins of their possessive behavior? Of the warning growl? And what of our own history? Where do we humans come from? What of our own "Do not trespass" warnings? What of our willingness to share our last crumb with the less fortunate? We will see that our own history begins in Africa and that we can now trace our probable ancestry back more than 4 million years.
- What about the dogs' leaping ability, their visual–motor coordination, when they saw a bone and went after it? They weren't born leaping or running or with sensorimotor coordination. How did these skills develop? Were they inborn, or did they require practice? How do humans "learn" to sit up or walk or talk? Which developments are shaped by the environment, and which are sort of built in, involving mainly the unfolding of our genetic heritage with nourishment and time?
- What about the animals' smell and taste preferences? Dog food smelled awful to me, yet they apparently liked it well enough—even though they would be happy to get the very occasional table treat. And did they prefer the treat because it smelled or tasted better or simply because it was novel. And what of our own preferences in smell and taste—a hot dog on the griddle, a chunk of chocolate, a sip of wine? (And why do both dogs and humans like some novelty?)

These questions are the province of psychology. **Question 1: What is psychology?**

PSYCHOLOGY AS A SCIENCE

Psychology is the scientific study of behavior and mental processes. Topics of interest to psychologists include the nervous system, sensation and perception, learning and memory, intelligence, language, thought, growth and development, personality, stress and health, psychological disorders, ways of treating those disorders, sexual behavior, and the behavior of people in social settings such as groups and organizations.

Sciences have certain goals. **Question 2: What are the goals of psychology?** Psychology, like other sciences, seeks to describe, explain, predict, and control the events it studies. **Truth or Fiction Revisited:** Psychology thus seeks to describe, explain, predict, and control behavior and mental processes. Does the attempt to control behavior and mental processes sound frightening? Read the nearby Controversy in Psychology to learn more.

Psychology The science that studies behavior and mental processes.

LearningConnections • PSYCHOLOGY AS A SCIENCE

ACTIVE REVIEW (1) Psychology is defined as the study of _____ and mental processes. (2) Psychology seeks to describe, explain, _____, and control behavior. (3) Behavior is explained through psychological _____, which are sets of statements that involve assumptions about behavior.

REFLECT AND RELATE How would you have defined psychology before you began this course?

CRITICAL THINKING What is the difference between the way that scientists view the world and the way that laypeople view the world?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Controversy in Psychology WHAT DO PSYCHOLOGISTS MEAN BY “CONTROLLING” BEHAVIOR AND MENTAL PROCESSES?

The scientific goal of controlling behavior and mental processes doesn't mean that psychologists seek ways to make people do their bidding, like puppets on strings. Psychologists are committed to a belief in the dignity of human beings, and human dignity demands that people be free to make their own decisions and choose their own behavior. The point is that the science of psychology seeks to understand the factors that influence behavior and that psychologists apply this knowledge for the public good—for example, to help individuals cope with problems such as anxiety and depression, help athletes reach peak performance, assist law enforcement agencies in the prevention of terrorist acts, and help school systems optimize

conditions for learning. They use their knowledge only on request and to help people clarify and meet their own goals.

When possible, descriptive terms and concepts are interwoven into **theories**. Theories are formulations of apparent relationships among observed events. They allow us to derive explanations and predictions. Many psychological theories combine statements about behavior (such as eating or aggression), mental processes (such as attitudes and mental images), and biological processes. For instance, many of our responses to drugs such as alcohol and marijuana can be measured as overt behavior, and they are presumed to reflect the actions of these drugs and of our (mental) expectations about their effects.

A satisfactory psychological theory allows us to predict behavior. For instance, a theory of hunger should allow us to predict when people will or will not eat. If our observations cannot be adequately explained by, or predicted from, a given theory, we should consider revising or replacing it.

The remainder of this chapter presents an overview of psychology as a science. You will see that psychologists have diverse interests and fields of specialization. We discuss the history of psychology and the major perspectives from which today's psychologists view behavior. Finally, we consider the research methods psychologists use to study behavior and mental processes.

WHAT PSYCHOLOGISTS DO: SOMETHING FOR EVERYONE?

Psychologists share a keen interest in behavior, but in other ways, they may differ markedly. **Question 3: Just what do psychologists do?** Psychologists engage in research, practice, and teaching. Some researchers engage primarily in basic, or pure, research. **Pure research** is undertaken because the researcher is interested in the research topic. Pure research has no immediate application to personal or social problems and has therefore been characterized as research for its own sake. Others engage in **applied research**, which is designed to find solutions to specific personal or social problems. Although pure research is sparked by curiosity and the desire to know and understand, today's pure research frequently enhances tomorrow's way of life. Pure research on learning and motivation in pigeons, rats, and monkeys done early in the 20th century has found applications in today's school systems. It has shown, for example, that learning often takes time and repetition and profits from “booster shots” (that is, repetition even after the learning goal has been reached). Pure research into the workings of the nervous system has enhanced knowledge of disorders such as epilepsy, Parkinson's disease, and Alzheimer's disease.

Many psychologists do not conduct research. Instead, they *practice* psychology by applying psychological knowledge to help individuals change their behavior so that they can meet their own goals more effectively. However, many practitioners are involved in research into the effectiveness of various methods of therapy. They may also teach students who are learning to engage in clinical practice by discussing students' clinical experiences with them. They may work with **practicum** students individually or in small groups. Still other psychologists engage primarily in teaching. They share psychological knowledge in classrooms, seminars, and workshops. As we have seen, psychologists may also engage in all three: research, practice, and teaching.

Fields of Psychology: From the Clinic to the Colosseum

Psychologists are found in a number of different specialties. Although some psychologists wear more than one hat, most carry out their functions in the following fields.

Theory A formulation of relationships underlying observed events.

Pure research Research conducted without concern for immediate applications.

Applied research Research conducted in an effort to find solutions to particular problems.

Practicum A college or university course, typically in a specialized field of study, that provides students with supervised practical application of previously studied theory.

Clinical psychologists help people with psychological disorders adjust to the demands of life. People's problems may range from anxiety and depression to sexual dysfunctions to loss of goals. Clinical psychologists evaluate these problems through interviews and psychological tests. They help their clients resolve their problems and change self-defeating behavior. Clinical psychologists are the largest subgroup of psychologists, comprising 54.8% of doctoral-level psychologists (American Psychological Association [APA], 2009a). The proportion of clinical psychologists is growing, as shown by the fact that they make up 62% of psychologists with new doctoral degrees (American Psychological Association, 2009a; see Table 1.1 ■). Clinical psychologists differ from psychiatrists in that *psychiatrists* are *medical* doctors who specialize in the study and treatment of psychological disorders. As medical doctors, psychiatrists can prescribe medication and other biological treatments for people with psychological disorders. **Truth or Fiction Revisited:** However, psychologists in some states, such as Louisiana and New Mexico, have been licensed to prescribe medicines used to help people with psychological disorders (American Psychological Association, 2009b).

Psychiatrists have M.D. (doctor of medicine) or D.O. (doctor of osteopathy) degrees. Doctoral-level psychologists typically have Ph.D. (doctor of philosophy) or Psy.D. (doctor of psychology) degrees. The Ph.D. generally requires somewhat more study of research methods and a doctoral dissertation that involves original research. The Psy.D. is generally more applied—requiring somewhat more supervised clinical experience and a dissertation that may be a review of the research literature in a given

Table 1.1 ■ New Doctorates in Psychology (median age = 32)

Demographic Factors	
Women	78.1%
Men	21.7%
Asian American/Pacific Islander	4.8%
African American	5.6%
Latina or Latino American	6.3%
Native American	<1.0%
European American	76.4%
Type of Degree	
Ph.D.	52.9%
Psy.D.	47.1%
Work Setting	
Academia	20.2%
Hospitals	19.6%
Other Human Service	16.0%
Independent Practice	13.7%
Business/Government	13.5%
Schools/Educational	7.8%
Managed Care	7.3%
Other	1.9%
Primary Work Activity	
Health Service	69.5%
Education	13.7%
Research	10.2%
Administration	4.1%
Other	3.5%
Selected Subfields	
Clinical Psychology	62.0%
Counseling Psychology	11.1%
School Psychology	9.5%
Clinical Child Psychology	6.4%
Other	10.7%

Source: Adapted from American Psychological Association (2009a). *Doctoral Psychology Workforce Fast Facts*. Health Service Provider Subfields. Center for Workforce Studies. <http://research.apa.org/fastfacts-09.pdf>. © Copyright 2009 APA Center for Workforce Studies. Washington, DC.

area of practice. The psychologist with the Psy.D. is an expert consumer of research to help clients. The psychologist with the Ph.D. is considered equally capable of generating new research. The Psy.D. has become increasingly popular for psychologists in clinical practice. Table 1.1 shows that recent psychology graduates are about equally likely to have the Ph.D. (52.9%) or the Psy.D. (47.1%). However, more mature psychologists, those with a median age of 55, are much more likely to have the Ph.D. (83.2%).

Counseling psychologists, like clinical psychologists, use interviews and tests to define their clients' problems. For example, clients may have trouble making academic or vocational decisions or making friends in college. They may experience marital or family conflict, have physical disabilities, or have adjustment problems such as those encountered by people who lose their jobs because of mergers, downsizing, or recession. They help clients clarify their goals and draw upon their strengths and resources to take action on their problems. They counsel and do psychotherapy with individuals, couples and families, and organizations such as businesses, hospitals, and schools. Counseling psychologists focus on the ways that behavior is influenced by the traits of the individual—psychological and physical—and by the environment of the individual—for instance, her or his family, social, and cultural background.

School psychologists are employed by school systems to identify and assist students who have problems that interfere with learning. Such problems range from social and family problems to emotional disturbances and learning disorders. They help schools make decisions about the placement of students in special classes.

Educational psychologists, like school psychologists, attempt to facilitate learning. But they usually focus on course planning and instructional methods for a school system rather than on individual children. Educational psychologists research theoretical issues related to learning, measurement, and child development. For example, they study how learning is affected by psychological factors such as motivation and intelligence, sociocultural factors such as poverty and acculturation, and teacher behavior. Some educational psychologists prepare standardized tests such as the SAT and GRE.

Developmental psychologists study the changes—physical, cognitive, social, and personality—that occur throughout the life span. They attempt to sort out the influences of heredity and the environment on development. Developmental psychologists conduct research on issues such as the effects of maternal use of drugs on an embryo, the outcomes of various patterns of child rearing, children's concepts of space and time, conflicts during adolescence, and problems of adjustment among older people.

Personality psychologists focus on goals such as identifying and measuring human traits; determining influences on human thought processes, feelings, and behavior; and explaining psychological disorders. They are particularly concerned with issues such as anxiety, aggression, and gender roles.

Social psychologists are primarily concerned with the nature and causes of individuals' thoughts, feelings, and behavior in social situations. Whereas personality psychologists tend to look within the person for explanations of behavior, social psychologists tend to focus on external or social influences.

Environmental psychologists study the ways that people and the environment—the natural environment and the human-made environment—influence one another. For example, we know that extremes of temperature and loud noises interfere with learning in school. Some generations ago, people seemed to be at the mercy of the environment, but in recent years, we have gained the capacity to do significant harm to the environment. As a result, environmental psychologists study ways to encourage people to recycle and to preserve bastions of wilderness. We have learned that initial resistance to recycling, for example, usually gives way to cooperation as people come to accept it as the norm.



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Developmental Psychology Developmental psychologists study the changes that occur throughout the life span. They attempt to sort out the influences of heredity and the environment. Their concerns range from the effects of day care on infants to the adjustment issues of older people.

Psychologists in all specialties may conduct experiments. However, those called *experimental psychologists* specialize in basic processes such as the nervous system, sensation and perception, learning and memory, thought, motivation, and emotion. For example, experimental psychologists have studied what areas of the brain are involved in processing math problems or listening to music. They have used animals such as pigeons and rats to study processes of learning in the laboratory.

Industrial psychology and organizational psychology are closely related fields. *Industrial psychologists* focus on the relationships between people and work. *Organizational psychologists* study the behavior of people in organizations such as businesses. *Human factors psychologists* make technical systems such as automobile dashboards and computer keyboards more user-friendly. *Consumer psychologists* study the behavior of shoppers in an effort to predict and influence their behavior. They advise store managers how to lay out the aisles of a supermarket in ways that boost impulse buying, how to arrange window displays to attract customers, and how to make newspaper ads and TV commercials more persuasive.

Health psychologists examine the ways in which behavior and mental processes such as attitudes are related to physical health. They study the effects of stress on health problems such as headaches, cardiovascular disease, and cancer. Health psychologists also guide clients toward healthier behavior patterns, such as exercising, quitting smoking, and making better food choices.

Crime is popular—on TV shows and in films, if not in your neighborhood. Many *forensic psychologists* work with criminal justice agencies to apply psychological expertise to activities such as hostage negotiations, police assessment of threats, decision making as to the use of deadly force, and the interrogation of witnesses and offenders (Crighton & Towl, 2010). Since September 11, 2001, forensic psychologists have also turned their attention to the study of terrorism—trying to understand who the terrorists are and how law enforcement agencies can prevent terrorist acts (DeAngelis, 2009; Horgan, 2009). They also engage in personality assessment of law enforcement agents and offenders and study deviant social groups, such as sex offenders and gang members.

Sport psychologists help people improve their performance in sports. They help athletes concentrate on their performance and not on the crowd, use cognitive strategies such as positive visualization (imagining themselves making the right moves) to enhance performance, and avoid choking under pressure (Jackson & Beauchamp, 2010; Wylleman et al., 2009).



© Miramax/Courtesy Everett Collection

Javier Bardem in the Film *No Country for Old Men* Why are people so fascinated by crime, and by psychopaths such as the one played by Bardem? Forensic psychologists and personality psychologists investigate the personalities of criminals and also bring psychological expertise to hostage negotiations, threat assessment, the decision to use deadly force, and the interrogation of offenders and witnesses to crime.

LearningConnections • WHAT PSYCHOLOGISTS DO: SOMETHING FOR EVERYONE?

ACTIVE REVIEW (4) Some psychologists engage in basic, or _____, research, which has no immediate applications. (5) Other psychologists engage in _____ research, which seeks solutions to specific problems. (6) Clinical psychologists help people resolve problems through _____. (7) _____ psychologists work with individuals who have adjustment problems but do not show seriously abnormal behavior. (8) _____ psychologists assist students with problems that interfere with learning. (9) _____ psychologists are more interested in theoretical issues concerning human learning. (10) _____ psychologists study the changes that occur throughout the life span. (11) _____ psychologists study the nature and causes of our thoughts, feelings, and behavior in social situations. (12) _____ psychologists conduct research into basic psychological processes, such as sensation and perception,

learning and memory, and motivation and emotion. (13) _____ psychologists focus on the relationships between people and work.

REFLECT AND RELATE Think of a friend who either has experienced a problem or is experiencing one now. Would you advise him or her to see a psychologist? Why or why not? If so, what kind of psychologist?

CRITICAL THINKING What unites all the various fields of psychology?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

WHERE PSYCHOLOGY COMES FROM: A HISTORY

The ancient Greek philosopher Socrates advised “Know thyself.” Psychology, which is in large part the endeavor to know ourselves, is as old as history and as modern as today. Knowledge of the history of psychology allows us to appreciate its theoretical conflicts, its place among the sciences, the evolution of its methods, and its social and political roles.

Question 4: Who were some of the ancient contributors to psychology?

One of them is the ancient Greek philosopher Aristotle. **Truth or Fiction Revisited:** It is true that more than 2,000 years ago, Aristotle wrote a book on psychology with contents similar to the book you are now holding. In fact, the outline for this textbook could have been written by Aristotle. One of Aristotle’s works, *Peri Psyches*, translates as “About the Psyche.” Like this book, *Peri Psyches* begins with a history of psychological thought and historical perspectives on the nature of the mind and behavior. Aristotle argued that human behavior, like the movements of the stars and the seas, is subject to rules and laws. Then he delved into his subject matter topic by topic: personality, sensation and perception, thought, intelligence, needs and motives, feelings and emotion, and memory. This book presents these topics in a different order, but each topic is here.

Aristotle also declared that people are motivated to seek pleasure and avoid pain. This view remains as current today as it was in ancient Greece.

Other ancient Greek philosophers also contributed to psychology. Around 400 B.C.E., Democritus suggested that we could think of behavior in terms of a body and a mind. (Contemporary psychologists still talk about the interaction of biological and mental processes.) He pointed out that our behavior is influenced by external stimulation. Democritus was one of the first to raise the question of whether there is free will or choice. Putting it another way, where do the influences of others end and our “real selves” begin?

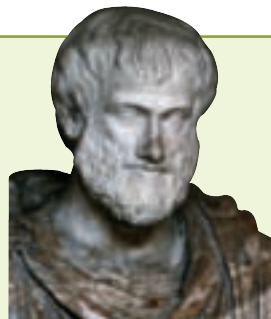
Truth or Fiction Revisited: It is true that Socrates suggested a research method that is still used in psychology. It is based on his advice to “Know thyself,” which has remained a motto of psychology ever since. Socrates claimed that we could not attain reliable self-knowledge through our senses because the senses do not mirror reality exactly. Because the senses provide imperfect knowledge, Socrates suggested that we should rely on processes such as rational thought and **introspection**—careful examination of one’s own thoughts and emotions—to gain self-knowledge. He also pointed out that people are social creatures who influence one another.

Introspection Deliberate looking into one’s own cognitive processes to examine one’s thoughts and feelings and to gain self-knowledge.

In Profile

His father was physician to a king. He himself was trained as a physician and was a student of Plato. He tutored the child who would become Alexander the Great. He founded what has been considered the world’s first university—the Lyceum. The Greek philosopher Aristotle (384–322 B.C.E.) is also the first philosopher to treat extensively topics that would later become part of the science of psychology.

How do we number Aristotle’s contributions to psychology? He was a proponent of empiricism—the view that science could rationally treat only information gathered by the senses. He numbered the so-called five senses of vision, hearing, smell, taste, and touch. He explored the nature of cause and effect. He pointed out that people differ from other living things in their



ARISTOTLE

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capacity for rational thought. He explained how the imagination and dreaming contained images that survived the stimulation that caused them. And he outlined laws of associationism that have lain at the heart of learning theory for more than 2,000 years.

These are but a few of the topics Aristotle touched upon within the province of psychology. How daunting is it, then, to consider that he also made significant contributions to logic, physics, biology (he was the first to note that whales are mammals), politics, ethics, and rhetoric? But in one way, Aristotle would agree with some contemporary students: He did not believe that mathematics was all that important.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Aristotle.

Had we room enough and time, we could trace psychology's roots to thinkers farther back in time than the ancient Greeks, and we could trace its development through the great thinkers of the Renaissance. As it is, we must move on to the development of psychology as a laboratory science during the second half of the 19th century. Some historians set the marker date at 1860. It was then that Gustav Theodor Fechner (1801–1887) published his landmark book *Elements of Psychophysics*, which showed how physical events (such as lights and sounds) are related to psychological sensation and perception. Fechner also showed how we can scientifically measure the effect of these events. Most historians set the debut of modern psychology as a laboratory science in the year 1879, when Wilhelm Wundt established the first psychological laboratory in Leipzig, Germany.

Structuralism: The Elements of Experience

Like Aristotle, the German psychologist Wilhelm Wundt (1832–1920) saw the mind as a natural event that could be studied scientifically, like light, heat, and the flow of blood. Wundt used introspection to try to discover the basic elements of experience. When presented with various sights and sounds, he and his colleagues tried to look inward as objectively as possible to describe their sensations and feelings.

Wundt and his students founded the school of psychology called structuralism.

Question 5: What is structuralism? Structuralism attempted to break conscious experience down into *objective* sensations, such as sight or taste, and *subjective* feelings, such as emotional responses, and mental images like memories or dreams. Structuralists believed that the mind functions by combining objective and subjective elements of experience.

Functionalism: Making Psychology a Habit

Toward the end of the 19th century, William James was a major figure in the development of psychology in the United States. He focused on the relation between conscious experience and behavior. He argued, for example, that the stream of consciousness is fluid and continuous. Introspection convinced him that experience cannot be broken down into objective sensations and subjective feelings as the structuralists maintained.

James was a founder of the school of **functionalism**. **Question 6: What is functionalism?** The school of functionalism focused on behavior in addition to the mind or consciousness. Functionalists looked at how our experience helps us function more

Structuralism The school of psychology that argues the mind consists of three basic elements—sensations, feelings, and images—that combine to form experience.

Functionalism The school of psychology that emphasizes the uses or functions of the mind and behavior rather than just the elements of experience.

In Profile

German psychologist Wilhelm Wundt was born in 1832, in a time when people used candles to light their homes and horses for travel. Several of Wundt's brothers died when he was young, and Wundt left home to live with a village pastor. At first, he did poorly in school—his mind would wander—and he had to repeat a grade. Eventually, he attended medical school because he wanted to earn a good living. He did not like working with patients, however, and dedicated himself to philosophy and psychology. He became such a workaholic that his wife and family received only one paragraph in his autobiography.

Truth or Fiction Revisited: In keeping with his theory of structuralism, Wundt became preoccupied with trying to analyze



WILHELM WUNDT

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the experience of dying during a serious illness. He kept an extensive diary of his conscious experiences, breaking them down into objective sensations such as what he was seeing and smelling and into subjective feelings such as his depressive (although busy!) emotional responses, his will to live, and his memories of childhood and recent events, even his dreams. It is ironic, however, that he recovered and went on to live a long life. As a result, his diary of dying was “reduced” to becoming a diary of an illness. Wundt eventually died in 1920, in a time when

people lit their homes with electricity and traveled by automobile and airplane.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Wilhelm Wundt.

In Profile

William James (1842–1910), brother of novelist Henry James, has been called the first true American psychologist. He came from a wealthy family, and his home was visited regularly by the likes of Ralph Waldo Emerson, Henry David Thoreau, Nathaniel Hawthorne, Alfred, Lord Tennyson, and John Stuart Mill. James received an M.D. degree from Harvard University but never practiced medicine. He made his career teaching at Harvard—first in physiology, then in philosophy, and finally in psychology. He described his views in the first modern psychology textbook, *The Principles of Psychology*, a huge two-volume work that was published in 1890. Two years later, he published a brief edition, which students affectionately called the “Jimmy.” He was often seen strolling across Harvard Yard, talking animatedly with students, in an era when most professors were more formal. James was also fascinated by religious experience and



WILLIAM JAMES

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occult phenomena such as extrasensory perception. He once brought the young Helen Keller an ostrich feather—a gift he believed the blind and deaf girl could appreciate.



© Bettmann/Corbis

Helen Keller Graduating Cum Laude from Radcliffe College in 1905 William James had brought the young Helen Keller an ostrich feather. Why would he do that?



Go to Psychology CourseMate at www.cengagebrain.com to access more information about William James.

adaptively in our environments—for example, how habits help us cope with common situations. (When eating with a spoon, we do not create an individual plan to bring each morsel of food to our mouths.) They also turned to the laboratory for direct observations as a way to supplement introspection. The structuralists tended to ask, “What are the pieces that make up thinking and experience?” In contrast, the functionalists tended to ask, “How do behavior and mental processes help people adapt to the requirements of their lives?”

James was also influenced by Charles Darwin’s (1809–1882) theory of evolution. Earlier in the 19th century, the British naturalist Darwin had argued that organisms with adaptive features—that is, the “fittest”—survive and reproduce. Functionalists adapted Darwin’s theory and proposed that adaptive behavior patterns are learned and maintained. Maladaptive behavior patterns tend to drop out, and only the fittest behavior patterns survive. These adaptive actions tend to be repeated and become habits. James wrote that “habit is the enormous flywheel of society.” Habit keeps the engine of civilization running.

Habits include such deceptively simple acts as how we lift a spoon to our mouth or turn a doorknob. At first, these acts require our full attention. If you are in doubt, stand by with paper towels and watch a baby’s first efforts at eating oatmeal by himself. Through repetition, the movements that make up self-feeding become automatic, or habitual. The multiple acts involved in learning to drive a car also become routine through repetition, so we can focus on other matters such as telling a joke to our passenger, and switching radio channels or DVDs. This idea of learning by repetition is also basic to the behavioral tradition in psychology.

Behaviorism: Practicing Psychology in Public

Imagine you have placed a hungry rat in a maze. It meanders down a pathway that ends in a T. It can then turn left or right. If you consistently reward the rat with food for turning right at this choice point, it will learn to turn right when it arrives there, at least when it is hungry. But what does the rat *think* when it is learning to turn right? “Hmm, last time I was in this situation and turned to the right, I was given some Purina Rat Chow. Think I’ll try that again?”

Does it seem absurd to try to place yourself in the “mind” of a rat? So it seemed to John Broadus Watson (1878–1958), the founder of American behaviorism. We will talk more about behaviorism shortly, but Watson was asked to consider the contents

I wished, by treating Psychology like a natural science, to help her become one.

WILLIAM JAMES

of a rat’s “mind” as one of the requirements for his doctoral degree, which he received from the University of Chicago in 1903. Functionalism was the dominant view of psychology at the University of Chicago, and functionalists were concerned with the stream of consciousness as well as observable behavior. But Watson (1913) believed that if psychology was to be a natural science, like physics or chemistry, it must limit itself to observable, measurable events—that is, to behavior alone—hence the term *behaviorism*.

Question 7: What is behaviorism? **Behaviorism** is the school of psychology that focuses on the learning and effects of observable behavior. “Observable” does not only mean visible to the eye. Yes, observable behavior does include activities such as pressing a lever, turning left or right, eating and mating, and dilation of the pupils of the eyes. But it also includes behaviors that are observable by means of specialized instruments, such as the heart rate, the blood pressure, and the emission of brain waves. All of these behaviors are *public*. They can be measured by simple observation or by laboratory instruments, and different observers would readily agree about their existence and features. Given their focus on behavior, it should come as no surprise that behaviorists define psychology as the scientific study of *behavior*, not of *behavior and mental processes*.

Behaviorism The school of psychology that defines psychology as the study of observable behavior and studies relationships between stimuli and responses.

In Profile

He was the son of a southern farmer and tended to get into fights in his youth. Later—much later—he taught rats to find their way through a miniature maze that was modeled on the maze at King Henry VIII’s retreat in the London suburbs.

Watson’s aim was to show how most human behavior and emotional reactions—other than a few inborn reflexes—resulted from conditioning. Perhaps his most renowned experiment was with “Little Albert,” an infant who was conditioned by Watson and his student, Rosalie Rayner, to develop a fear of furry white animals (see Chapter 6). Watson was later forced to resign by the president of Johns Hopkins University when it was discovered he and Rayner were having an affair. His wife had written the university president about the affair, assuming that the president would compel Watson to change his ways. But her letter did not have the effect she sought: The president forced Watson to resign, and the couple were divorced. Watson then married Rayner, and the couple eventually had two sons.

After leaving the university, Watson and Rayner moved to New York, where he worked as a psychologist for the J. Walter Thompson advertising agency. He grew wealthy through successful ad campaigns for products such as Camel cigarettes, Johnson & Johnson Baby Powder, and Maxwell House Coffee—in which he introduced the idea of the “coffee break.”

Tragically, Rosalie died from dysentery in her 30s and Watson, 58, never remarried. He continued to work sporadically and was awarded a gold medal from the APA for his lifetime contributions to psychology one year before he died at the age of 80. He had let himself go following his wife’s death. He put on weight and paid little attention to his appearance. His children had to “pull him together” and dress him for his final appearance before the APA, which he attended, so to speak, as a “bundle of nerves.”



JOHN B. WATSON

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© Image Source/Getty Images

Learning Theory on Madison Avenue: Associating Good Things with Products John B. Watson introduced American to the concept of the coffee break as part of a campaign to sell Maxwell House Coffee.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about John B. Watson.

Another major contributor to behaviorism was Harvard University psychologist B. F. Skinner (1904–1990). He believed that organisms learn to behave in certain ways because they have been **reinforced** for doing so—that is, their behavior has a positive outcome. He demonstrated that laboratory animals can be trained to carry out behaviors through strategic use of reinforcers, such as food. He trained rats to turn in circles, climb ladders, and push toys across the floor. Because Skinner demonstrated that remarkable combinations of behaviors could be taught by means of reinforcement, many psychologists adopted the view that, in principle, one could explain complex human behavior in terms of thousands of instances of learning through reinforcement.



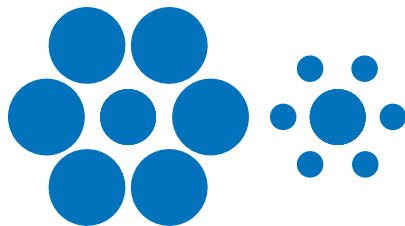
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Gestalt Psychology: Making Psychology Whole

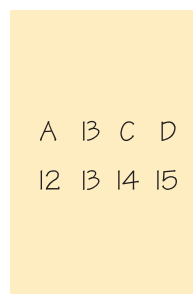
In the 1920s, another school of psychology—**Gestalt psychology**—was prominent in Germany. In the 1930s, the three founders of the school—Max Wertheimer (1880–1943), Kurt Koffka (1886–1941), and Wolfgang Köhler (1887–1967)—left Europe to escape the Nazi threat. They carried on their work in the United States, giving further impetus to the growing American ascendance in psychology.

Question 8: What is Gestalt psychology? Gestalt psychologists focused on perception and on how perception influences thinking and problem solving. The German word *Gestalt* translates roughly to “pattern” or “organized whole.” In contrast to the behaviorists, Gestalt psychologists argued that we cannot hope to understand human nature by focusing only on overt behavior. In contrast to the structuralists, they claimed that we cannot explain human perceptions, emotions, or thought processes in terms of basic units. Perceptions are *more* than the sums of their parts: Gestalt psychologists saw our perceptions as wholes that give meaning to parts, as we see in Figure 1.1 ■.

Gestalt psychologists illustrated how we tend to perceive separate pieces of information as integrated wholes depending on the contexts in which they occur. In Figure 1.1A, the dots in the centers of the configurations are the same size, yet we may perceive them as being of different sizes because of what surrounds them. The second symbol in each line in part B is identical, but in the top row we may perceive it as a B and in the bottom row as the number 13. The symbol has not



A. Are the dots in the center of the configurations the same size? Why not take a ruler and measure them?



B. Is the second symbol in each line the letter B or the number 13?



C. Which one of the gray squares is brighter?

The Power of Reinforcement In the photo on the left, we see a feathered friend that has learned to drop shapes into their proper places through reinforcement. In the photo on the right, “Air Raccoon” shoots a basket. Behaviorists teach animals complex behaviors such as shooting baskets by first reinforcing approximations to the goal (or target behavior). As time progresses, closer approximations are demanded before reinforcement is given.

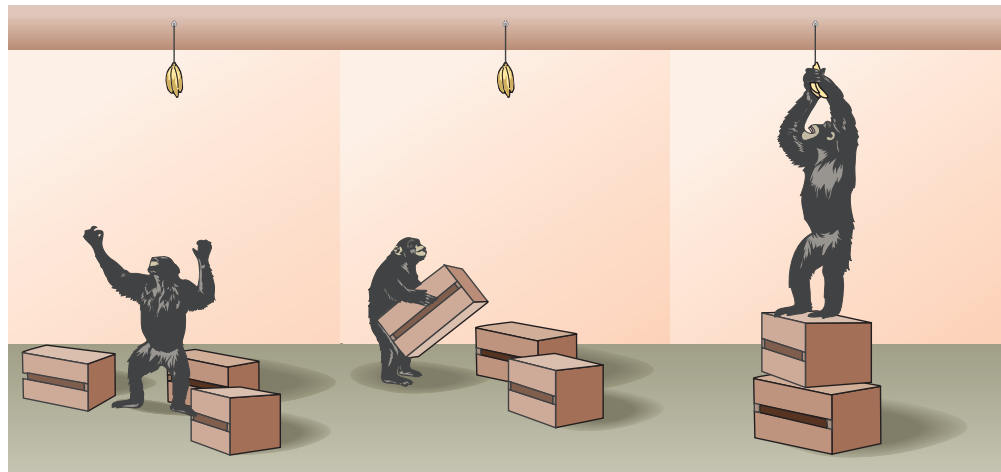
Reinforcement A stimulus that follows a response and increases the frequency of the response.

Gestalt psychology The school of psychology that emphasizes the tendency to organize perceptions into wholes and to integrate separate stimuli into meaningful patterns.

Figure 1.1 ■ The Importance of Context Gestalt psychologists have shown that our perceptions depend not only on our sensory impressions but also on the context of our impressions. You will interpret a man running toward you very differently depending on whether you are on a deserted street at night or at a track in the morning.

Figure 1.2 ■ Some Insight into Insight

At first, the chimpanzee cannot reach the bananas hanging from the ceiling. After some time has passed, it has an apparent “flash of insight” and piles the boxes on top of one another to reach the fruit.



changed, but the context in which it appears has. The inner squares in part C are equally bright, but they do not appear so because of their contrasting backgrounds. There are many examples of this in literature and everyday life. In *The Prince and the Pauper*, Mark Twain dressed a peasant boy as a prince, and the kingdom bowed to him. Do clothes sometimes make the man or woman? Try wearing cutoffs for a job interview!

Gestalt psychologists believed that learning could be active and purposeful, not merely responsive and mechanical as in Watson’s and Skinner’s experiments. They demonstrated that much learning, especially in problem solving, is accomplished by insight, not by mechanical repetition, as we see in a classic experiment that took place early in the last century.

Wolfgang Köhler was marooned during World War I on one of the Canary Islands, where the Prussian Academy of Science kept a colony of apes, and his research while there gave him, well, insight into the process of learning by **insight**. Have you ever pondered a problem for quite a while and then, suddenly, seen the solution? Did the solution seem to come out of nowhere? In a “flash”? Consider the chimpanzee in Figure 1.2 ■. At first, it is unsuccessful in reaching bananas suspended from the ceiling. Then it suddenly stacks the boxes and climbs up to reach the bananas. It seems the chimp has experienced a sudden reorganization of the mental elements of the problem—that is, it has had a “flash of insight.” Köhler’s findings suggest that we often manipulate the elements of problems until we group them in such a way that we believe we will be able to reach a goal. The manipulations may take quite some time as mental trial and error proceeds. Once the proper grouping has been found, however, we seem to perceive it all at once as a clear pattern or whole.

Psychoanalysis: Digging Beneath the Surface

Psychoanalysis, the school of psychology founded by Sigmund Freud (1856–1939), differs from the other schools in both background and approach. Freud’s theory has invaded popular culture, and you may be familiar with a number of its concepts. For example, perhaps a friend has tried to “interpret” a slip of the tongue you made or has asked what you thought might be the meaning of an especially vivid dream.

Question 9: What is psychoanalysis? **Psychoanalysis** is the name given to the theory of personality and to the method of therapy originated by Sigmund Freud. As a theory of personality, psychoanalysis was based on the idea that much of our lives are governed by unconscious ideas and impulses that have their origins in childhood conflicts. As a method of psychotherapy, psychoanalysis aims to help patients gain insight into their conflicts and to find socially acceptable ways of expressing wishes and gratifying needs (see Chapter 16).

Insight In Gestalt psychology, the sudden reorganization of perceptions, allowing the sudden solution of a problem.

Psychoanalysis The school of psychology that asserts that much of our behavior and mental processes are governed by unconscious ideas and impulses that have their origins in childhood conflicts.

CONCEPT REVIEW HISTORIC SCHOOLS OF PSYCHOLOGY

School/Major Proponent(s)

Key Concepts

Current Status

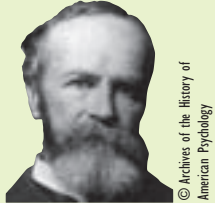
Structuralism Wilhelm Wundt



The mind can be studied scientifically by using introspection to discover the basic elements of experience. Conscious experience can be broken down into *objective* sensations such as sight or taste and *subjective* feelings such as emotional responses, will, and mental images like memories or dreams.

We do not encounter structuralists today, but cognitive and experimental psychologists study related topics such as sensation and perception, emotion, memory, and states of consciousness (including dreams).

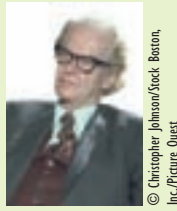
Functionalism William James



There is a relationship between consciousness and behavior. Consciousness flows streamlike. Experience cannot be broken down into objective sensations and subjective feelings. Functionalists focused on how experience helps us function more adaptively in our environments.

We do not have pure functionalists today, but functionalism preceded behaviorism in its interest in how habits are formed by experience and help us adapt. Behavior is seen as evolving: Adaptive behavior is maintained, whereas maladaptive behavior tends to drop out.

Behaviorism John B. Watson, B. F. Skinner



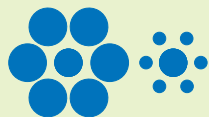
John B. Watson

B. F. Skinner

Psychology must limit itself to observable, measurable events—to behavior, not mental processes. Organisms learn to behave in certain ways because of the effects of their behavior.

Some “pure” behaviorists remain, but behaviorism more generally has contributed to experimental psychology, the psychology of learning, and methods of therapy (behavior therapy). Although many contemporary psychologists argue that it is desirable to study consciousness and mental processes, the behaviorist influence has encouraged them to base many of their conclusions on measurable behaviors.

Gestalt Psychology Max Wertheimer, Kurt Koffka, Wolfgang Köhler



A. Are the dots in the center of the configurations the same size? Why not take a ruler and measure them?

Gestalt psychologists focused on perception, thinking, and problem solving. Whereas structuralists tried to isolate basic elements of experience, Gestalt psychologists focused on the tendency to see perceptions as wholes that give meaning to parts.

Gestalt principles continue to be studied in the field of sensation and perception. Other Gestalt ideas, such as those involving thinking and problem solving, continue to be studied by cognitive psychologists and experimental psychologists. Gestalt therapy—which aims to help people integrate conflicting parts of their personalities—remains in use.

Psychoanalysis Sigmund Freud, Carl Jung, Alfred Adler, Karen Horney, Erik Erikson



Sigmund Freud

Karen Horney

Erik Erikson

Visible behavior and conscious thinking are influenced by unconscious ideas and conflicts. People are motivated to gratify primitive sexual and aggressive impulses, even if they are unaware of their true motives. Unconscious processes are more influential than conscious thought in determining human behavior.

Psychoanalytic thinking remains quite alive in the popular culture. Among psychologists, many discount psychoanalysis altogether because many of its concepts cannot be studied by scientific means. Modern psychoanalytic therapists tend to place more emphasis on the roles of conscious motives, conscious thinking, and decision making.



Go to Psychology CourseMate at www.cengagebrain.com to access an interactive version of this Concept Review designed to help you test yourself on the topics presented here.

ACTIVE REVIEW The Greek philosopher (14) _____ was among the first to argue that human behavior is subject to rules and laws. (15) _____ proclaimed “Know thyself” and suggested the use of introspection to gain self-knowledge. (16) _____ founded the school of structuralism. (17) William James founded the school of _____, which dealt with behavior as well as conscious experience. (18) _____ founded the school of behaviorism. (19) _____ psychologists saw our perceptions as wholes that give meaning to parts. (20) _____ founded the school of psychoanalysis.

REFLECT AND RELATE Psychologist William James visited Helen Keller as a child and brought her an ostrich feather. If you had been Helen Keller, would you have appreciated this gift? Explain.

CRITICAL THINKING Do you believe that the richness and complexity of human behavior can be explained as the summation of so many instances of learning? Explain.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

HOW TODAY’S PSYCHOLOGISTS VIEW BEHAVIOR AND MENTAL PROCESSES

Today, we no longer find psychologists who describe themselves as structuralists or functionalists. Although the school of Gestalt psychology gave birth to current research approaches in perception and problem solving, few would consider themselves Gestalt psychologists. On the other hand, we do find Gestalt therapists who focus on helping clients integrate conflicting parts of their personality (making themselves “whole”). The numbers of orthodox behaviorists and psychoanalysts have been declining (Robins et al., 1999). Many contemporary psychologists in the behaviorist tradition look on themselves as social-cognitive theorists, and many psychoanalysts consider themselves “neoanalysts” rather than traditional Freudians.

The history of psychological thought has taken many turns, and contemporary psychologists differ in their approaches. Today, there are several broad, influential perspectives in psychology: the evolutionary, biological, cognitive, humanistic–existential, psychodynamic, learning, and sociocultural perspectives. Each emphasizes different topics of investigation. Each approaches topics in its own ways.

The Evolutionary and Biological Perspectives: It’s Only Natural

Psychologists are interested in the roles of evolution and heredity in behavior and mental processes such as psychological disorders, criminal behavior, and thinking. Generally speaking, our heredity provides a broad range of behavioral and mental possibilities. Environmental factors interact with inherited factors to determine specific behavior and mental processes. **Question 10: What is the evolutionary perspective?**

The **evolutionary perspective** focuses on the evolution of behavior and mental processes as created in the cauldron of natural selection. Charles Darwin argued that in the age-old struggle for existence, only the fittest (most adaptive) organisms manage to reach maturity and reproduce. For example, fish that swim faster or people who are naturally immune to certain diseases are more likely to survive and transmit their genes to future generations. Individuals die, but species tend to evolve in adaptive directions. Evolutionary psychologists suggest that much human social behavior, such as aggressive behavior and mate selection, has a hereditary basis. People may be influenced by social rules, cultural factors, and even personal choice, but evolutionary psychologists believe that inherited tendencies sort of whisper in people’s ears and tend to move them in certain directions.

When we ask the question “What evolves?” the answer is biological processes and structures. These processes and structures may give rise to ideas and behaviors, but it is not believed that ideas and behavior exist in the absence of biological substance.

Evolutionary perspective The view that our behavior and mental processes have been shaped, at least in part, by natural selection as our ancestors strived to meet our prehistoric and historic challenges.

Psychologists assume that thoughts, fantasies, and dreams—and the inborn or **instinctive** behavior patterns of various species—are made possible by the nervous system and especially by the brain. **Question 11: What is the biological perspective?** Psychologists with a **biological perspective** seek the links between the electrical and chemical activity of the brain, the chemical activity of hormones, and heredity, on the one hand, and behavior and mental processes, on the other. They use techniques such as CAT scans and functional magnetic resonance imaging (fMRI) that show which parts of the brain are involved in such activities as language, mathematical problem solving, and music (Goghari & MacDonald, 2009; Henseler et al., 2009). For example, fMRI can show how the blood flow in the brain changes as we are thinking. We have learned how natural chemical substances in the brain are involved in the formation of memories. Experiments have shown that, among some animals, electrical stimulation of parts of the brain prompts the expression of “prewired,” or inborn, sexual and aggressive behaviors.

Biological psychologists are also concerned with the influences of the endocrine system on behavior and mental processes. The endocrine system consists of glands that secrete hormones and release them into the bloodstream. In people, for instance, the hormone prolactin stimulates production of milk. But in many species, such as rats, prolactin also gives rise to maternal behavior (Numan & Stolzenberg, 2009). In many animals, sex hormones determine whether mating behavior will follow stereotypical masculine or feminine behavior patterns. In humans, sex hormones regulate the menstrual cycle and are also connected with feelings of psychological well-being.

The biological perspective tends to focus on events that occur below the level of consciousness. The cognitive perspective is the essence of consciousness. **Question 12: What is the cognitive perspective?**

The Cognitive Perspective: Keeping Psychology “in Mind”

Psychologists with a **cognitive perspective** venture into the realm of mental processes to understand human nature. They investigate the ways we perceive and mentally represent the world, how we learn, remember the past, plan for the future, solve problems, form judgments, make decisions, and use language. Cognitive psychologists, in short, study those things we refer to as the *mind*.

The cognitive tradition has roots in Socrates’ advice to “Know thyself” and in his suggested method of introspection. We also find cognitive psychology’s roots in structuralism, functionalism, and Gestalt psychology, each of which, in its own way, addressed issues that are of interest to cognitive psychologists. In general, cognitive science has experienced a rapid expansion in the past couple of decades and continues to attract interest and inspire research.

The Humanistic–Existential Perspective: The Search for Meaning

The humanistic–existential perspective is cognitive in flavor, yet it emphasizes more the role of subjective (personal) experience. **Question 13: What is the humanistic–existential perspective?** Let’s consider each of the parts of this perspective: *humanism* and *existentialism*. **Humanism** stresses the human capacity for self-fulfillment and the central roles of consciousness, self-awareness, and decision making. Humanistic psychology considers personal, or subjective, experience to be the most important event in psychology. Humanists believe that self-awareness, experience, and choice permit us, to a large extent, to “invent ourselves” and our ways of relating to the world as we progress through life. Humanistic–existential psychologists stress the importance of subjective experience and assert that people have the freedom to make choices. Consciousness—our sense of being in the world—is seen as the force that unifies our personalities. **Existentialism** views people as free to choose and be responsible for choosing ethical conduct.

Humanistic–existential psychologists stress the importance of subjective experience and assert that people have the freedom to make real choices. Grounded in the work of Carl Rogers (1951) and Abraham Maslow (1970), the humanistic perspective continues to find many contemporary adherents (Elkins, 2009).

Instinctive An inborn pattern of behavior that is triggered by a particular stimulus.

Biological perspective The approach to psychology that seeks to understand the nature of the links between biological processes and structures such as the functioning of the brain, the endocrine system, and heredity, on the one hand, and behavior and mental processes, on the other.

Cognitive perspective The approach to psychology that focuses on the nature of consciousness and on mental processes such as sensation and perception, memory, problem solving, decision making, judgment, language, and intelligence.

Humanism The philosophy and school of psychology that asserts that people are conscious, self-aware, and capable of free choice, self-fulfillment, and ethical behavior.

Existentialism The view that people are free and responsible for their own behavior.

The Psychodynamic Perspective: Still Digging

Many modern psychologists continue to embrace the diverse theories descended from Sigmund Freud. In fact, in the 1940s and 1950s, psychodynamic theory dominated the practice of psychotherapy and was influential in scientific psychology and the arts. Most psychotherapists were psychodynamically oriented. Many renowned artists and writers consulted psychodynamic therapists as a way to liberate the expression of their unconscious ideas. Today, Freud's influence continues to be felt, although it no longer dominates methods of psychotherapy.

Question 14: What is the role of psychoanalysis today? Contemporary psychologists who follow theories derived from Freud are likely to call themselves *neanalysts*. Famous neanalysts such as Karen Horney (1885–1952) and Erik Erikson (1902–1994) focused less on unconscious processes and more on conscious choice and self-direction.

Let's note also that many Freudian ideas are retained in some form by the population at large. For example, we occasionally have ideas or desires that seem unusual for us. We may even say that it sometimes seems as if an unconscious idea or impulse is trying to get the better of us. In the Middle Ages, such thoughts and impulses were usually attributed to the devil or to demons. Dreams, likewise, were thought to enter us magically from the spirit world. Followers of Freud tend to attribute dreams and unusual ideas or desires to unconscious processes, and dreams are commonly viewed this way in popular culture.

Perspectives on Learning: From the Behavioral to the Cognitive

Many contemporary psychologists study the effects of experience on behavior. Learning, to them, is the essential factor in describing, explaining, predicting, and controlling behavior. The term *learning* has different meanings to psychologists of different persuasions, however. Some students of learning find roles for consciousness and insight. Others do not. This distinction is found today among those who adhere to the behavioral and social-cognitive perspectives. **Question 15: What are the two major perspectives on learning?**

For the founder of American behaviorism, John B. Watson, behaviorism was an approach to life as well as a broad guideline for psychological research. Not only did Watson despair of measuring consciousness and mental processes in the laboratory, but he also applied behavioral analysis to virtually all situations in his daily life. He viewed people as doing things because of their learning histories, their situations, and rewards rather than because of conscious choice.

Like Watson, contemporary behaviorists emphasize environmental influences and the learning of habits through repetition and reinforcement. Modern **social-cognitive theorists** (once termed *social-learning theorists*), in contrast, suggest that people can modify or even create their environments. They also grant **cognition** a key role. They note that people engage in intentional learning by observing others. Since the 1960s, social-cognitive theorists have gained influence in the areas of personality development, psychological disorders, and psychotherapy.

The Sociocultural Perspective: How Do You Complete the Sentence “I Am...”?

The profession of psychology focuses mainly on the individual and is committed to the dignity of the individual. However, many psychologists today believe we cannot understand people's behavior and mental processes without reference to their diversity (Alarcón et al., 2009). Studying perspectives other than their own helps psychologists understand the role of a culture's beliefs, values, and attitudes in behavior and mental processes. It helps them perceive why people from diverse cultures behave and think in different ways and how the science of psychology is enriched by addressing those differences (Denmark, 1998; Le et al., 2009).

Question 16: What is the sociocultural perspective? The **sociocultural perspective** addresses many of the ways that people differ from one another. It studies

Social-cognitive theory A school of psychology in the behaviorist tradition that includes cognitive factors in the explanation and prediction of behavior; formerly termed *social-learning theory*.

Cognition The use of mental processes to perceive and mentally represent the world, think, and engage in problem solving and decision making.

Sociocultural perspective The view that focuses on the roles of ethnicity, gender, culture, and socioeconomic status in behavior and mental processes.

the influences of ethnicity, gender, culture, and socioeconomic status on behavior and mental processes (Sanchez et al., 2009; Vodosek, 2009). For example, what is often seen as healthful, self-assertive, outspoken behavior by most U.S. women may be interpreted as brazen behavior in Latino and Latina American or Asian American communities.

ETHNICITY

One kind of diversity involves people's ethnicity. Members of an **ethnic group** are united by their cultural heritage, race, language, and common history. The experiences of various ethnic groups in the United States highlight the impact of social, political, and economic factors on human behavior and development (Phinney & Ong, 2007).

The probing of human diversity enables students to appreciate the cultural heritages and historical problems of various ethnic groups. This textbook considers many psychological issues related to ethnicity, such as the representation of ethnic minority groups in psychological research studies, substance abuse among adolescents from various ethnic minority groups, bilingualism, and ethnic differences in intelligence test scores. We also look into the prevalence of suicide among members of different ethnic groups, ethnic differences in vulnerability to physical problems and disorders ranging from obesity to hypertension and cancer, multicultural issues in the practice of psychotherapy, and prejudice.

GENDER

Gender refers to the culturally defined concepts of *masculinity* and *femininity*. Gender is not fully defined by anatomic sex. It involves a complex web of cultural expectations and social roles that affect people's self-concepts and hopes and dreams as well as their behavior. How can sciences such as psychology and medicine hope to promote the welfare of the individual if they accept traditional gender roles that limit opportunities for women? Although the times are changing, throughout the last century most research was conducted on men and by men. For such reasons, more information has been obtained on the health of men, and so-called masculine behavior has frequently been seen as the norm (Dart et al., 2006).

Just as members of ethnic minority groups have experienced prejudice, so too have gay males and lesbians. Even much of the scientific research on gender roles and gender differences assumes that the behavior and attitudes of heterosexuals represent the norm (Lee & Crawford, 2007).



© David Bullington/Getty Images

Ethnic group A group characterized by common features such as cultural heritage, history, race, and language.

Gender The culturally defined concepts of masculinity and femininity.

LearningConnections • HOW TODAY'S PSYCHOLOGISTS VIEW BEHAVIOR AND MENTAL PROCESSES

ACTIVE REVIEW (21) _____ psychologists note that only the fittest organisms reach maturity and reproduce, thereby transmitting their genes to future generations and causing species to evolve in adaptive directions. (22) _____ oriented psychologists study the links between behavior, the brain, hormones, and heredity. (23) _____ psychologists study the ways that we perceive and mentally represent the world. (24) Humanistic—_____ psychologists stress the importance of self-awareness and people's freedom to make choices. (25) _____-cognitive theorists are in the behaviorist tradition but also find roles for intentional learning and note that people can create or modify their environments. (26) The _____ perspective fosters the consideration of matters of ethnicity, gender, culture, and socioeconomic status in psychology.

REFLECT AND RELATE Which contemporary perspective on human behavior has the most personal appeal to you? Why?

CRITICAL THINKING Many psychologists argue that Freud's views have not been supported by research evidence and are thus of no more than historical interest. Therefore, they argue that Freud's ideas should not be emphasized in psychology textbooks. Some psychologists would even exclude Freud from a scientific textbook. What do you think?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Our discussion of the sociocultural perspective naturally leads us to reflect—in the following section—on the roles of women and people from various racial and ethnic backgrounds in psychology.

GENDER, ETHNICITY, AND PSYCHOLOGY: REAL PEOPLE IN THE REAL WORLD

It's all about access. **Question 17: How have access to education and the field of psychology historically influenced the participation of women and people from various ethnic and racial backgrounds?** Until the 20th century, women and people of color were systematically excluded from most institutions of higher learning. Thus, it is not surprising that the overwhelming majority of psychologists in the 1800s and early 1900s were European and European American males. Nevertheless, a few pioneering women and individuals from various racial and ethnic backgrounds were able to open the door to an education and to the field of psychology.

Women in Psychology: Opening the Floodgates

Although American women have only attended college since 1833, when Oberlin College opened its doors to women, most American college students today are in fact women. **Truth or Fiction Revisited:** Women now receive the majority of undergraduate degrees in psychology and, as shown in Table 1.1 ■, some 78% of the doctoral degrees (American Psychological Association, 2009a). Table 1.2 ■ shows how rapidly the percentage of women in the doctoral-level psychology workforce has grown. Women make up 58% of the overall workforce in psychology, whose median age is 55. Yet among new doctorates, with a median age of 32, women make up 78.1% of the workforce.

Mary Whiton Calkins, who is profiled nearby, is one of thousands of women who have made indispensable contributions to psychology. Consider also Christine Ladd-Franklin (1847–1930). She, like Calkins, was born during an era in American history when women were expected to remain in the home and were excluded from careers in science. She nevertheless pursued a career in psychology, taught at Johns Hopkins and Columbia universities, and formulated a theory of color vision.

Margaret Floy Washburn (1871–1939) was the first woman to receive a Ph.D. in psychology. Washburn wrote *The Animal Mind*, a work containing many ideas that would later become part of behaviorism. Helen Bradford Thompson (1874–1947)

Table 1.2 ■ Doctoral Psychology Workforce: Gender and Ethnicity, by Age

	Median age	
	32	55
Women	78.1%	58.0%
Men	21.7%	42.0%
Asian American/Pacific Islander	4.8%	2.0%
African American	5.6%	3.0%
Latina or Latino American	6.3%	4.0%
Native American	<1.0%	<1.0%
European American	76.4%	84.6%

Source: Adapted from American Psychological Association (2009a). *Doctoral Psychology Workforce Fast Facts*. Health Service Provider Subfields. Center for Workforce Studies. <http://research.apa.org/fastfacts-09.pdf>. © Copyright 2009 APA Center for Workforce Studies. Washington, DC.

In Profile

She just said no. Mary Whiton Calkins (1863–1930) had completed all the requirements for the Ph.D., but accepting the degree would endorse prejudice against women. So she turned it down. Calkins studied psychology at Harvard University. However, she had to attend Harvard as a “guest student” because Harvard was not yet admitting women. It did not matter that William James considered Calkins to be his brightest student. When she completed her degree requirements, Harvard would not award her the degree because of her gender. Instead, Harvard offered to grant her a doctorate from its sister school, Radcliffe. She declined the offer. **Truth or Fiction Revisited:** It is therefore true that the first female president of the American Psychological Association turned down the doctoral degree that was offered to her.

Calkins’ story is typical of those of talented, self-assertive women who pressed for political rights and economic indepen-



MARY WHITON CALKINS

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dence at the turn of the 19th century into the 20th. At a time when men dominated the discipline of psychology, Calkins was one of the pioneers who fought the male-centered bias and encouraged psychology to incorporate the values of the “new woman” (D. Rogers, 2009). Calkins fought mightily for many of the rights that women in the United States can take for granted today.

Even without a doctorate, Calkins went on to pioneer research in memory at Wellesley College, where she founded a psychology laboratory in 1891.

She introduced the method of paired associates, discovered the primacy and recency effects, and engaged in research into the role of the frequency of repetition in the vividness of memories. In 1905, she became the first female president of the American Psychological Association—doctorate or no.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Mary Whiton Calkins.

was the first psychologist to study psychological gender differences. Her 1903 book *The Mental Traits of Sex* analyzed the performance of 25 women and 25 men on tests of intellect, emotional response, and sensation and perception. Thompson was ahead of her time in her conclusion that gender differences in these areas appeared to be strongly influenced by the social environment from infancy through adulthood.

In more recent years, Mary Salter Ainsworth (1913–1999) revolutionized our understanding of attachment between parents and children by means of her cross-cultural studies and her innovation of the Strange Situation method (see Chapter 10). Elizabeth Loftus (e.g., Laney & Loftus, 2009) has shown that our memories are not snapshots of the past. Instead, they often consist of something old (what actually happened), something new (that is, influenced by more recent events), something borrowed (for example, further shaped by our biases and prejudices), and something blue (altered by tinges of color or emotion) (see Chapter 8). Susan Nolen-Hoeksema (e.g., Nolen-Hoeksema & Hilt, 2008) is contributing to our understanding of the ways in which self-destructive ruminating (that is, going back and forth repeatedly over the same issues) prevents us from making decisions and heightens feelings of depression (see Chapter 15). The number of women making such contributions today is truly countless.

Ethnicity and Psychology

Like women, individuals from various ethnic and racial groups have also struggled for recognition in psychology. Back in 1901, Gilbert Haven Jones was the first African American to receive a Ph.D. in psychology, but he had to do so in Germany. J. Henry Alston engaged in research on perception of heat and cold and was the first African American psychologist to be published in a major psychology journal (the year was 1920).

The best-known African American psychologists may be Kenneth Clark and Mamie Phipps Clark (see the nearby In Profile feature). They played important roles in desegregation and in the education of African American children.

Today, African Americans continue to have a powerful impact on the profession of psychology. For example, psychologist Claude Steele (e.g., Purdie-Vaughns et al., 2008) has shown that many African Americans sabotage their own performance on intelligence tests because of *stereotype threat* (see Chapter 8). That is, rather than focus

In Profile

Kenneth Bancroft Clark (1914–2005) was the son of West Indian parents. He earned his bachelor's degree from Howard University in Washington, DC, where he also met and married Mamie Phipps (1917–1983). Although Mamie was the daughter of a physician, she attended a segregated school in her hometown in Arkansas and was compelled to use public facilities labeled for “coloreds only.”

Kenneth Clark and Mamie Phipps Clark earned their doctorates in psychology at Columbia University. (Kenneth was the first African American to receive a Ph.D. in psychology from Columbia.) The couple were committed to children's welfare. In the 1940s, the Clarks founded the Northside Center for Child Development and conducted research that showed the negative effects of school segregation on African American children. In one such study, African American children were shown white and brown dolls and asked to “Give me the pretty doll” or “Give me the doll that looks bad.” Most children's choices showed that they preferred the white dolls over the brown ones. The Clarks concluded that the children had swallowed the larger society's prejudiced views that favored European Americans.



**KENNETH B. CLARK AND
MAMIE PHIPPS CLARK**

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The Clarks were activists as well as psychologists (Adler, 2005). In the 1950s, Kenneth Clark began working with the NAACP to end school segregation. Clark's research was cited by the Supreme Court in 1954 when it overturned the “separate but equal” schools doctrine that had allowed inequalities in school services for various ethnic groups. Clark went on to study the quality of education and juvenile delinquency. He was among the first to recommend education for preschoolers, after-school programs, and community participation in educational decision making.



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Go to Psychology CourseMate at www.cengagebrain.com to access more information about Kenneth B. Clark and Mamie Phipps Clark.

on the test items, they worry about the stereotype, or widespread belief, that African Americans are not as intelligent as European Americans. As a result, they hurt their own performance. According to Steele, this phenomenon can apply to any negatively stereotyped group—to women in mathematics, for example. African American psychologist Nancy Boyd-Franklin (e.g., Boyd-Franklin & Lockwood, 2009) is on the faculty at Rutgers University and studies group and family therapy with African Americans. African American psychologist Tony Strickland (e.g., Strickland, 2007) studies the effects of psychoactive drugs on individuals with and without psychological disorders. He has discovered that people from different ethnic groups may respond to drugs in different ways.

Latino and Latina American and Asian American psychologists have also made their mark. Jorge Sanchez was among the first to show how intelligence tests are culturally biased—to the disadvantage of Mexican American children. Latina American psychologist Lillian Comas-Diaz (e.g., 2008) has edited a journal on multicultural mental health. Latina American psychologist Martha E. Bernal (1932–2002) studied the development of ethnic identity among Mexican American children. Asian American psychologist Stanley Sue (e.g., Sue & Zane, 2009) directed the National Research Center on Asian American Mental Health in Los Angeles and has shown that discrimination may be connected with racial differences in intelligence and achievement (see Chapter 8). Asian American psychologist Richard M. Suinn (e.g., 2001) studies mental health and the development of identity among Asians and Asian Americans.

The contributions of women and members of diverse ethnic and racial groups have broadened our understanding of the influences of gender and ethnicity on behavior and mental processes. They have taught us that what is true for men may not always be true for women (that is, what is sauce for the goose may not always be sauce for the gander). What is true for European Americans may not be true for Americans from other backgrounds. The presence of women and individuals from diverse ethnic backgrounds has given us the grand mosaic that is psychology today.

African Americans make up nearly 6% of new doctoral-level psychologists; nearly 5% are Asian American; more than 6% are Latina and Latino American; and not quite 1% are Native American (American Psychological Association, 2009a). Although these percentages do not yet reflect these groups' numbers in the general population, Table 1.2 shows that the percentage of new doctorates from ethnic minority groups notably surpasses their percentages in the overall psychology workforce. Note, too, that although the overall percentage of European American psychologists is 84.6%, that proportion drops to 76.4% among psychologists with new doctorates (see Table 1.2).

By now, we have a sense of the various fields of psychology, the history of psychology, and the ways in which today's psychologists look at behavior and mental processes. Basically, psychology has sought to be the scientific study of behavior and mental processes. Like other scientists, psychologists rely on research to find answers to the questions that interest them. We will explore methods of research in the following chapter.

LearningConnections • GENDER, ETHNICITY, AND PSYCHOLOGY: REAL PEOPLE IN THE REAL WORLD

ACTIVE REVIEW (27) _____ introduced the method of paired associates and discovered the primacy and recency effects. (28) _____ formulated a theory of color vision. (29) Kenneth B. _____ influenced a key United States Supreme Court decision on desegregation in the schools.

REFLECT AND RELATE Consider your own gender and ethnic background. What would it have been like for you to try to study psychology in the United States a century ago?

CRITICAL THINKING Women now receive the majority of undergraduate and graduate degrees in psychology. Review the fields in psychology and speculate as to why this may be so.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections GETTING READY TO WORK IN PSYCHOLOGY

If you are interested in a career as a psychologist, you need to complete graduate school in psychology. Although most graduate programs in psychology are in academic departments located in the university colleges of arts and sciences, some are located in professional schools of psychology, education, business, medicine, and engineering.

Take time to research your choices. The program should match your interests. Although most psychology departments offer a breadth of education in the discipline of psychology, they vary in their strengths or areas of emphasis. You need to find out what those are and match them to your graduate education interests. The areas of expertise and research interests of individual faculty members can guide you in matching your career interest with a specific area of research or practice in psychology.

A graduate or professional school's catalog, brochures, and website are generally the best and most current sources of information about the nature of each graduate program and its program and admission requirements. A composite source of such information is also available in the American Psychological Association (APA) publication *Graduate Study in Psychology*, which can be ordered through the APA via telephone: (800) 374-2721, or at the website: <http://apa.org/pubs/index.aspx>.

Throughout the graduate school application process, discuss your plans with an advisor or your undergraduate faculty. Apply to a number of programs that offer you a reasonable chance of acceptance.



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history and systems, and tests and measurement. Typically, you will be ready to take electives in psychology by the time you are a college junior. This is a good time to make graduate school plans so you can make wise choices about future courses and extracurricular activities during the last 2 years of college. Know, however, that as long as you've taken the basic electives in psychology, you don't always need to have a bachelor's degree in psychology to get into a graduate program in the field.

Graduate School

Most graduate departments make entrance decisions on a variety of factors, including test scores, GPA, course selection, recommendations, and practical experience. In addition, most departments require that you take a standard aptitude test, usually the Graduate Record Examination (GRE). Although programs vary in the weight they attach to test scores, successful applicants typically score well above 500 on both the verbal and quantitative portions of the GRE. Determine if your GRE scores will qualify you for consideration by the institution to which you would like to apply. Competition for spaces in graduate school is keen.

Master's Degree

Undergraduate course requirements for a terminal master's degree are relatively few: usually, a background in introductory or general psychology, experimental

Shaping Your Undergraduate Program to Prepare for Graduate School in Psychology

Most undergraduate programs in psychology require a blend of science and liberal arts courses for a bachelor's degree. The courses usually include introductory psychology, experimental psychology, and statistics. Other required courses can be in learning, personality, abnormal psychology, social psychology, developmental psychology, physiological or comparative psychology,

psychology with a laboratory course, and statistics. The university usually takes undergraduate grade point average (GPA) into account, too.

A recent survey of 26 psychology master's programs shows that the most commonly required courses once you are in the master's program are those with industrial/organizational content, statistics, and research design. Course work at the master's level often also includes study in ethics, assessment, program evaluation, and personality-related topics as well.

A master's degree in psychology, along with preparation in the natural sciences or mathematics, is increasingly valued by doctoral programs in psychology. Each doctoral program also decides which credits earned at the master's level it will accept for transfer. Occasionally, students need to repeat some course work. Some institutions will not accept a master's degree from any school other than their own. For these reasons, it is important to ask questions about these and other issues early in the application process.

Doctoral Degree

Each graduate program determines its own entrance requirements. Some doctoral programs require applicants to have a master's degree in psychology. More commonly, students can enter the doctoral programs with a bachelor's degree and work directly on a doctoral degree.

Earning a doctoral degree typically requires at least 4 years, with the median time to degree being closer to 7 years of study after the bachelor's degree. Early in the graduate program, you will probably take course work in the core areas of psychology. You will work with a professor to learn how to do research; you'll also study how psychological research is applied to life situations. Once you have completed all

the course work, you must pass a comprehensive exam and write and defend a dissertation or other scholarly product.

If you want to be a professional psychologist in clinical, counseling, school, or other health service areas of psychology, you will also have to complete a 1-year internship as part of your doctoral study in these areas of practice. Some universities and professional schools offer a Psy.D. (doctor of psychology) degree in lieu of the traditional research doctoral degree (Ph.D). In choosing applicants, these programs may look for candidates who already have clinical experience or other work experience in applied psychology.

The Importance of Accreditation

There are two kinds of accreditation: institutional and specialized. *Institutional accreditation* certifies that an institution has met minimum standards of quality. It is granted by one of seven regional accrediting organizations recognized for this purpose by the U.S. Department of Education. Membership in the APA requires that one's doctoral degree in psychology or equivalent be from an accredited institution. Most state licensing boards in psychology also have such a requirement, though some require that the licensure applicant have graduated from an accredited doctoral program in psychology. The latter is what we refer to as *specialized accreditation*. Specialized accreditation only applies to professional programs. It certifies that the program meets the minimal standards of quality as defined by that profession. In the field of psychology, specialized accreditation is granted by the APA Committee on Accreditation and applies only to doctoral programs, internships, and postdoctoral residence programs in professional psychology.

For more information about accredited programs, contact the APA

Education Directorate at 750 First Street, N.E., Washington, DC 20002-4242; e-mail: education@apa.org

If You Need Financial Aid

You may be able to get financial aid to attend both undergraduate and graduate school. Assistance comes in different forms: fellowships, scholarships, grants or subsidies, work-study programs, federal loans, and teaching or research assistantships. Graduate assistantships and work study require part-time work.

Students seeking financial aid for a graduate degree should get advice as early as possible. Consult with both the psychology office and the office of financial aid on your own campus and also with the office of financial aid at the school to which you are applying. Students of ethnic minority background should also contact the APA Minority Fellowship Program: www.apa.org/mfp.

Licensure and Certification

For independent practice as a psychologist anywhere in the United States or Canada, you must be licensed for such. Before granting you permission to take the licensing exam, the state licensing board will review your educational background. A doctoral degree does not automatically make you eligible; requirements vary from state to state. At a minimum, states require that the doctorate be in psychology or a field of study "primarily psychological in nature" and that it be from a regionally accredited institution. You also must have had at least 2 years of supervised professional experience.

American Psychological Association. (2010). *Careers in Psychology. Getting Ready to Work in Psychology*. Retrieved from <http://www.apa.org/careers/resources/guides/careers.aspx>. p. 5.

1. What is psychology?

Psychology is the scientific study of behavior and mental processes.

Psychology as a Science

2. What are the goals of psychology?

Psychology seeks to describe, explain, predict, and control behavior and mental processes. Behavior and mental processes are explained through psychological theories, which are sets of statements that involve assumptions about behavior. Explanations and predictions are derived from theories. Theories are revised, as needed, to accommodate new observations.

What Psychologists Do: Something for Everyone?

3. Just what do psychologists do?

Psychologists engage in research, practice, and teaching. Research can be pure or applied. Basic or pure research has no immediate applications. Applied research seeks solutions to specific problems. Psychologists also specialize in various fields. Clinical psychologists help people with psychological disorders adjust to the demands of life. Counseling psychologists are more likely to work with people who have adjustment problems. School psychologists assist students with problems that interfere with learning. Developmental psychologists study the changes that occur throughout the life span. Personality psychologists study influences on our thought processes, feelings, and behavior. Social psychologists focus on the nature and causes of behavior in social situations. Experimental psychologists conduct research into basic psychological processes such as sensation and perception, learning and memory, thinking, motivation, and emotion. Industrial psychologists focus on the relationships between people and work. Health psychologists study the ways that behavior and mental processes such as attitudes are related to physical health.

Where Psychology Comes From: A History

4. Who were some of the ancient contributors to psychology?

The ancient Greek philosopher Aristotle declared that people are motivated to seek pleasure and avoid pain. Another Greek, Democritus, suggested that we could think of behavior in terms of a body and a mind and raised the question of whether there is free will or choice.

5. What is structuralism?

Structuralism, founded by Wilhelm Wundt, used introspection to study the objective and subjective elements of experience. Wundt also established the first psychological laboratory in Leipzig, Germany, in 1879.

6. What is functionalism?

Functionalism is the school founded by William James. It dealt with observable behavior as well as conscious experience and focused on the importance of habit.

7. What is behaviorism?

Behaviorism, founded by John B. Watson, argues that psychology must limit itself to observable behavior and not attempt to deal with subjective consciousness. Behaviorism focuses on learning by conditioning, and B. F. Skinner introduced the concept of reinforcement as an explanation of how learning occurs.

8. What is Gestalt psychology?

Gestalt psychology is the school of psychology founded by Wertheimer, Koffka, and Köhler. It is concerned with perception and argues that the wholeness of human experience is more than the sum of its parts.

9. What is psychoanalysis?

Psychoanalysis was founded by Sigmund Freud. The school asserts that people are driven by hidden impulses and that they distort reality to protect themselves from anxiety.

How Today's Psychologists View Behavior and Mental Processes

10. What is the evolutionary perspective?

The evolutionary perspective is based on the work of Charles Darwin, who argued that in the age-old struggle for survival, only the fittest organisms reach maturity and reproduce, thereby transmitting the traits that enable them to survive to their offspring.

11. What is the biological perspective?

The biological perspective studies the links between behavior and mental processes, on the one hand, and the functioning of the brain, the endocrine system, and heredity, on the other.

12. What is the cognitive perspective?

The cognitive perspective is concerned with the ways we mentally represent the world and process information. Cognitive psychologists study how we learn, remember the past, plan for the future, solve problems, form judgments, make decisions, and use language.

13. What is the humanistic–existential perspective?

Humanistic–existential psychologists stress the importance of subjective experience and assert that people have the freedom to make choices.

14. What is the role of psychoanalysis today?

Contemporary psychoanalysts often call themselves *neoneoanalysts* because they focus less on unconscious processes and more on conscious choice and self-direction. Psychoanalysis remains popular in the culture at large.

15. What are the two major perspectives on learning?

The two key perspectives on learning are the behavioral perspective and the social-cognitive perspective. Behaviorism focuses on environmental influences on learning. Social-cognitive theory argues that psychologists can address thought processes, that people engage in intentional learning, and that people are free to modify and create environments.

16. What is the sociocultural perspective?

The sociocultural perspective focuses on the roles of ethnicity, gender, culture, and socioeconomic status in behavior and mental processes.

Gender, Ethnicity, and Psychology: Real People in the Real World

17. How have access to education and the field of psychology historically influenced the participation of women and people from various ethnic and racial backgrounds?

Although excluded from most institutions of higher learning until the 20th century, women and people of color have made major contributions to psychology in the United States for more than a century. Calkins studied memory and heightened awareness of prejudice against women. Ladd-Franklin formulated a theory of color vision. Washburn's views presaged behaviorism. Ainsworth has made key contributions to the field of child development (attachment theory), and Loftus is a major figure in the psychology of memory. Nolen-Hoeksema has shown how people's cognitive styles can prolong feelings of depression. People from ethnic minority groups have contributed to all areas of psychology, but some, like Kenneth Clark, Mamie Phipps Clark, and Jorge Sanchez, have heightened awareness of issues concerning their groups.



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KEY TERMS

Applied research (p. 5)

Behaviorism (p. 12)

Biological perspective (p. 17)

Cognition (p. 18)

Cognitive perspective (p. 17)

Ethnic group (p. 19)

Evolutionary perspective (p. 16)

Existentialism (p. 17)

Functionalism (p. 10)

Gender (p. 19)

Gestalt psychology (p. 13)

Humanism (p. 17)

Insight (p. 14)

Instinctive (p. 17)

Introspection (p. 9)

Practicum (p. 5)

Psychoanalysis (p. 14)

Psychology (p. 4)

Pure research (p. 5)

Reinforcement (p. 13)

Social-cognitive theory (p. 18)

Sociocultural perspective (p. 18)

Structuralism (p. 10)

Theory (p. 5)

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2

Sorting Truth from Fiction in Psychology: Critical Thinking and Research Methods



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MAJOR TOPICS

Thinking like a Psychologist
How Psychologists Study
Behavior and Mental
Processes
Statistics: How Psychologists
Handle Data
Ethical Issues in Psychological
Research and Practice

FEATURES

A Closer Look—Real Life: Thinking Critically about Psychological Advice on the Internet: Are There Any Quick Fixes?
Self-Assessment: Dare You Say What You Think? The Social-Desirability Scale
In Profile: Sir Francis Galton
Concept Review: Research Methods
Life Connections: Critical Thinking, Science, and Pseudoscience

TRUTH OR FICTION?

- T F** People who claim they have been abducted by aliens are lying.
- T F** You could survey millions of voters and still not accurately predict the outcome of a presidential election.
- T F** In many experiments, neither the participants nor the researchers know who is receiving the real treatment and who is not.
- T F** Being a “10” is not necessarily a good thing.
- T F** You should not assume that you can walk across a river with an average depth of 4 feet.
- T F** Psychologists express your IQ score in terms of how deviant you are.
- T F** An IQ score of 130 suggests greater academic potential than an SAT score of 500.
- T F** A psychologist could write a believable personality report about you without interviewing you, testing you, or even knowing who you are.
- T F** About half of Americans believe in psychic or spiritual healing.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

My favorite place: The checkout counter of the supermarket. After being buffeted about by the crowds in the aisles and trying to convince myself that I really will survive until the people in line ahead of me are checked out, I am rewarded by the display of all the supermarket tabloids.

The headlines cry out. Each week, there are 10 new sightings of Elvis and 10 new encounters with extraterrestrials. There are 10 new “absolutely proven effective” ways to take off weight and 10 new ways to conquer stress and depression. There are 10 new ways to tell if your partner has been cheating and, of course, 10 new predictions by astrologers and psychics.

Extraterrestrials regularly kidnap us Earthlings but never send ransom notes. Although they have the technology to fly between the stars, they apparently still need to prod and poke us to figure out how we work—or don’t work. They’re not all that stylish. If you can believe the photos and drawings in the tabloids, they’ve been hopping around in the same flying saucers for half a century or more. According to a TV interview with a man who claimed to be a kidnap victim, these vehicles tend to be your “classic saucer-shaped silver metallic disk, with a hump on top.” Meanwhile, we inferior humans have progressed. We have evolved our modes of transportation from sleek cars with tail fins to boxy Scions and Elements. We continuously update our iPods with the latest music and download the newest ringtones into our camera cell phones. But the aliens keep flying the same model flying saucers. They’re nothing to text home about.

Although we can find some humor in these tales of abduction by aliens, psychologists and other scientists are very interested in the questions they raise about human nature and the distinction between personal anecdotes (brief accounts of interesting or humorous personal incidents or events) and science. What do we know about people who claim to have been abducted by aliens? What standards or rules should we apply when we are trying to sort out truth from fiction and decide whether we will believe the “kidnap victims”?

Many psychologists have studied the reported alien kidnappings, and one of their conclusions is that the kidnappings never occurred. **Truth or Fiction Revisited:** However, the people making the claims are not necessarily mentally ill, nor are they even lying (Clancy et al., 2002). By and large, these are people who have “remembered” their “experiences” while undergoing therapy, often under hypnosis. Tales of alien abduction are widely known throughout our culture, so it is not at all surprising that the “memories” of kidnap victims would tend to coincide (Meyersburg et al., 2009; Swami et al., 2009).

“Abductees” generally claim that they are awakened in their sleep by the aliens and unable to move. Psychologists know that many of our voluntary muscles—the ones involved in movement—are “paralyzed” when we sleep, which is why we usually don’t thrash about when we dream (Clancy, 2008; Forrest, 2008). *Hallucinations*—that is, seeing



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and hearing things that are not really there—are quite common as we are waking from a sleep-paralyzed state, and it seems that the reported experiences of abductees fit the pattern.

Psychologists also know that people are quite open to suggestion (Bernstein & Loftus, 2009; Clark & Loftus, 1996). Memories are not perfect snapshots. When trial witnesses are asked leading questions—that is, questions that might encourage them to recall events in a certain way—the opposing attorney will usually object (“Leading the witness, your Honor”). Sometimes, the person interviewing the supposed kidnap victim asks leading questions, looking for experiences with aliens.

All in all, “UFO memories may be constructed from bits and pieces of sleep-related hallucinations, nightmares, and media attention and fixed solidly into place with the suggestion of hypnosis and the validation of support groups” (Clark & Loftus, 1996, p. 294). Abductees may also be trying to escape, temporarily, from their humdrum lives—just as the buyers of supermarket tabloids might be doing (Clancy et al., 2002).

Psychologists have thus worked to explain how it is possible that many people report being abducted by aliens and being subjected to tests by them. But what of the evidence? Is there or is there not evidence that people have been abducted by aliens?

In a 2005 interview on the PBS show *Nova*, astronomer Carl Sagan noted that the evidence is almost entirely anecdotal.

Someone says something happened to them . . . And, people can say anything. The fact that someone says something doesn't mean it's true. Doesn't mean they're lying, but it doesn't mean it's true. . . . To be taken seriously, you need physical evidence that can be examined at leisure by skeptical scientists: a scraping of the . . . ship, and the discovery that it contains [chemicals] that aren't present on Earth, . . . Or material of absolutely bizarre properties of many sorts. . . . There are many things like that that would instantly give serious credence to an account. But there's no scrapings, no interior photographs, no filched page from the captain's log book. All there are are stories.

In sum, when we think critically about the stories in the supermarket tabloids, we usually find that they fall short of any reasonable requirements of evidence. In this chapter, we will see how scientists, as in the case of so-called alien abductions, sort out truth from fiction. Scientists, including psychologists, begin with an attitude of skepticism—a hallmark of critical thinking. Critical thinking is our first topic, a topic of crucial importance to you in your study of science and of just as crucial importance throughout your daily life. Then we will see how psychologists go about gathering evidence through various methods of research.

THINKING LIKE A PSYCHOLOGIST

Let's look at the world through the eyes of the psychologist. Psychologists are guided by scientific principles, and as noted earlier, one hallmark of science is **critical thinking**.

Question 1: What is critical thinking? Critical thinking has many meanings. On one level, it means taking nothing for granted. It means not believing things just because they are in print or because they were uttered by authority figures or celebrities. It means not necessarily believing that it is healthful to express all of your feelings just because a friend in therapy urges you to do so. On another level, critical thinking refers to a process of thoughtfully analyzing and probing the questions, statements, and arguments of others. It means examining definitions of terms, examining the premises or assumptions behind arguments, and then scrutinizing the logic with which arguments are developed.

The goals of critical thinking involve fostering the following thinking skills (Halpern, 2007; Sternberg, 2007):

- Development of skepticism about explanations and conclusions.
- The ability to inquire about causes and effects.
- Increased curiosity about behavior.
- Knowledge of research methods.
- The ability to analyze arguments critically.

*A great many people think they
are thinking when they are merely
rearranging their prejudices.*

WILLIAM JAMES

*Mental fight means thinking
against the current, not with it.
It is our business to puncture
gas bags and discover the seeds
of truth.*

VIRGINIA WOOLF

Critical thinking An approach to the examination of arguments based on skepticism, logical analysis, and insistence upon the importance of empirical evidence.

Principles of Critical Thinking

Let's consider some principles of critical thinking that can help you in college and beyond:

1. *Be skeptical:* Keep an open mind. Politicians and advertisers try to persuade you. Even research reported in the media or in textbooks may take a certain slant. Extend this principle to yourself. Are some of your own attitudes and beliefs superficial or unfounded? Accept nothing as the truth until you have examined the evidence.
2. *Examine definitions of terms:* Some statements are true when a term is defined in one way but not when it is defined in another way. Consider the statement, "Head Start programs have raised children's IQs." The correctness of the statement depends on the definition of IQ. (You will see later in the text that *IQ* has a specific meaning and is not exactly the same as *intelligence*.)
3. *Examine the assumptions or premises of arguments:* Consider the statement that one cannot learn about human beings by engaging in research with animals. One premise in the statement seems to be that human beings are not animals. We are, of course. (Would you rather be a plant?)
4. *Be cautious in drawing conclusions from evidence:* For many years, studies had shown that most clients who receive psychotherapy improve. It was therefore generally assumed that psychotherapy worked. Some 40 years ago, however, psychologist Hans Eysenck pointed out that most psychologically troubled people who did *not* receive psychotherapy also improved. The question thus becomes whether people receiving psychotherapy are *more* likely to improve than those who do not. Current research on the effectiveness of psychotherapy therefore carefully compares the benefits of therapy techniques to the benefits of other techniques or of no treatment at all. Be especially skeptical of anecdotes. When you hear "I know someone who . . .," ask yourself whether this one person's reported experience is satisfactory as evidence.
5. *Consider alternative interpretations of research evidence:* Does alcohol cause aggression? Later in this chapter we report evidence that there is a clear *connection*, or correlation, between alcohol and aggression. For example, many people who commit violent crimes have been drinking. But does the evidence show that drinking causes aggression? Might other factors, such as gender, age, or willingness to take risks, account for both drinking and aggressive behavior?
6. *Do not oversimplify:* Most human behavior involves complex interactions of genetic and environmental influences. Also consider the issue of whether psychotherapy helps people with psychological problems. A broad answer to this question—a simple yes or no—might be oversimplifying. It is more worthwhile to ask: What *type* of psychotherapy, practiced by *whom*, is most helpful for *what kind of problem*?
7. *Do not overgeneralize:* Consider the statement that one cannot learn about human beings by engaging in research with nonhuman animals. Is the truth of the matter an all-or-nothing issue? Are there certain kinds of information we can obtain about people from research with animals? What kinds of things are you likely to learn only through research with people?
8. *Apply critical thinking to all areas of life:* A skeptical attitude and a demand for evidence are not only useful in college but are of value in all areas of life. Be skeptical when you are bombarded by TV commercials, when political causes try to sweep you up, and when you see the latest cover stories about Elvis and UFO sightings in supermarket tabloids. How many times have you heard the claim "Studies have shown that . . ."? Perhaps such claims sound convincing, but ask yourself: Who ran the studies? Were the researchers neutral scientists, or were they biased toward obtaining certain results?



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In my view, an unexamined faith is not worth having, for fundamentalism and uncritical certitude entail the rejection of one of the great human gifts: that of free will, of the liberty to make up our own minds based on evidence and tradition and reason.

JON MEACHEM

A CLOSER LOOK • REAL LIFE

THINKING CRITICALLY ABOUT PSYCHOLOGICAL ADVICE ON THE INTERNET: ARE THERE ANY QUICK FIXES?

www.goaskalice.columbia.edu
www.cdc.gov
www.suicide.org
<http://www.nimh.nih.gov/health/topics/index.shtml>
<http://panicdisorder.about.com/>
www.depression.com
www.apa.org

These are just a few of the websites offering psychological advice that have flooded the Internet in recent years. These happen to be reliable. However, lonely people, anxious people, depressed people, confused people, and people with sexual problems surf the Internet every day in hope of finding a website that will provide the answer to their problems. How can they evaluate the merits of the websites they find?

There are no easy answers. Many of us believe the things we see posted, and anecdotes about how Tyrone lost 30 pounds in 2 months and how Maria learned to read her textbooks 10 times more rapidly—and increased her comprehension!—can have a powerful allure.

Be on guard. A price we pay for freedom of speech is that nearly anything can wind up posted on a website or in print (Wu, 2009). Authors can make extravagant claims with little fear of punishment. They can lie about the effectiveness of a new cure for acne or for feelings of depression as easily as they can lie about sightings of Elvis Presley or UFOs.

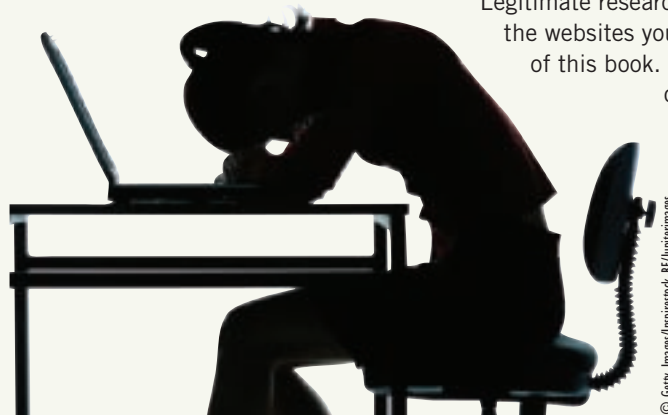
How can you protect yourself?
Try some critical thinking:

1. In this instance, *do* “judge the book by its cover.” Does the website look well organized? Do the links within the webpages work? A credible website will look professional and will be well maintained.
2. Ignore websites that make extravagant claims. If it sounds too good to be true, it probably is. No method helps everyone who tries it. Very few methods work overnight.
3. Check the credentials of the people who posted the information. Be suspicious if the author’s title is “Dr.” and is placed before the name. The degree could be a phony doctorate bought through the mail. It is better if the “doctor” has a Ph.D., Psy.D., M.D., or Ed.D. *after* her or his name.
4. Check authors’ affiliations. Professionals who are affiliated with colleges, universities, clinics, and hospitals may have more to offer than those who are not.
5. Check the *evidence* reported on the website. Unscientific websites (and books) usually make extensive use of personal *anecdotes*—unsupported stories or case studies about fantastic results with one or a few individuals. Responsible helping professionals test the effectiveness of techniques with large numbers of people. They carefully measure the outcomes. They use cautious language. For example, they say “It appears that . . .” or “It may be that . . .”

6. Check the reference citations for the evidence.

Legitimate research is reported in the journals or on the websites you will find in the References section of this book. If there are no links to reference citations or if the references look suspicious, you should be suspicious, too.

7. Ask your instructor for advice on what to do, where to go (electronically, perhaps), whom to talk to, what to read.
8. Talk to someone in your college or university counseling center.



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LearningConnections • THINKING LIKE A PSYCHOLOGIST

ACTIVE REVIEW (1) Critical thinking involves the development of _____ about explanations and conclusions. (2) Critical thinkers are cautious about drawing _____ from evidence.

REFLECT AND RELATE Who are the authority figures who try to shape your ideas in your own life? Would you insist that an authority figure provide scientific evidence for his or her views? Why or why not?

CRITICAL THINKING Why do people find it difficult to challenge authority figures?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

These are the kinds of principles that guide psychologists' thinking as they observe behavior, engage in research, or advise clients on how to improve the quality of their lives. Perhaps these principles will help you improve the quality of your own life.

HOW PSYCHOLOGISTS STUDY BEHAVIOR AND MENTAL PROCESSES

Consider some questions of interest to psychologists: Does alcohol cause aggression? Why do some people hardly ever think of food, whereas others are obsessed with it and snack all day long? Why do some unhappy people attempt suicide, whereas others seek ways of coping with their problems? Does having people of different ethnic backgrounds collaborate in their work serve to decrease or increase feelings of prejudice?

Many of us have expressed opinions—including some strong opinions—on questions like these. Various psychological theories also suggest possible answers. Modern psychology aims to be an **empirical science**, however. In an empirical science, we cannot test assumptions about the behavior of cosmic rays, chemical compounds, cells, or people unless we observe and measure that behavior. Assumptions must be supported by evidence. Strong arguments, personal stories, reference to authority figures, and even tightly knit theories are not adequate as scientific evidence. The guiding principle behind this kind of skepticism is the scientific method.

The Scientific Method: Putting Ideas to the Test

Question 2: What is the scientific method? The **scientific method** is an organized way of using experience and testing ideas to expand and refine knowledge. Psychologists do not necessarily follow the steps of the scientific method as we might follow a recipe in a cookbook. However, modern research ideally is guided by certain principles.

Psychologists usually begin by *formulating a research question*. Research questions can have many sources. Our daily experiences, psychological theory, and even folklore all help generate questions for research. Consider some questions that may arise from daily experience. Daily experience in using day-care centers may motivate us to conduct research on whether day care affects the development of social skills or the bonds of attachment between children and mothers. Social cognitive principles of observational learning may prompt research on the effects of TV violence.

Research questions may also arise from common knowledge. Consider familiar adages such as “misery loves company,” “opposites attract,” and “seeing is believing.” Psychologists may ask: *Does misery love company? Do opposites attract? Can people believe what they see?*

A research question may be studied as a question or reworded as a *hypothesis* (see Figure 2.1) ■. A **hypothesis** is a specific statement about behavior or mental processes that is testable through research. A nontestable hypothesis might be whether or not angels exist. Consider hypotheses within the science of psychology: A hypothesis about day care might be that preschoolers who are placed in day care will acquire greater social skills in relating to peers than preschoolers who are cared for in the home. A hypothesis about TV violence might be that elementary schoolchildren who watch more violent TV shows tend to behave more aggressively toward their peers.

Psychologists next examine the research question or *test the hypothesis* through controlled methods such as the *experiment*, which we'll discuss shortly. For example, we could take a group of preschoolers who attend day care and another group who do not, and introduce each to a new child in a controlled setting such as a child-research center. We could then observe how children in each group interact with the new acquaintance.

Psychologists draw conclusions about their research questions or the accuracy of their hypotheses on the basis of their observations or findings. When their observations do not bear out their hypotheses, they may modify the theories from which the hypotheses were derived. Research findings often suggest refinements to psychological theories and, consequently, new avenues of research.

In our research on day care, we would probably find that children in day care show greater social skills than children who are cared for in the home (Belsky et al., 2001).

Science is a way of thinking much more than it is a body of knowledge.

CARL SAGAN

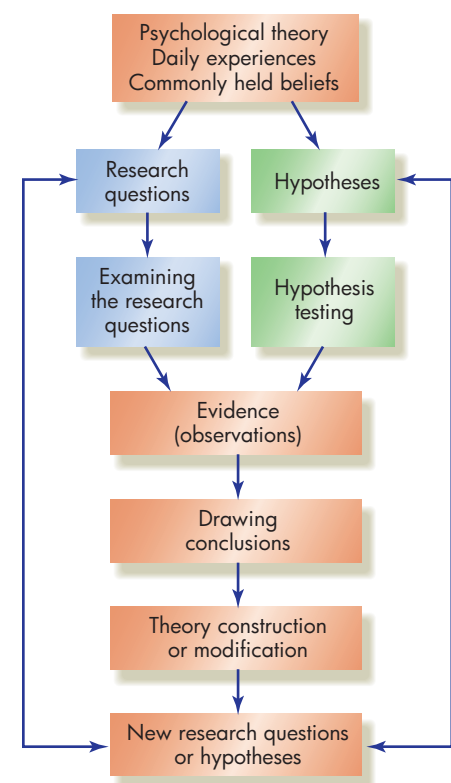


Figure 2.1 ■ The Scientific Method

The scientific method is a systematic way of organizing and expanding scientific knowledge.

Empirical science A science that obtains evidence by experience or experimentation.

Scientific method An approach to acquiring or confirming knowledge that is based on gathering measurable evidence through observation and experimentation. Evidence is often obtained to test hypotheses.

Hypothesis Within the science of psychology, a specific statement about behavior or mental processes that is testable through research.

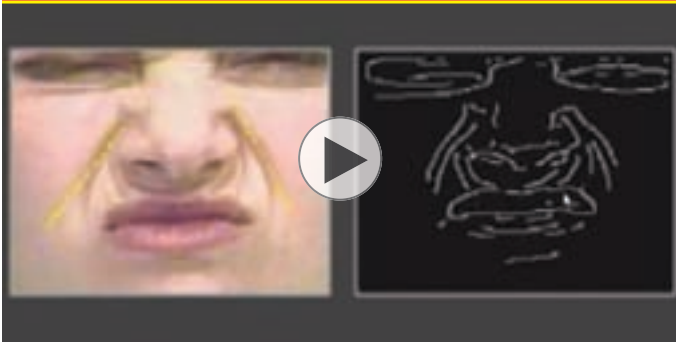
We would probably also find that more aggressive children spend more time watching TV violence.

As psychologists draw conclusions from research evidence, they are guided by principles of critical thinking. For example, they try not to confuse **correlations**—or associations—between findings with cause and effect. Although more aggressive children apparently spend more time watching violent TV shows, it may be erroneous to conclude from this kind of evidence that TV violence *causes* aggressive behavior. Perhaps a **selection factor** is at work—because the children studied choose (select) for themselves what they will watch. Perhaps more aggressive children are more likely than less aggressive children to tune in to violent TV shows.

To better understand the effects of the selection factor, consider a study on the relationship between exercise and health. Imagine that we were to compare a group of people who exercised regularly with a group of people who did not. We might find that the exercisers were physically healthier than the couch potatoes. But could we conclude without doubt that exercise is a causal factor in good health? Perhaps not. The selection factor—the fact that one group chose to exercise and the other did not—could also explain the results. Perhaps healthier people are more likely to *choose* to exercise. As we will see in the section on experimentation, psychologists could control for the selection factor in a study on the effects of exercise by randomly assigning some people to a specific kind of exercise and assigning other people to another type of exercise or to no exercise at all. Then after a reasonable period of time had passed, they could assess the results in physical terms, such as weight gain or loss, and in psychological terms, such as changes in levels of anxiety or depression.

Some psychologists include the publication of research reports in professional journals as a crucial part of the scientific method. Researchers are obligated to provide enough details of their work so that others will be able to repeat or **replicate** it to see whether the findings hold up over time and with different participants. Publication of research also permits the scientific community at large to evaluate the methods and conclusions of other scientists.

Video Connections—Facial Analysis—The Scientific Method in Action



Will you soon be using your camera cell phone to snap a picture of someone, send it to a lab for analysis, and get a report back on the person? View the video to understand more about the scientific method in action.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

Samples and Populations: Hitting the Target Population

Consider a piece of history that never quite happened: The Republican candidate Alf Landon defeated the incumbent president, Franklin D. Roosevelt, in 1936. Or at least Landon did so in a poll conducted by a popular magazine of the day, the *Literary Digest*. In the actual election, however, Roosevelt routed Landon by a landslide of 11 million votes. **Truth or Fiction Revisited:** It is true that you could survey millions of voters and still not predict the outcome of a presidential election. In effect, the *Digest* accomplished something like this when they predicted a Landon victory. How was so great a discrepancy possible?

The *Digest*, you see, had surveyed voters by phone. Today, telephone sampling is a widely practiced and reasonably legitimate polling technique. But the *Digest* poll was taken during the Great Depression, when people who had telephones were much wealthier than those who did not. People at higher income levels are also more likely to vote Republican. No surprise, then, that the overwhelming majority of those sampled said they would vote for Landon.

Question 3: How do psychologists use samples to represent populations? The *Digest* poll failed because of its method of sampling.

A **sample** is a segment of a **population** that must be drawn so that it accurately *represents* that population. Only representative samples allow us to **generalize**—or *extend*—our findings from research samples to target populations, such as U.S. voters, and not subgroups, such as Southern Californians or European American members of the middle class.



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PROBLEMS IN GENERALIZING FROM PSYCHOLOGICAL RESEARCH

Many factors must be considered when interpreting the accuracy of the results of scientific research. One is the nature of the research sample.

Later in the chapter, we consider research in which the participants were drawn from a population of college men who were social drinkers. That is, they tended to drink at social gatherings but not when alone. Whom do college men represent other than themselves? To whom can we extend, or generalize, the results? For one thing, the results may not extend to women, not even to college women. In the chapter on consciousness, for example, we will learn that alcohol affects women more quickly than men.

In addition, compared to the general adult male population, college men tend to be younger and score higher on intelligence tests. We cannot be certain that the findings extend to older men or to those with lower intelligence test scores, although it seems reasonable to assume they do. Social drinkers may also differ biologically and psychologically from alcoholics, who have difficulty controlling their drinking. Nor can we be certain that male college social drinkers represent people who do not drink at all.

By and large, we must also question whether findings of research with men can be generalized to women and whether research with European American men can be extended to members of ethnic minority groups. For example, personality tests completed by European Americans and by African Americans may need to be interpreted in diverse ways if accurate conclusions are to be drawn. The well-known Kinsey studies on sexual behavior (Kinsey et al., 1948; Kinsey et al., 1953) did not adequately represent African Americans, low-income people, older people, and numerous other groups.

RANDOM AND STRATIFIED SAMPLING

One way to achieve a representative sample is by means of random sampling. In a **random sample**, each member of a population has an equal chance of being selected to participate. Researchers can also use a **stratified sample**, which is selected so that identified subgroups in the population are represented proportionately in the sample. For instance, 13% of the American population is African American. A stratified sample would thus be 13% African American. As a practical matter, a large randomly selected sample will show reasonably accurate stratification. For example, a random sample of 1,500 people will represent the broad American population reasonably well. However, a sample of 20 million drawn either in the North or the South or the East or the West will not.

Large-scale magazine surveys of sexual behavior have asked readers to fill out and return questionnaires. Although many thousands of readers completed the questionnaires and sent them in, did the survey respondents represent the American population? Probably not. These and similar studies may have been influenced by **volunteer bias**. People who offer or volunteer to participate in research studies differ systematically from people who do not. In the case of research on sexual behavior, volunteers may represent subgroups of the population—or of readers of the magazines in question—who are willing to disclose intimate information and therefore may also be likely to be more liberal in their sexual behavior (Rathus et al., 2011). Volunteers may also be more interested in research than other people, as well as have more spare time. How might such volunteers differ from the population at large? How might such differences slant or bias the research outcomes?

As we discuss in the next section, another bias in the case study and survey methods of research is social desirability. That is, many people involved in research studies tend to tell the interviewer what they think the interviewer would like to hear and not what they really think. You can gain insight into whether you tend to express your genuine feelings or socially desirable answers by completing the nearby Social-Desirability Scale.

Methods of Observation: The Better to See You With

Many people consider themselves experts on behavior and mental processes. How many times, for example, have you or someone else been eager to share a life experience that proves some point about human nature?

*All generalizations are dangerous,
even this one.*

ALEXANDRE DUMAS

Correlation An association or relationship among variables, as we might find between height and weight or between study habits and school grades.

Selection factor A source of bias that may occur in research findings when participants are allowed to choose for themselves a certain treatment in a scientific study.

Replicate Repeat, reproduce, copy.

Sample Part of a population.

Population A complete group of organisms or events.

Generalize To extend from the particular to the general; to apply observations based on a sample to a population.

Random sample A sample drawn so that each member of a population has an equal chance of being selected to participate.

Stratified sample A sample drawn so that identified subgroups in the population are represented proportionately in the sample.

Volunteer bias A source of bias or error in research reflecting the prospect that people who offer to participate in research studies differ systematically from people who do not.

SELF ASSESSMENT

Dare You Say What You Think? The Social-Desirability Scale

One of the problems researchers encounter during surveys and case studies is that of social desirability. That is, people being interviewed may tell the researcher what they think the researcher wants to hear and not what they really believe. In doing so, they may provide the so-called *socially desirable answer*—the answer they believe will earn the approval of the researcher. Falling prey to social desirability may cause us to distort our beliefs and experiences in interviews and psychological tests. The bias toward responding in socially desirable directions is a source of error in the case study and survey methods.

What about you? Do you say what you think, or do you tend to misrepresent your beliefs to earn the approval of others? Do you answer questions honestly, or do you say what you think other people want to hear?

You can complete the Social-Desirability Scale devised by Crowne and Marlowe to gain insight into whether you have a tendency to produce socially desirable responses.

Directions: Read each item and decide whether it is true (T) or false (F) for you. Try to work rapidly and answer each question by circling the T or the F. Then turn to the scoring key in the appendix to interpret your answers.

- | | | | | | | | |
|---|---|-----|--|---|---|-----|---|
| T | F | 1. | Before voting, I thoroughly investigate the qualifications of all the candidates. | T | F | 13. | No matter whom I'm talking to, I'm always a good listener. |
| T | F | 2. | I never hesitate to go out of my way to help someone in trouble. | T | F | 14. | I can remember "playing sick" to get out of something. |
| T | F | 3. | It is sometimes hard for me to go on with my work if I am not encouraged. | T | F | 15. | There have been occasions when I have taken advantage of someone. |
| T | F | 4. | I have never intensely disliked anyone. | T | F | 16. | I'm always willing to admit it when I make a mistake. |
| T | F | 5. | On occasions I have had doubts about my ability to succeed in life. | T | F | 17. | I always try to practice what I preach. |
| T | F | 6. | I sometimes feel resentful when I don't get my way. | T | F | 18. | I don't find it particularly difficult to get along with loudmouthed, obnoxious people. |
| T | F | 7. | I am always careful about my manner of dress. | T | F | 19. | I sometimes try to get even rather than forgive and forget. |
| T | F | 8. | My table manners at home are as good as when I eat out in a restaurant. | T | F | 20. | When I don't know something I don't mind at all admitting it. |
| T | F | 9. | If I could get into a movie without paying and be sure I was not seen, I would probably do it. | T | F | 21. | I am always courteous, even to people who are disagreeable. |
| T | F | 10. | On a few occasions, I have given up something because I thought too little of my ability. | T | F | 22. | At times I have really insisted on having things my own way. |
| T | F | 11. | I like to gossip at times. | T | F | 23. | There have been occasions when I felt like smashing things. |
| T | F | 12. | There have been times when I felt like rebelling against people in authority even though I knew they were right. | T | F | 24. | I would never think of letting someone else be punished for my wrongdoings. |
| | | | | T | F | 25. | I never resent being asked to return a favor. |
| | | | | T | F | 26. | I have never been irked when people expressed ideas very different from my own. |
| | | | | T | F | 27. | I never make a long trip without checking the safety of my car. |
| | | | | T | F | 28. | There have been times when I was quite jealous of the good fortune of others. |
| | | | | T | F | 29. | I have almost never felt the urge to tell someone off. |
| | | | | T | F | 30. | I am sometimes irritated by people who ask favors of me. |
| | | | | T | F | 31. | I have never felt that I was punished without cause. |
| | | | | T | F | 32. | I sometimes think when people have a misfortune they only got what they deserved. |
| | | | | T | F | 33. | I have never deliberately said something that hurt someone's feelings. |

Source: D. P. Crowne and D. A. Marlowe, A new scale of social desirability independent of pathology, *Journal of Consulting Psychology*, 24 (1960): 351. Copyright 1960 by the American Psychological Association.

Indeed, we see much during our lifetimes. However, our personal observations tend to be fleeting and unsystematic. We sift through experience for the things that interest us. We often ignore the obvious because it does not fit our assumptions about the way things ought to be. Scientists, however, have devised more controlled ways of observing others. **Question 4: What methods of observation do psychologists use?** In this section, we consider three methods of observation widely used by psychologists and other behavioral scientists: the case study, survey, naturalistic observation, and brain imaging methods.

CASE STUDY

We begin with the case study method because our own informal ideas about human nature tend to be based on **case studies**, or information we collect about individuals and small groups through interviews, questionnaires, and psychological tests. But most of us gather our information haphazardly. We often see only what we want to see. Ideally, psychologists attempt to gather information about individuals more carefully.

Case studies are sometimes used to investigate rare occurrences, as in the case of “Eve,” immortalized in the film *The Three Faces of Eve*. Eve was an example of a person with multiple personalities (technically termed *dissociative identity disorder*). “Eve White” was a mousy, well-intentioned woman who had two other “personalities” living inside her. One was “Eve Black,” a promiscuous personality who emerged now and then to take control of her behavior. The third personality, “Jane,” was a well-adjusted woman who integrated parts of Eve White and Eve Black.

Case studies can provide compelling portraits of individuals, but they also have some sources of inaccuracy. For example, there are gaps and factual inaccuracies in people’s memories (Bernstein & Loftus, 2009). People may also distort their pasts due to social desirability or because they want to remember things in certain ways. Interviewers may also have certain expectations and may subtly encourage participants to fill in gaps in ways that are consistent with these expectations. Psychoanalysts, for example, have been criticized for guiding people who seek their help into viewing their own lives from the psychodynamic perspective (Hergenhahn, 2009). No wonder, then, that many people provide “evidence” that is consistent with psychodynamic theory—such as, “My parents’ inept handling of my toilet training is the source of my compulsive neatness.” However, interviewers and other kinds of researchers who hold *any* theoretical viewpoint run the risk of indirectly prodding people into saying what they want to hear.

THE SURVEY

In the good old days, we had to wait until the wee hours of the morning to learn the results of local and national elections. Throughout the evening and early morning hours, suspense would build as ballots from distant neighborhoods and states were tallied. Nowadays, we are barely settled with an after-dinner cup of coffee on election night when reporters announce that a computer has examined the ballots of a “scientifically selected sample” and predicted the next president of the United States. All of this may occur with less than 1% of the vote tallied.

Just as computers and pollsters predict election results and report national opinion on the basis of scientifically selected samples, psychologists conduct **surveys** to learn about behavior and mental processes that cannot be observed in the natural setting or studied experimentally. Psychologists conducting surveys may employ questionnaires and interviews or examine public records. One of the advantages of the survey is that by distributing questionnaires and analyzing answers with a computer, psychologists can study many thousands of people at a time (Schwartz, 2007).

Alfred Kinsey of Indiana University and his colleagues published two surveys of sexual behavior, based on interviews, that shocked the nation. These were *Sexual Behavior in the Human Male* (1948) and *Sexual Behavior in the Human Female* (1953). Kinsey reported that masturbation was virtually universal in his sample of men at a time when



© Fredfall Images/Alamy

Case study A carefully drawn biography that may be obtained through interviews, questionnaires, and psychological tests.

Survey A method of scientific investigation in which a large sample of people answer questions about their attitudes or behavior.



© Photos 12/Alamy

Investigating Human Sexuality In the film biography *Kinsey*, Liam Neeson played Alfred Kinsey, the scientist who investigated human sexuality during a time when even talking about sex was considered indecent.

Naturalistic observation A scientific method in which organisms are observed in their natural environments.



Naturalistic Observations Jane Goodall's naturalistic observations revealed that chimpanzees—like humans—use tools and greet one another with a kiss.

masturbation was still widely thought to impair health. He also reported that about one woman in three who was still single at age 25 had engaged in premarital intercourse.

Surveys, like case studies, have various sources of inaccuracy (Schwartz, 2007). People may recall their behavior inaccurately or purposefully misrepresent it. Some people try to ingratiate themselves with their interviewers by answering in what they perceive to be the socially desirable direction. The Kinsey studies all relied on male interviewers, for example. It has been speculated that female interviewees might have been more open and honest with female interviewers. Similar problems may occur when interviewers and the people surveyed are from different ethnic or socioeconomic backgrounds. Other people may falsify their attitudes and exaggerate their problems to draw attention to themselves or intentionally foul up the results.

Consider some examples of survey measurement errors caused by inaccurate self-reports of behavior. If people brushed their teeth as often as they claimed and used the amount of toothpaste they indicated, three times as much toothpaste would be sold in the United States as is actually sold (Koerber et al., 2006). People also appear to overreport the degree to which they follow doctors' orders (Wilson et al., 2009) and to underreport how much they smoke (Swan et al., 2007). Why do you think this is so?

INTERNET SURVEYS Many surveys today are conducted over the Internet. The websites of magazines such as *Cosmopolitan* and *Elle* frequently encourage visitors to fill out online questionnaires, for example. Professional psychologists also use the Internet to conduct research.

One Internet study sought to determine which psychotherapists were considered most influential among practitioners of psychotherapy today (Cook et al., 2009). The research group targeted readers of a psychotherapy magazine, the *Psychotherapy Networker* (PN). They justified their choice by pointing out that the magazine received the “esteemed” National Magazine Award and was named by the *Chicago Tribune* as “one of the 50 Best Magazines in America.” They e-mailed some 22,000 readers—about 40% of the readership who had listed e-mail addresses, and the magazine editor also wrote the membership, endorsing the survey. About 13% of readers contacted (2,902 readers) consented to participate, and the responses of 2,647 readers were analyzed. The researchers compared the responses of psychologists and others, including social workers, counselors, and so on. Cognitive therapist Aaron Beck was considered most influential by psychologists, mentioned by nearly one psychologist in four (24.1%) but only by about one in nine (11.7%) nonpsychologists. The most influential psychotherapist overall was Carl Rogers, with mentions by nearly one psychotherapist in five, whether psychologist or nonpsychologist. We will discuss Aaron Beck and Carl Rogers in Chapter 16—“Methods of Therapy.”

Let's say you're looking to be a critical thinker. Would you agree that the readers of PN are representative of psychologists in general? Why or why not? What of readers who chose to participate? Do they represent all readers of PN? Why or why not? What sampling problems did the researchers have? Do you imagine that these problems would apply to other Internet studies? Why or why not?

NATURALISTIC OBSERVATION

You use **naturalistic observation**—that is, you observe people in their natural habitats—every day. So do psychologists and other scientists. Naturalistic observation has the advantage of allowing psychologists and other scientists to observe behavior where it happens, or “in the field.” In doing so, researchers use unobtrusive measures to avoid interfering with the behaviors they are observing. For example, Jane Goodall has observed the behavior of chimpanzees in their natural environment to learn about their social behavior, sexual behavior, use of tools, and other facts of chimp life (Peterson, 2006; Pusey et al., 2008). Her observations have shown us that (a) we were incorrect to think that only humans use tools and (b) kissing on the lips, as a greeting, is apparently used by chimpanzees as well as by humans.

Jane Goodall observed her chimpanzees with her own eyes. As we see next, other researchers might take images of things going on in the brains of chimpanzees—and humans—while they are thinking.

In Profile

His parents named him Francis. I think of him as Mr. Measurement.

Englishman Sir Francis Galton (1822–1911) was reading and writing by the age of 2½. He read Shakespeare for pleasure at the age of 7. He invented weather maps and coined the now-familiar climate terms *high*, *low*, and *front*. He innovated the use of fingerprinting for purposes of identification. He was also Charles Darwin’s cousin. Independently wealthy, young Galton attended medical school for a while and then dropped out. He traveled in the Middle East and Africa and mapped out previously uncharted territories. He assumed that intelligence could be measured by means of sensory sharpness (it cannot) and constructed devices to measure the keenness of the senses. He also believed that intelligence was inherited and founded the eugenics movement, which proposed that only bright people should mate. In fact, he wanted the British government to pay people who shared desirable traits to marry and bear children. These views have since caused him to be branded as exclusionary and racist.



SIR FRANCIS GALTON

© The Granger Collection, New York

But Galton’s fascination with measurement led to many positive innovations in the field of psychology, such as the use of questionnaires and twin studies. He invented the use of the correlational method so that there would be a mathematical way to see what goes with what—that is, the relationship between variables, as discussed on page 41. For example, he sought ways to measure the amount of boredom in the audience at scientific lectures—an undertaking that probably did not heighten his popularity with his fellow scientists. He also sought to measure the effectiveness of prayers (he concluded that they were ineffective) and to determine which nation had the world’s most attractive women. He chose his native England, mistakenly assuming that the local standards for beauty were universal.

Despite Galton’s missteps, observation and the measurement of observations are keys to the scientific method. Much of what Galton taught, such as the use of questionnaires and the correlational method, remains in use today.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Sir Francis Galton.

IMAGING THE BRAIN

“Gage is no longer Gage,” said those who had known him before the accident. There are many key characters in the history of psychology, and some of them did not arrive there intentionally. One of these was a railroad worker, Phineas Gage, who was helping our young nation stretch from coast to coast. Gage was admired by his friends and his coworkers. But all that changed one day in 1848. While he was tamping down the blasting powder for a dynamite charge, Gage accidentally set the powder off. The inch-thick metal tamping rod shot upward through his cheek and brain and out the top of his head (see Figure 2.2) ■.



Reprinted with permission from Damasio, H., Gravowski, T., Frank, R., Galaburda, A.M., Dumusio, A.R.: “The Return of Phineas Gage: Clues About the Brain from the Skull of a Famous Patient.” *Science*, 264: 1102–1105, © 1994. Department of Neurology and Image Analysis Facility, University of Iowa.

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Figure 2.2 ■ Two Views of Phineas

Gage The drawing shows the trajectory of a tamping rod through his head. The photo shows him holding the rod, blinded in the left eye. “Here is business enough for you” Gage allegedly told the first doctor to treat him after a premature detonation on a railroad building site turned the rod into a missile.

If the trajectory of the rod had been slightly different, Gage would have died. Although Gage fell back in a heap, he was miraculously alive. His coworkers watched in shock as he stood up a few moments later and spoke. While the local doctor marveled at the hole through Gage's head, Gage asked when he'd be able to return to work. Two months later, Gage's external wounds had healed, but the psychological wounds were now obvious. Gage had become undependable, foul-mouthed, and ill-mannered.

Generations of researchers—psychologists, physicians, biologists, neuroscientists—have wondered how the changes in Gage's personality might have been caused by the damage to his brain. Perhaps the trajectory of the rod spared parts that are involved in language and movement but damaged areas connected with personality and emotional response.

When Gage had his accident, the only ways to look into the brain were to drill holes or crack it open, neither of which would have contributed to the well-being of the participant. But researchers today use computers to generate images of parts of the brain without invading it. A number of imaging methods are in use.

As shown in Figure 2.3 ■, *computerized axial tomography*, or a *CAT scan*, passes a narrow X-ray beam through the head and measures the structures that reflect the X-rays from various angles, generating a three-dimensional image of the brain. The CAT scan reveals deformities in shape and structure that are connected with blood clots, tumors, and other health problems. *Positron emission tomography (PET scan)* forms a computer-generated image of the activity of parts of the brain by tracing the amount of glucose used (or metabolized) by these parts. More glucose is metabolized in more active parts of the brain. In *functional magnetic resonance imaging (fMRI)*, the person lies in a powerful magnetic field and is exposed to radio waves that cause parts of the brain to emit signals, which are measured from several angles. fMRI relies on subtle shifts in blood flow. (More blood flows to more active parts of the brain, supplying them with oxygen.) fMRI can record brain signals without the risk of radiation found in CAT and PET scans. The PET scan and fMRI have been used by researchers to see which parts of the brain are most active when we are, for example, listening to music, working out a math problem, using language, or playing chess (Krueger et al., 2008; Newman et al., 2009; Stocco & Anderson, 2008). fMRI has shown that people with the psychological disorder known as schizophrenia have smaller prefrontal regions (see Figure 2.3) of the cortex than other people but larger ventricles (hollow spaces) in the brain (Mata et al., 2009).

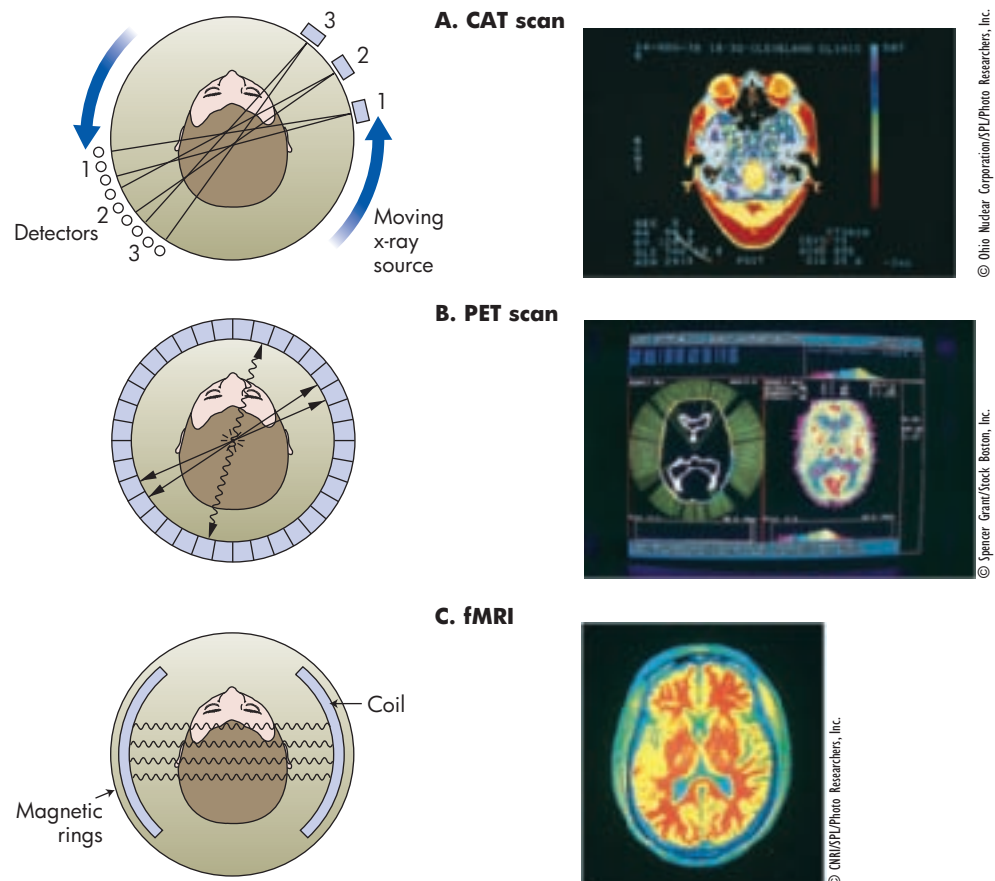


Figure 2.3 ■ Brain Imaging Techniques Part A Shows a CAT scan, part B a PET scan, and part C an fMRI.

Research with PET scans and fMRIs suggests that the prefrontal part of the brain is where we do much of the work in making plans and solving problems (Gilbert et al., 2008; Wang et al., 2008). Many researchers refer to the prefrontal cortex as the brain's "executive center," where we think about and develop solutions to verbal and spatial problems.

Correlation: On How Things Go Together—or Not

Are people with higher intelligence more likely to do well in school? Are people with a stronger need for achievement likely to climb higher up the corporate ladder? What is the relationship between stress and health?

Such questions are often answered by means of the **correlational method**. **Question 5: What is the correlational method?** By using the correlational method, psychologists investigate whether observed behavior or a measured trait is related to, or correlated with, another. Consider the variables of intelligence and academic performance. These variables are assigned numbers such as intelligence test scores and academic averages. Then the numbers are mathematically related and expressed as a **correlation coefficient**. A correlation coefficient is a number between +1.00 and -1.00 that expresses the strength and direction (positive or negative) of the relationship between two variables.

Studies report **positive correlations** between intelligence test scores and academic achievement, as measured, for example, by grade point averages. Generally speaking, the higher people score on intelligence tests, the better their academic performance is likely to be. The scores attained on intelligence tests tend to be positively correlated (about +0.30 to +0.60) with academic achievement (see Figure 2.4) ■. But factors *other* than performance on intelligence tests also contribute to academic success. These include desire to get ahead, self-discipline, ability to manage stress, and belief in one's ability to succeed (Duckworth & Seligman, 2005; Jennings et al., 2009; Thomas, 2008).

Many correlations are **negative correlations**; that is, as one variable increases, the other variable decreases. For example, there is a negative correlation between stress and health. As the amount of stress affecting us increases, the functioning of our immune system decreases. Under high levels of stress, many people show poorer health.

What kinds of correlations (positive or negative) would you expect to find among behavior patterns such as the following: Churchgoing and crime? Language ability and musical ability? Level of education and incidence of teenage pregnancy? Grades in school and delinquency? Why?

Correlational research may *suggest* but does not *prove* cause and effect. For instance, it may seem logical to assume that high intelligence makes it possible for children to profit from education. Research has also shown, however, that education contributes to higher scores on intelligence tests (Nisbett, 2009). Preschoolers who are

Correlational method A mathematical method of determining whether one variable increases or decreases as another variable increases or decreases. For example, there is a correlation between intelligence test scores and grades in school.

Correlation coefficient A number between +1.00 and -1.00 that expresses the strength and direction (positive or negative) of the relationship between two variables.

Positive correlation A relationship between variables in which one variable increases as the other also increases.

Negative correlation A relationship between two variables in which one variable increases as the other decreases.

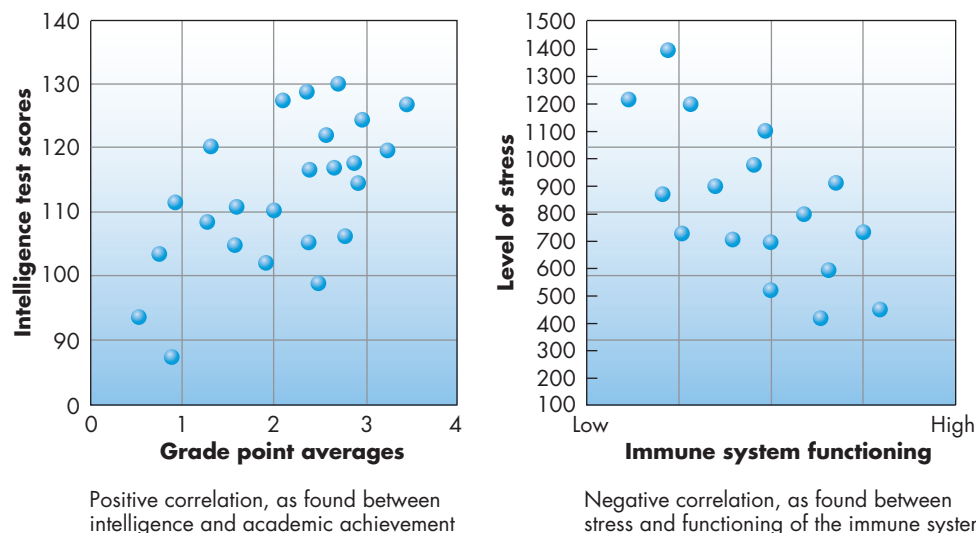
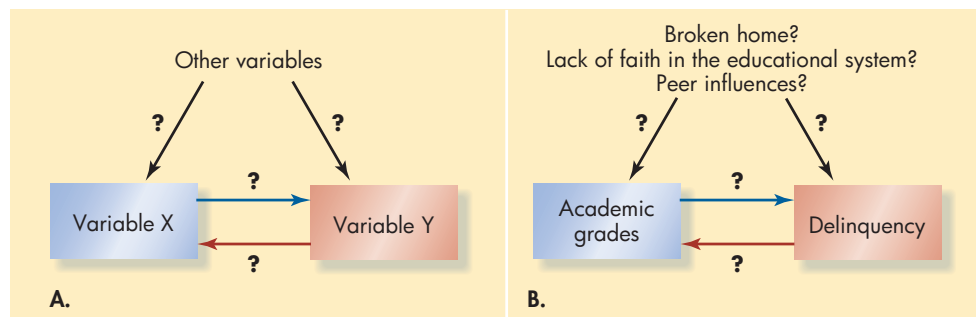


Figure 2.4 ■ Positive and Negative Correlations When there is a positive correlation between variables, as there is between intelligence and achievement, one increases as the other increases. By and large, the higher people score on intelligence tests, the better their academic performance is likely to be, as in the diagram to the left. (Each dot represents an individual's intelligence test score and grade point average.) But there is a negative correlation between stress and health. As the amount of stress we experience increases, the functioning of our immune system tends to decrease.

Figure 2.5 ■ Correlational Relationships, Cause, and Effect Correlational relationships may suggest but do not demonstrate cause and effect. In part A, there is a correlation between variables X and Y. Does this mean that either variable X causes variable Y or that variable Y causes variable X? Not necessarily. Other factors could affect both variables X and Y. Consider the examples of academic grades (variable X) and juvenile delinquency (variable Y) in part B. There is a negative correlation between the two. Does this mean that poor grades contribute to delinquency? Perhaps. Does it mean that delinquency contributes to poor grades? Again, perhaps. But there could also be other variables—such as a broken home, lack of faith in the educational system, or peer influences—that contribute both to poor grades and delinquency.



placed in stimulating Head Start programs later attain higher scores on intelligence tests than age-mates who did not have this experience. The relationship between intelligence and academic performance may not be as simple as we think. What of the link between stress and health? Does stress impair health, or is it possible that people in poorer health encounter more stress? (See Figure 2.5. ■)

The Experimental Method: Trying Things Out

Question 6: What is the experimental method? Most psychologists agree that the preferred method for answering questions about cause and effect is the experiment. In an **experiment**, a group of participants obtains a **treatment**, such as a dose of alcohol, a change in room temperature, or perhaps an injection of a drug. The participants are then observed carefully to determine whether the treatment makes a difference in their behavior. Does alcohol alter the ability to take tests, for example? What about differences in room temperatures and level of background noise?

Experiments are used whenever possible because they allow psychologists to control the experiences of participants and draw conclusions about cause and effect (Roediger & McCabe, 2007). A psychologist may theorize that alcohol leads to aggression because it reduces fear of consequences or because it energizes the activity levels of drinkers (Sayette et al., 2009). She or he may then hypothesize that a treatment in which participants receive a specified dosage of alcohol will lead to increases in aggression. Let's follow the example of the effects of alcohol on aggression to further our understanding of the experimental method.

INDEPENDENT AND DEPENDENT VARIABLES

In an experiment to determine whether alcohol causes aggression, participants are given an amount of alcohol and its effects are measured. In this case, alcohol is an **independent variable**. The presence of an independent variable is manipulated by the experimenters so that its effects may be determined. The independent variable of alcohol may be administered at different levels, or doses, from none or very little to enough to cause intoxication or drunkenness.

The measured results, or outcomes, in an experiment are called **dependent variables**. The presence of dependent variables presumably depends on the independent variables. In an experiment to determine whether alcohol influences aggression, aggressive behavior would be a dependent variable. Other dependent variables of interest might include sexual arousal, visual-motor coordination, and performance on intellectual tasks such as defining words or doing numerical computations.

In an experiment on the relationships between temperature and aggression, temperature would be an independent variable and aggressive behavior would be a dependent variable. We could set temperatures from below freezing to blistering hot and study its effects on aggression. We could also use a second independent variable such as social provocation. That is, we could insult some participants but not others and see whether insults affect their level of aggression. This method would allow us to study how two independent variables—temperature and social provocation—affect aggression, singly and/or together.

Experiment A scientific method that seeks to confirm cause-and-effect relationships by introducing independent variables and observing their effects on dependent variables.

Treatment In experiments, a condition received by participants so that its effects may be observed.

Independent variable A condition in a scientific study that is manipulated so that its effects may be observed.

Dependent variable A measure of an assumed effect of an independent variable.

EXPERIMENTAL AND CONTROL GROUPS

Ideal experiments use experimental groups and control groups. Participants in **experimental groups** obtain the treatment. Members of **control groups** do not. Every effort is made to ensure that all other conditions are held constant for both groups. This method enhances the researchers' ability to draw conclusions about cause and effect. The researchers can be more confident that outcomes of the experiment are caused by the treatments and not by chance factors or chance fluctuations in behavior.

For example, in an experiment on the effects of alcohol on aggression, members of the experimental group would ingest alcohol, and members of the control group would not (Eriksson, 2008). The researcher would then measure how much aggression was expressed by each group. In a complex version of this experiment, different experimental groups might ingest different dosages of alcohol and be exposed to different types of social provocations as well.

BLINDS AND DOUBLE BLINDS

One experiment on the effects of alcohol on aggression (Boyatzis, 1974) reported that men at parties where beer and liquor were served acted more aggressively than men at parties where only soft drinks were served. But participants in the experimental group knew they had drunk alcohol, and those in the control group knew they had not. Aggression that appeared to result from alcohol might not have reflected drinking per se. Instead, it might have reflected the participants' expectations about the effects of alcohol. People tend to act in stereotypical ways when they believe they have been drinking alcohol (Eriksson, 2008). For instance, men who have been drinking alcohol tend to become less anxious in social situations, more aggressive, and more sexually aroused. To what extent do these behavior patterns reflect the direct effects of alcohol on the body and to what extent do they affect people's beliefs about the effects of alcohol?

In medicine, physicians have sometimes given patients **placebos** (or "sugar pills") when the patient insisted on having a medical cure but the physician did not believe that medicine was necessary. When patients report that placebos have helped them, it is because they expected the pills to be of help and not because of the direct effect of the pills on their bodies. Psychologists and other researchers have adopted the lore of the sugar pill to sort out the effects of actual treatments from people's expectations about the effects of those treatments. Placebos are not limited to pills made of sugar. When participants in psychological experiments are given placebos such as tonic water, but they think they have drunk alcohol, we can conclude that changes in their behavior stem from their beliefs about the effects of alcohol, not from the alcohol itself.

Well-designed experiments control for the effects of expectations by creating conditions under which participants are unaware of, or **blind** to, the treatment. Yet researchers may also have expectations. They may, in effect, be "rooting for" a certain treatment outcome, a phenomenon known as **experimenter bias**. For instance, tobacco company executives may wish to show that cigarette smoking is harmless. In such cases, it is useful if the people measuring the experimental outcomes are unaware of which participants have received the treatment. Studies in which neither the participants nor the experimenters know who has obtained the treatment are called **double-blind studies**.

Truth or Fiction Revisited: Neither the participants nor the researchers know who is receiving the real treatment in many experiments. For example, the Food and Drug Administration requires double-blind studies before it allows the marketing of new drugs. The drug and the placebo look and taste alike. Experimenters assign the drug or placebo to participants at random. Neither the participants nor the observers know who is taking the drug and who is taking the placebo. After the final measurements have been made, a neutral panel (a group of people who have no personal stake in the outcome of the study) judges whether the effects of the drug differed from those of the placebo.

In one double-blind study on the effects of alcohol, Alan Lang and his colleagues (1975) pretested a highball of vodka and tonic water to determine that it could not be discriminated by taste from tonic water alone. They recruited college men who described themselves as social drinkers to participate in the study. Some of the men drank vodka



Correlations What kind of correlation would you expect to find between grades in school and delinquency? Why?

Experimental groups In experiments, groups whose members obtain the treatment.

Control groups In experiments, groups whose members do not obtain the treatment, while other conditions are held constant.

Placebo A bogus treatment that has the appearance of being genuine.

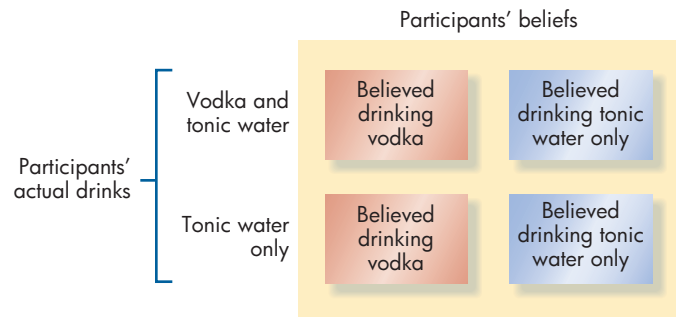
Blind In experimental terminology, being unaware of whether one has received a treatment or not.

Experimenter bias A condition in which a researcher expects or desires a certain outcome in a research study, possibly affecting the outcome.

Double-blind study A study in which neither the participants nor the observers know who has received the treatment.



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BRUNUS, PSYCH 1/e. © 2009 Cengage Learning.

Figure 2.6 ■ The Experimental Conditions in the Lang Study The taste of vodka cannot be discerned when vodka is mixed with tonic water. For this reason, it was possible for subjects in the Lang study on the effects of alcohol to be kept “blind” as to whether or not they had actually drunk alcohol. Blind studies allow psychologists to control for the effects of study participants’ expectations.

and tonic water. Others drank tonic water only. Of the men who drank vodka, half were misled into believing they had drunk tonic water only (see Figure 2.6) ■. Of those who drank tonic water only, half were misled into believing their drink contained vodka. Thus, half the participants were blind to their treatment. Experimenters who measured the men’s aggressive responses were also blind concerning which participants had drunk vodka.

The research team found that men who believed that they had drunk vodka responded more aggressively to a provocation than men who believed that they had drunk tonic water only. The actual content of the drink was immaterial. That is, the men’s *belief* about what they drank affected their aggressive behavior more than what they actually consumed. The results of the Lang study differ dramatically from those reported by Boyatzis, perhaps because the Boyatzis study did not control for the effects of expectations or beliefs about alcohol. The nearby Concept Review will enhance your understanding of all the research methods you have just learned about.

WHEN WE CANNOT RUN EXPERIMENTS . . .

We noted that there is difficulty in showing a causal relationship between intelligence and educational achievement. We assume that high levels of intelligence facilitate achievement in school, yet education can also raise scores on intelligence tests. We cannot use the experimental method to show the effects of intelligence in humans because we cannot manipulate the independent variable. That is, we cannot assign high or low intelligence at random.

Can we use the experimental method to show that cigarette smoking causes lung cancer among humans? The answer is no because we cannot (ethically) assign some people to smoke cigarettes and others not to smoke. People must be allowed to make their own decisions, so it is possible that the same factors that lead some people to smoke—selection factors—or to continue to smoke after they have experimented with cigarettes also lead to lung cancer. One selection factor would be the choice to lead a healthful lifestyle.

Although we cannot run experiments to answer either of these questions, we can use the correlation coefficient to reveal whether there is a relationship between



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Does Cigarette Smoking Cause Lung Cancer? How would you run an experiment to answer the question? Could your experiment actually be run with humans? Why or why not?

Method

What Happens

Comments

Case Study

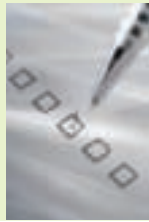


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The researcher uses interviews and records to gather in-depth information about an individual or a small group.

The accuracy of case studies is compromised by gaps and mistakes in memory and by participants' tendency to present themselves in a socially desirable manner.

The Survey



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The researcher uses interviews, questionnaires, or public records to gather information about large numbers of people.

Surveys can include thousands of people but are subject to the same limitations as case studies. People who volunteer to participate in surveys may also differ from people who do not. There may thus be problems in generalization of results to people who do not participate.

Naturalistic Observation



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The researcher observes behavior where it happens—"in the field."

Researchers try to avoid interfering with the behaviors they are observing by using *unobtrusive* measures.

Brain Imaging

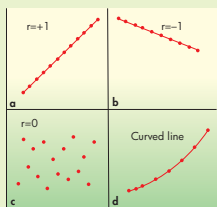


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The researchers uses methods such as the CAT scan, the PET scan, and fMRI to learn what is happening in the brain when a person is solving a problem, listening to music, and so on.

Contemporary brain imaging techniques are noninvasive—that is, they do not cause pain or discomfort. They have enabled researchers to gather new information from the biological perspective.

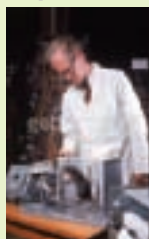
Correlation



The researcher uses statistical (mathematical) methods to reveal positive and negative relationships between variables.

The correlational method does not show cause and effect. Correlation coefficients vary between +1.00 (a perfect positive correlation) and -1.00 (a perfect negative correlation).

Experiment



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The researcher manipulates independent variables and observes their effects on dependent variables.

Experimental groups obtain the treatment; control groups do not. Researchers use *blinds* to control for the effect of expectations. With *double blinds*, neither the participants nor the observers know which participant has received which treatment. The experimental method allows researchers to draw conclusions about cause and effect.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of this Concept Review designed to help you test yourself the topics presented here.

ACTIVE REVIEW (3) Scientists often test a specific statement, or _____, about behavior or mental processes. (4) Samples must accurately represent the target _____. (5) In a _____ sample, each member of a population has an equal chance of being selected to participate. (6) A _____ study is a carefully drawn biography. (7) In the _____, a large sample of people answer questions about their attitudes or behavior. (8) The _____-observation method observes individuals in their natural habitats. (9) The _____ method investigates whether behaviors or traits are related to others. (10) Correlational research does not reveal _____ and effect. (11) An _____ is conducted in an effort to determine cause and effect. (12) The _____ variable is manipulated by the experimenters so that its effects may be determined. (13) Ideal experiments use experimental and _____ groups. (14) Well-designed experiments control for the effects of expectations by creating conditions under which subjects are unaware of, or _____ to, the treatment they have received.

REFLECT AND RELATE Why not try out the naturalistic observation method for yourself? The next time you eat at a fast-food restaurant, look around. Pick out slender people and overweight people and note whether they eat differently—even when they select the same foods. Do overweight people eat more rapidly? Do they chew less frequently? Do they leave less food on their plates? What conclusions can you draw?

CRITICAL THINKING Let's assume that we can provide scientific evidence that people who exercise are generally healthier than people who do not. Would this evidence show that exercise is a causal factor in good health? Why or why not? How could we run an experiment to help determine whether exercise contributes to health?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

intelligence and achievement and a relationship between smoking and cancer. The correlation between smoking and cancer is significant, and experimental research with animals shows that cigarette smoke can cause cancer in animals other than mammals. All in all, would one be stretching the evidence to say it has *not* been shown that there is a powerful relationship between smoking and cancer in humans?

Put it another way. Nobody can contest the view that cigarette smoking places the smoker in a higher risk group for cancer than nonsmokers are in. Which risk group would you rather be in?



STATISTICS: HOW PSYCHOLOGISTS HANDLE DATA

Imagine that our alien friends from outer space arrive outside Madison Square Garden in New York City. Their goal this dark and numbing winter evening is to learn all they can about planet Earth. They are drawn inside the Garden by lights, shouts, and warmth. The spotlighting inside rivets their attention to a wood-floored arena where the New York Big Apples are hosting the California Quakes in a briskly contested basketball game.

Our visitors use their sophisticated instruments to take some measurements of the players. Some interesting statistics are sent back to their planet of origin: It appears that (a) 100% of Earthlings are male and (b) the height of Earthlings ranges from 6 feet 1 inch to 7 feet 2 inches.

These measurements are called **statistics**. **Question 7: What is statistics?** Statistics is the science concerned with obtaining and organizing numerical information or measurements. Now let's sort truth from fiction: Our visitors have sent home statistics about the gender and size of human beings that are at once accurate and misleading. Although they accurately measured the basketball players, their small sample of Earth's population was, shall we say, distorted. Fortunately for us Earthlings, about half of the world's population is female. And the *range* of heights observed by the aliens—6 feet 1 inch to 7 feet 2 inches—is both restricted and too high. People vary in height by more than 1 foot and 1 inch. And our **average** height is not between 6 feet 1 inch and 7 feet 2 inches; rather, it is a number of inches lower.

© Brand X Pictures/Jupiterimages

Psychologists, like our aliens, are concerned with measuring human as well as animal characteristics and traits—not only physical characteristics such as height but also psychological traits such as intelligence, sociability, aggressiveness, neatness, anxiety, and depression. By observing the central tendencies (averages) and variations in measurement from person to person, psychologists can say that one person is average or above average in intelligence or that someone else is less anxious than, say, 60% of the population.

But psychologists, unlike our aliens, attempt to select a sample that accurately represents the entire population. Professional basketball players do not represent the entire human species. They are taller, stronger, and more agile than most of us. They also make more sneaker commercials. Their “abnormalities” are assets to them, not deficits.

In this section, we survey some of the statistical methods used by psychologists to draw conclusions about the measurements they take in research. First we discuss *descriptive statistics* and learn what types of statements we can make about height and other human traits. Then we discuss the *normal curve* and learn why basketball players are abnormal—at least in terms of height. We have a look at *inferential statistics*, and we see why we can be bold enough to say that the difference in height between basketball players and other people is not a chance fluctuation or fluke. Basketball players are *statistically significantly* taller than the general population.

Descriptive Statistics

Being told that someone is a 10 may sound great; however, it is not very descriptive unless you know something about how the scores on the scale are distributed and how frequently one finds a 10. Fortunately—for 10s, if not for the rest of us—people usually mean that the person is a 10 on a scale from 1 to 10 and that 10 is the highest possible score. If this is not sufficient, one will also be told that 10s are few and far between—rather unusual statistical events. **Truth or Fiction Revisited:** But note that the scale could also vary from 0 to 100, in which case a score of 10 would place one near the bottom of the scale and make a score of 50 the center point. With such a scale, being a 10 would not be impressive.

The idea of the scale from 1 to 10 may not be very scientific, but it does suggest something about descriptive statistics. **Question 8: What is descriptive statistics?** **Descriptive statistics** is the branch of statistics that provides information about a distribution of scores. We can use descriptive statistics to clarify our understanding of a distribution of scores such as heights, test grades, IQs, or even increases or decreases in measures of aggressive behavior following the drinking of alcohol. For example, descriptive statistics can help us determine measures of central tendency (averages) and determine how much fluctuation or variability there is in the scores. Being a 10 loses much of its charm if the average score is an 11. Being a 10 is more remarkable in a distribution whose scores range from 1 to 10 than it is in a distribution whose scores range from 9 to 11.



© Image Source: Black/Jupiterimages

Smoking is one of the leading causes of all statistics.

LIZA MINNELLI

Statistics show that of those who contract the habit of eating, very few survive.

GEORGE BERNARD SHAW

There are lies, damned lies and statistics.

MARK TWAIN

Statistics Numerical facts assembled in such a manner that they provide useful information about measures or scores (from the Latin *status*, meaning “standing” or “position”).

Average The central tendency of a group of measures, expressed either as the mean, median, or mode of a distribution.

Descriptive statistics The branch of statistics concerned with providing descriptive information about a distribution of scores.

Descriptive Statistics Is being a 10 always a good thing? Perhaps not if the mean is 11.

—■—
*Never try to walk across a river
just because it has an average
depth of four feet.*

MARTIN FRIEDMAN

—■—

Mean A type of average that is calculated by adding all the scores in a distribution and then dividing the sum by the number of scores.

Median The central score in a frequency distribution; the score beneath which 50% of the cases fall.

Let's now consider some of the concerns of descriptive statistics: measures of central tendency (types of averages) and measures of variability.

MEASURES OF CENTRAL TENDENCY

Truth or Fiction Revisited: A river with an average depth of 4 feet could be over your head in many places, so, as suggested in the quip by Martin Friedman, a measure of central tendency can sometimes be misleading. **Question 9: What are measures of central tendency?** Measures of central tendency are “averages” that show the center or balancing points of a distribution of scores or measurements. There are three commonly used types of measures of central tendency: the *mean*, *median*, and *mode*. Each attempts to describe something about the scores through the use of a typical or representative number.

The **mean** is what most people think of as “the average.” We obtain the mean of a distribution by adding up the scores and then dividing the sum by the number of scores. Table 2.1 ■ shows the rosters for a recent basketball game between the California Quakes and the New York Big Apples. The players are listed according to the numbers on their uniforms. Let's convert their heights into a single unit, such as inches (6' 1" becomes 73" and so on). If we add all the heights in inches and then divide by the number of players (22), we obtain a mean height of 78.73". If we convert that number back into units of feet and inches, we obtain 6' 6.73".

The **median** is the score of the middle case in a distribution. It is the score beneath which 50% of the cases fall. In a distribution with an even number of cases, such as the distribution of the heights of the 22 basketball players, we obtain the median by finding the mean of the two middle cases. When we list the 22 cases in ascending order (moving from lowest to highest), the 11th case is 6' 6" and the 12th case is 6' 7". Therefore, the median of the distribution is $(6' 6" + 6' 7") / 2$, or 6' 6½".

When we analyze the heights of the basketball players, we find that the mean and median are similar. Either one serves as a useful indicator of the central tendency of the data. But suppose we are trying to find the average savings of 30 families living on a suburban block. Let's assume that 29 of the 30 families have savings between \$8,000 and \$12,000, adding up to \$294,000. But the 30th family has savings of \$1,400,000! The mean savings for a family on this block would thus be \$56,467. The mean can be greatly distorted by one or two extreme scores. An IQ score of 145 would similarly distort the mean of the IQ scores of a class of 20 students, among whom the other 19 IQ scores range from 93 to 112. Then, too, if a few basketball

Table 2.1 ■ Rosters of Quakes Versus Big Apples at New York

California Quakes		New York Big Apples	
2 Callahan	6' 7"	3 Roosevelt	6' 1"
5 Daly	6' 11"	12 Chaffee	6' 5"
6 Chico	6' 2"	13 Baldwin	6' 9"
12 Capistrano	6' 3"	25 Delmar	6' 6"
21 Brentwood	6' 5"	27 Merrick	6' 8"
25 Van Nuys	6' 3"	28 Hewlett	6' 6"
31 Clemente	6' 9"	33 Hollis	6' 9"
32 Whittier	6' 8"	42 Bedford	6' 5"
41 Fernando	7' 2"	43 Coram	6' 2"
43 Watts	6' 9"	45 Hampton	6' 10"
53 Huntington	6' 6"	53 Ardsley	6' 10"

A glance at the rosters for a recent basketball game in which the New York Big Apples “entertained” the California Quakes shows that the heights of the team members, combined, ranged from 6 feet 1 inch to 7 feet 2 inches. Do the heights of the team members represent those of the general male population? What do you think?

players signed up for one of your classes, the mean of the students' heights would be distorted in an upward direction. Therefore, adding people's incomes and then dividing them by the number of people can be an awful way of showing the average income. A few extremely high incomes or IQ scores or heights can distort the average of a group in an upward direction.

When there are a few extreme scores in a distribution, the median is a better indicator of central tendency. The median savings on our hypothetical block would lie between \$8,000 and \$12,000 and be more representative of the central tendency of savings.

The **mode** is simply the most frequently occurring score or measure in a distribution. The mode of the data in Table 2.1 is 6' 9" because this height occurs most often among the players on the two teams. With this particular distribution, the mode is somewhat higher than the mean or median.

In some cases, the mode is a more appropriate description of the central tendency of a distribution than the mean or the median. Figure 2.7 ■ shows a **bimodal** distribution—that is, a distribution with two modes. This is a hypothetical distribution of test scores obtained by a class. The mode at the left indicates the most common class interval (45 to 49) for students who did not study, and the mode at the right shows the most common class interval (65 to 69) for students who did study. The mean and median test scores would probably lie within the 55 to 59 class interval, yet use of that interval as the measure of central tendency would obscure rather than reveal important information about this distribution of scores. It might suggest that the test was too hard, not that several students chose not to study. It is clearly best to visualize this distribution of scores as bimodal.

Measures of Variability

Our hypothetical class obtained test scores ranging from class intervals of 35 to 39 to class intervals of 75 to 79. That is, the scores *varied* from the lower class interval to the higher class interval. Now, if all the students had obtained scores from 55 to 59 or from 65 to 69, the scores would not have varied as much; that is, they would have clustered closer to one another and would have had lower variability.

Question 10: What are measures of variability? The measures of the variability of a distribution inform us about the spread of scores—that is, about the typical distances of scores from the average score. Two commonly used measures of variability are the *range* and the *standard deviation* of scores.

The **range** of scores is the difference between the highest score and the lowest score. It is obtained by subtracting the lowest score from the highest score. The range of heights in Table 2.1 is obtained by subtracting 6' 1" from 7' 2", or 1' 1". It is useful to know the range of temperatures when we move to an area with a different climate so that we may anticipate the weather and dress appropriately. A teacher must have some understanding of the range of abilities or skills in a class to teach effectively. An understanding of the range of human heights can be used to design doorways, beds, and headroom in automobiles. Even so, the typical doorway is 6' 8" high; and as we saw with the California Quakes and New York Big Apples, some people will have to duck to get through.

The range is strongly influenced by extreme scores. The range of savings of the 30 families on our suburban block is \$1,400,000 minus \$8,000, or \$1,392,000. This is a large number, and it is certainly true. However, it tells us little about the *typical* variation of savings accounts, which lies within a more restricted range of \$8,000 to \$12,000.

The **standard deviation** does a better job of showing how the scores in a distribution are distributed (spread) about the mean. It is usually better than the range because it considers every score in the distribution, not just the highest and lowest scores. Consider Figure 2.8 ■. Each distribution in the figure has the same number of scores, the same mean, and the same range of scores. However, the scores in the distribution on the right side cluster more closely about the mean. Therefore, the standard deviation of

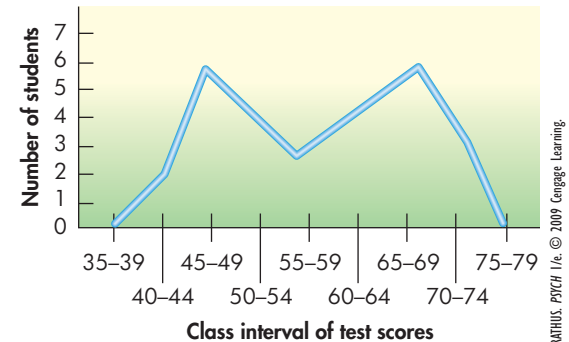


Figure 2.7 ■ A Bimodal Distribution

This hypothetical distribution represents students' scores on a test. The mode at the left represents the central tendency of the test scores of students who did not study. The mode at the right represents the mode of the test scores of students who did study.

Mode The most frequently occurring number or score in a distribution.

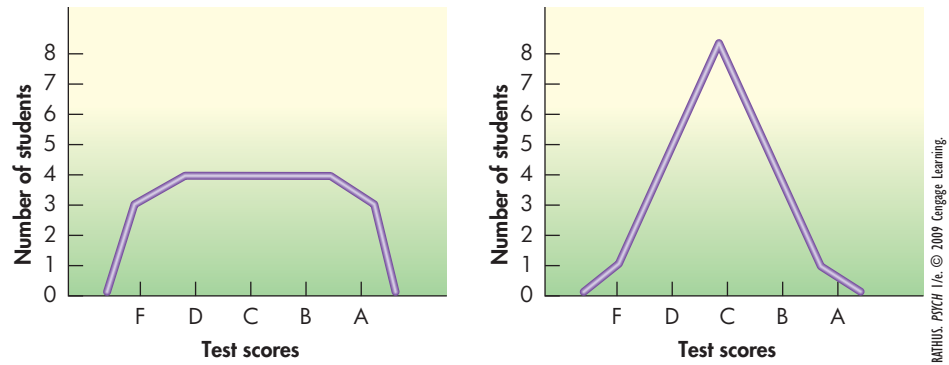
Bimodal Having two modes.

Range A measure of variability defined as the high score in a distribution minus the low score.

Standard deviation A measure of the variability of a distribution, obtained by the formula

$$\text{S.D.} = \sqrt{\frac{\text{Sum of } d^2}{N}}$$

Figure 2.8 ■ Hypothetical Distributions of Student Test Scores Each distribution has the same number of scores, the same mean, and even the same range, but the standard deviation (a measure of variability) is greater for the distribution on the left because the scores tend to be farther from the mean.



the distribution on the right is smaller. That is, the typical score deviates less from the mean score.

The standard deviation is usually abbreviated as S.D. It is calculated by the formula

$$\text{S.D.} = \sqrt{\frac{\text{Sum of } d^2}{N}}$$

where d equals the deviation of each score from the mean of the distribution and N equals the number of scores in the distribution.

Let's find the mean and standard deviation of the IQ scores listed in column 1 of Table 2.2 ■. To obtain the mean, we add all the scores, attain 1,500, and then divide by the number of scores (15) to obtain a mean of 100. We obtain the deviation score (d) for each IQ score by subtracting the score from 100. The d for an IQ score of 85 equals 100 minus 85, or 15, and so on. Then we square each d and add the squares. The S.D. equals the square root of the sum of squares (1,426) divided by the number of scores (15), or 9.75.

As an additional exercise, we can show that the S.D. of the test scores on the left (in Figure 2.8) is greater than that for the scores on the right. First, we assign the grades a number according to a 4.0 system. Let A = 4, B = 3, C = 2, D = 1, and F = 0. The S.D. for each distribution is computed in Table 2.3 ■. The larger S.D. for the distribution on the left indicates that the scores in that distribution are more variable, or tend to be farther from the mean.

Table 2.2 ■ Hypothetical Scores Obtained from an IQ Testing

IQ Score	d (Deviation Score)	d^2 (Deviation Score Squared)
85	15	225
87	13	169
89	11	121
90	10	100
93	7	49
97	3	9
97	3	9
100	0	0
101	-1	1
104	-4	16
105	-5	25
110	-10	100
112	-12	144
113	-13	169
117	-17	289
Sum of IQ scores = 1,500		Sum of d^2 scores = 1,426

Table 2.3 ■ Computation of Standard Deviations for Test-Score Distributions in Figure 2.8

Distribution at Left			Distribution to the Right		
Grade	d	d^2	Grade	d	d^2
A (4)	2	4	A (4)	2	4
A (4)	2	4	B (3)	1	1
A (4)	2	4	B (3)	1	1
B (3)	1	1	B (3)	1	1
B (3)	1	1	B (3)	1	1
B (3)	1	1	C (2)	0	0
B (3)	1	1	C (2)	0	0
C (2)	0	0	C (2)	0	0
C (2)	0	0	C (2)	0	0
C (2)	0	0	C (2)	0	0
C (2)	0	0	C (2)	0	0
D (1)	-1	1	C (2)	0	0
D (1)	-1	1	C (2)	0	0
D (1)	-1	1	D (1)	-1	1
D (1)	-1	1	D (1)	-1	1
F (0)	-2	4	D (1)	-1	1
F (0)	-2	4	D (1)	-1	1
F (0)	-2	4	F (0)	-2	4

Sum of grades = 36	Sum of grades = 36
Mean grade = $36 / 18 = 2$	Mean grade = $36 / 18 = 2$
Sum of $d^2 = 32$	Sum of $d^2 = 16$

Normal distribution A symmetrical distribution that is assumed to reflect chance fluctuations, giving rise to a normal curve or bell-shaped curve.

The Normal Curve

Many human traits and characteristics, including height and intelligence, seem to be distributed in a pattern known as a normal distribution. **Question 11: What is a normal distribution?** A **normal distribution** is a symmetrical distribution that is assumed to reflect chance fluctuations, giving rise to a bell-shaped curve. The mean, median, and mode all fall at the same score. Scores cluster most heavily about the mean, fall off rapidly in either direction at first (as shown in Figure 2.9) ■, and then taper off more gradually.

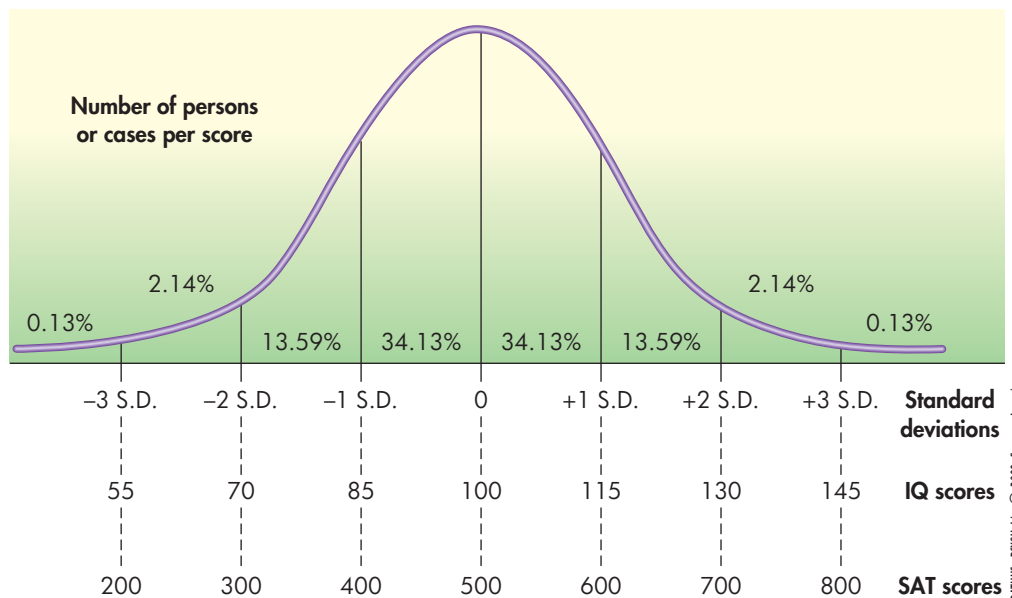
Figure 2.9 shows a normal distribution or bell-shaped curve. This curve is believed to represent the distribution of scores that are determined by chance variation, such as the differences in the lengths of tosses of hundreds of baseballs by the same person. (We could space out the timing of the tosses so that fatigue didn't enter the picture.) People's heights are thought to be largely determined by chance combinations of genetic material, and it does happen that the distribution of the heights of a random sample of the population approximates normal distributions for men and women. The mean of the distribution for men is higher than the mean for women.

Test developers traditionally assumed that intelligence was also randomly or normally distributed among the population. For that reason, they constructed intelligence tests so that scores would be distributed in as close to a normal curve as possible. In actuality, IQ scores are also influenced by environmental factors and chromosomal abnormalities so that the actual curves are not quite bell-shaped. The means or averages of most IQ tests, including the Wechsler Intelligence Scales, are defined as scores of 100 points. That is, the average IQ is 100. The Wechsler Intelligence Scales are also constructed to have a standard deviation (S.D.) of 15 points (see Figure 2.9) ■. With a standard deviation of 15 points, 50% of the Wechsler scores fall between 90 and 110, which is called the "broad average" range of intelligence. About 68% of scores (two of



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Figure 2.9 ■ A Bell-Shaped or Normal Curve In a normal curve, approximately two of three cases (68%) lie within a standard deviation (S.D.) from the mean. The mean, median, and mode all lie at the same score. IQ tests and SATs are constructed so that their distributions approximate the normal curve.



RATHUS, PSYCH 1/e. © 2009 Cengage Learning

three) fall between 85 and 115 (within a standard deviation of the mean). More than 95% fall between 70 and 130—that is, within two standard deviations of the mean. **Truth or Fiction Revisited:** Psychologists, therefore, may express your IQ score in terms of how “deviant” you are. Very high and very low IQ scores deviate far from the mean score.

The SAT was constructed so that the mean scores would be 500 points and the S.D. would be 100 points. Thus, a score of 600 would equal or excel that of some 84% to 85% of the test takers. Because the variables that determine SAT scores—including intelligence, motivation, and education—are not distributed by chance, the distribution of SAT scores is not perfectly bell-shaped either. Moreover, the actual mean or average scores vary somewhat from year to year and, in the case of the SAT IIs, from test to test. In the case of SAT IIs, the importance of education is obvious.

Truth or Fiction Revisited: An IQ score of 130 may therefore be more impressive than an SAT score of 500. The IQ score of 130 is two standard deviations above the mean and exceeds that of more than 97% of the population. An SAT score of 500 represents the mean SAT score and equals or excels that of 50% of the population taking the test.

Inferential statistics The branch of statistics concerned with the confidence with which conclusions drawn about samples can be extended to the populations from which the samples were drawn.

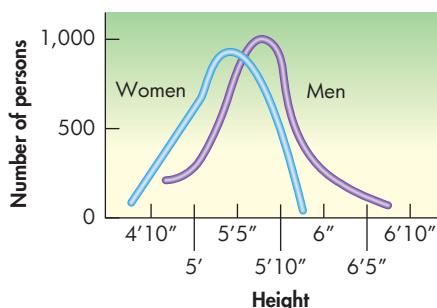


Figure 2.10 ■ Distribution of Heights for Random Samples of Men and Women Note that the mean height of the men is greater than that of the women. Is the group mean difference in height statistically significant? Researchers use a tool called inferential statistics to determine the answer. RATHUS, PSYCH 1/e. © 2009 Cengage Learning.

Inferential Statistics

Head Start programs have apparently raised children’s intellectual functioning, as reflected in their grades and IQ scores. In one such study, children enrolled in a Head Start program obtained a mean IQ score of 99, whereas children similar in background who were not enrolled in Head Start obtained a mean IQ score of 93. Is this difference of six points in IQ *significant*, or does it represent a chance fluctuation in scores? In the Lang study, college students were provoked by people in league with the researchers. Some of the students believed they had drunk alcohol; others believed they had drunk tonic water only. The students were then given the opportunity to shock the individuals who had provoked them. Students who believed they had drunk alcohol chose higher levels of shock than students who believed they had drunk tonic water only. Did the mean difference in shock level chosen by the two groups of students represent actual differences between the groups, or might it have been a chance fluctuation? The individuals in the Head Start study were a sample of young children. The individuals in the alcohol study were a sample of college students. **Question 12: What is inferential statistics?** Inferential statistics helps us determine whether we can conclude that the differences between such samples can be generalized to the populations that they represent.

Figure 2.10 ■ shows the distribution of heights of 1,000 men and 1,000 women who were selected at random from the general U.S. population. The mean height for

men is greater than the mean height for women. Can we conclude, or *infer*, that this difference in height is not just a chance fluctuation but represents an actual difference between the general populations of men and women? Or must we avoid such an inference and summarize our results by stating only that the mean height of the sample of men in the study was greater than the mean height of the sample of women in the study?

STATISTICALLY SIGNIFICANT DIFFERENCES

Researchers tend not to talk about “real differences” or “actual differences” between groups, however. Instead, they speak of *statistically significant differences*. **Question 13: What are statistically significant differences?** Statistically significant differences are unlikely to be due to chance fluctuation. Psychologists usually do not accept a difference as statistically significant unless the probability (p) that it is due to chance fluctuation is less than 1 in 20 (that is, $p < .05$). They are more comfortable labeling a difference as statistically significant when the probability (p) that it is due to chance fluctuation is less than 1 in 100 (that is, $p < .01$).

Psychologists use formulas involving the means (for example, mean IQ scores of 93 versus 99) and the standard deviations of sample groups to determine whether differences in means are statistically significant. As you can see in Figure 2.11 ■, the farther apart group means are, the more likely it is that they are statistically significant. In other words, if men are on average 5 inches taller than the women, it is more likely that the difference is statistically significant than if men are only 0.25 inch taller on average. Principle 1: Everything else being equal, the greater the difference between means, the greater the probability that the difference is statistically significant. This makes common sense. After all, if you were told that your neighbor’s car had gotten one-tenth of a mile more per gallon of gas than your car in the past year, you would probably attribute the difference to chance fluctuation. But if the difference were 14 miles per gallon, you would probably assume that the difference reflected an actual difference in driving habits or the efficiency of the automobile.

As you can see in Figure 2.12 ■, the smaller the standard deviations (a measure of variability) of the groups, the more likely it is that the difference between means is statistically significant. Consider the extreme example in which there is *no* variability within each group. That is, imagine that every woman in the randomly selected sample of 1,000 women is exactly 5' 5" tall. Similarly, imagine that every man in the randomly selected sample of 1,000 men is exactly 5' 10" tall. In such a case, the heights of the men and women would not overlap at all, and it would appear that the differences were statistically significant. Consider the other extreme—one with unnaturally large variability. Imagine that the heights of the women vary from 2' to 14' and that the heights of the men vary from 2' 1" to 14' 3". In such a case, we might be more likely to assume that the difference in group means of 5" was a chance fluctuation. Principle 2: Everything else being equal, the smaller the variability of the distributions of scores, the greater the probability that the difference in group means is statistically significant.

Therefore, we cannot conclude that men are taller than women unless we know the average heights of men and women and how much the heights within each group vary. We must know both the central tendencies (means) and variability of the two distributions of heights to infer that the mean heights are statistically significantly different.

Infer To go to the general from the particular; to draw a conclusion.

Statistically significant difference

A difference between groups that is large enough so that it is unlikely to be due to chance fluctuation.

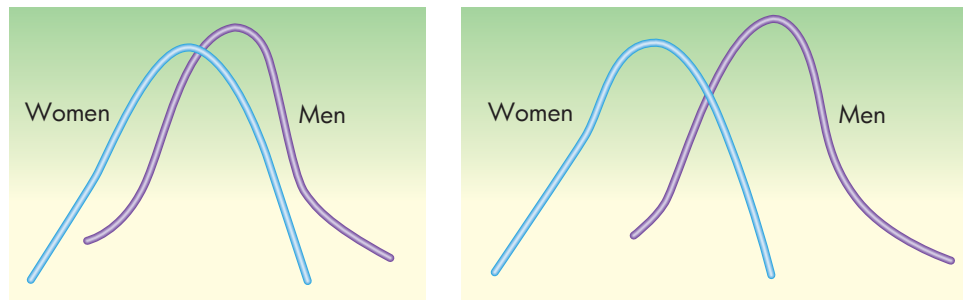


Figure 2.11 ■ Decreasing and Increasing the Mean Group Difference in Heights

Everything else being equal, the greater the difference in group means, the greater the probability that the difference is statistically significant. The distribution on the right shows a greater difference in group means; therefore, there is a greater probability that the difference is statistically significant.

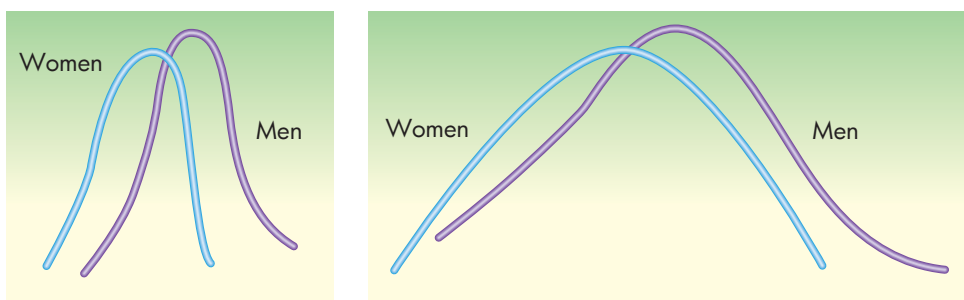


Figure 2.12 ■ Decreasing and Increasing the Variability of the Distributions of Scores

Everything else being equal, the smaller the variability in group scores, the greater the probability that the difference in group means is statistically significant. The distribution on the right shows a greater difference in the variability of the groups; therefore, there is a lower probability that the difference in group means is statistically significant.

We have been “eyeballing” the data and making assumptions. We have been relying on what one professor of mine called the “Wow!” effect. As noted, psychologists and other researchers actually use mathematical techniques that take group means and standard deviations into account to determine whether group differences are statistically significant. Eyeballing real data often does not yield clear results or even good guesses.

LearningConnections • STATISTICS: HOW PSYCHOLOGISTS HANDLE DATA

ACTIVE SUMMARY (15) _____ statistics provides information about distributions of scores. (16) Descriptive statistics helps us determine measures of central tendency and how much fluctuation or _____ there is in a distribution. (17) We obtain the _____ of a distribution by adding the scores and then dividing the sum by the number of scores. (18) The _____ is the score beneath which 50% of the cases fall. (19) The _____ is the most frequently occurring measure in a distribution. (20) The range of scores is obtained by subtracting the _____ score from the highest score. (21) In a(n) _____ distribution, the mean, median, and mode are the same score. (22) _____ statistics helps us decide whether we can generalize differences among samples to their populations. (23) Psychologists usually do not accept a difference as statistically significant unless the probability that it is due to chance fluctuation is less than one in _____. (24) Psychologists use formulas involving the means and _____ deviations of sample

groups to determine whether differences in means are statistically significant.

REFLECT AND RELATE Suppose some aliens “borrowed” you for a while and studied you to learn about the human species. What could they correctly infer about all people from studying you? What errors would they make if they assumed that other people were just like you?

CRITICAL THINKING Which of the following scores would you rather receive: a Wechsler IQ score of 130 or an SAT score of 500? Why? Which score is more “normal”? Explain. What does it mean to say that the difference in heights between men and women is *statistically significant*?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

ETHICAL ISSUES IN PSYCHOLOGICAL RESEARCH AND PRACTICE

The researchers in the Lang study gave some participants alcohol to drink and deceived the entire group about the purposes and methods of the study. Was their method **ethical**? We’ll return to this question, but let’s first address a broader one. **Question 14: What are the ethical issues that concern psychological research and practice with humans?**

Psychologists adhere to a number of ethical standards that are intended to promote individual dignity, human welfare, and scientific integrity. The standards are also intended to ensure that psychologists do not undertake research methods or treatments that are harmful.

Research with Humans

If the Lang group were running their experiment today rather than in the 1970s, they would probably have been denied permission to do so by a university ethics review committee. Why? Because in virtually all institutional settings, including colleges, hospitals, and research foundations, ethics review committees help researchers consider the potential harm of their methods and review proposed studies according to ethical guidelines. When such committees find that proposed research might be unacceptably harmful to participants, they may withhold approval until the proposal has been modified. Ethics review committees also weigh the potential benefits of research against the potential harm.

*An act has no ethical quality
whatever unless it be chosen out
of several all equally possible.*

WILLIAM JAMES

Ethical Moral; referring to one’s system of deriving standards for determining what is moral.

Today, individuals must provide **informed consent** before they participate in research (American Psychological Association, 2002). Having a general overview of the research and the opportunity to choose not to participate apparently give them a sense of control and decrease the stress of participating (Fisher, 2009). Can you think of some reasons that the Lang research group should have obtained informed consent from potential participants in the study? For example, what if a participant was recovering from alcoholism? Can you think of a way participants in the Lang study could have provided informed consent without giving away so much information about the methods in the study that the study was invalidated?

Psychologists treat the records of research participants and clients as confidential (Fisher, 2009). This is because they respect people's privacy and also because people are more likely to express their true thoughts and feelings when researchers or therapists keep their disclosures confidential. Sometimes, conflicts of interest arise, however; for example, this can happen when a client threatens to harm someone, and the psychologist feels an obligation, and may be required by law, to warn that person (Follingstad & McCormick, 2002).

Ethics also limit the types of research that psychologists may conduct. For example, how can we determine whether early separation from one's mother impairs social development? One way would be to observe the development of children who were separated from their mothers at an early age for reasons such as the death of the mother or court-ordered protective custody. It is difficult to draw conclusions from such research, however, because of the selection factor. That is, the same factors that led to the separation—such as family tragedy or irresponsible parents—and *not* the separation may have led to the outcome. Scientifically, it would be sounder to run experiments in which researchers separate children from their mothers at an early age and compare their development with that of other children. But psychologists would not undertake such research because of the ethical issues they pose. Yet, they run experiments in which infant animals are separated from their mothers, which, as we'll see later, has brought criticism from animal-rights groups.

THE STANFORD PRISON EXPERIMENT

Also consider the Stanford Prison Experiment, conducted by Philip Zimbardo in 1971. In the study, "mature, emotionally stable, normal, intelligent college students from middle-class homes throughout the United States and Canada" were randomly assigned the roles of "guard" or "prisoner" in a mock prison on the Stanford University campus. The study was planned to last for 2 weeks, but it was ended early when it appeared that many "guards" were brutalizing "prisoners," and many "prisoners" were in deep distress. Some participants, in fact, felt the need for psychological counseling.

The point of the study was to show that college students—as other groups—were likely to try to meet the demands of their social situations regardless of their personal values. In this case, all participants were students who knew that they were participating in an experiment, but some were beaten down physically and psychologically by others based on the nature of the role (prisoner vs. guard) they were assigned.

The results of the study are certainly important. As with other social psychology studies (discussed in Chapter 17), it revealed that normal people can act in brutal ways in brutal situations—as in warfare and interrogating prisoners (Lurigio, 2009; P. G. Zimbardo, 2007). The longer individuals are immersed in a situation on the battlefield or in a prison, the more susceptible they become to humiliating and torturing others. A noted recent example occurred at the prison at Abu Ghraib in Iraq, where U.S. soldiers humiliated Iraqi prisoners (Zimbardo, 2008).

Informed consent A participant's agreement to participate in research after receiving information about the purposes of the study and the nature of the treatments.



A Scene from the Stanford Prison Experiment Zimbardo's experiment revealed important information about people's tendencies to meet the requirements of their social situations but has been called unethical due to the stress it placed on participants.

The Stanford study has for many years encouraged prison reforms to prevent prisoner abuse (Lurigio, 2009) and helped make us all aware of the dangers inherent in exposing normal people to abnormal situations.

Although the information obtained in the Stanford Prison Study is useful and important, it has been considered unethical because it placed participants in a dehumanizing situation (Bigger, 2009). Guards, in other words, began to view prisoners as less human than themselves—as real guards and soldiers may consider the perceived enemy to be vermin or “gooks”—and therefore felt free to treat prisoners in inhumane ways.

DECEPTION OF STUDY PARTICIPANTS

Question 15: Is it ethical for psychologists to deceive research participants about the methods and objectives of their research? Some studies are not able to be done if participants know what the researchers are trying to find out or which treatment they have received (for example, a new medicine or a sugar pill). As you can imagine, psychologists have long debated the ethics of deceiving participants. According to the American Psychological Association’s (2002) *Ethical Principles of Psychologists and Code of Conduct*, psychologists may use deception only when they believe the benefits of the research outweigh its potential harm, when they believe the individuals might have been willing to participate if they had understood the benefits of the research, and when participants are **debriefed**. Debriefing means that the purposes and methods of the research are explained afterward.

Let’s return to the Lang (Lang et al., 1975) study on alcohol and aggression. In this study, the researchers (a) misinformed participants about the beverage they were drinking and (b) misled them into believing they were giving other participants electric shock when they were actually only pressing switches on a dead control board. (*Aggression* was defined as pressing these switches in the study.) In the Lang study, students who believed they had drunk vodka were “more aggressive”—that is, selected higher levels of shock—than students who believed they had not.

What do you think? Was it ethical to deceive participants in the Lang study as to what they were drinking? Why or why not?

Research with Animals

Psychologists and other scientists frequently use animals to conduct research that cannot be carried out with humans. For example, as noted earlier, experiments on the effects of early separation from the mother have been done with monkeys and other animals (see Chapter 10). Such research has helped psychologists investigate the formation of attachment bonds between parent and child.

Question 16: What are the ethical issues that concern research with animals?

Experiments with infant monkeys highlight some of the ethical issues faced by psychologists and other scientists who contemplate potentially harmful research. Psychologists and biologists who study the workings of the brain destroy sections of the brains of laboratory animals to learn how they influence behavior. For instance, a lesion in one part of a brain structure causes a rat to overeat. A lesion elsewhere causes the rat to go on a crash diet. Psychologists generalize to humans from experiments such as these in the hope of finding solutions to problems such as eating disorders (Mehta & Gosling, 2008). Proponents of the use of animals in research argue that major advances in medicine and psychology could not have taken place without them (Ringach & Jentsch, 2009). For example, we would know much less about how experimental drugs affect cancerous growths and the brain.

However, the majority of psychologists disapprove of research in which animals are exposed to pain or killed (Plous, 1996). According to the ethical guidelines of the American Psychological Association, animals may be harmed only when there is no alternative and when researchers believe that the benefits of the research justify the harm (American Psychological Association, 2002; Fisher, 2009).

Debrief To elicit information about a completed procedure.



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LearningConnections • ETHICAL ISSUES IN PSYCHOLOGICAL RESEARCH AND PRACTICE

ACTIVE REVIEW (25) Psychologists adhere to _____ standards that help promote the dignity of the individual, maintain scientific integrity, and protect subjects or clients from harm. (26) To help avoid harm, human subjects must provide _____ consent. (27) Ethics require that subjects who are deceived be _____ afterward to help eliminate misconceptions and anxieties about the research. (28) Researchers use _____ to conduct research that cannot be carried out with humans.

REFLECT AND RELATE Do you believe it is ethical to harm animals in conducting research when the results may be beneficial to humans? Why or why not?

CRITICAL THINKING Psychologists are expected to keep things that clients tell them confidential. However, if a client in therapy were to tell his psychologist that he was thinking of hurting you, should the psychologist tell you about it? Why or why not?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections

CRITICAL THINKING, SCIENCE, AND PSEUDOSCIENCE

At the outset of the chapter, we noted the intriguing nature of the tabloids at supermarket checkout counters. Some of them boast that they have new predictions by astrologers and psychics. For example, according to tabloids, Mick Jagger was supposed to be elected to Parliament, and Elvis was supposed to be returned to Earth by aliens in 2002.

Neither event took place—at least, not that we know of. But will those facts dissuade people who believe in psychics and astrologers? Clairvoyance and astrology are pseudosciences, not true sciences. Unfortunately, a survey of 1,574 adults by the National Science Foundation (2002) found that 70% of Americans do not understand the difference between science and pseudoscience (*pseudo* means “false”).

Critical Thinking and Astrology

Let’s apply principles of critical thinking to one pseudoscience—astrology. But first read this personality report. I wrote it about you:

You have your strengths and your weaknesses, but much of the time, you do not give yourself enough credit for your strengths. You are one of those people who has the inner potential for change, but you need to pay more attention to your own feelings so that you can determine the right direction for yourself.

You have many times found yourself to be in conflict as your inner impulses have run up against the limits of social rules and moral codes. Most of the time, you manage to resolve conflict in a way that makes sense to you, but now and then, you have doubts and wonder whether you have done

the right thing. You would often like to be doing two or more things at the same time, and you occasionally resent the fact that you cannot.

There is an inner you known to you alone, and you often present a face to the world that does not quite reflect your genuine thoughts and feelings. And now and then, you look at the things you have done and the path that you have taken, and you have some doubt as to whether it is all worth it.

That’s you to a tee, isn’t it? It probably sounds familiar enough. The tendency to believe a generalized (but phony) personality report is called the *Barnum effect*, after circus magnate P. T. Barnum, who once declared that a good circus had a “little something for everybody.” **Truth or Fiction Revisited:** The Barnum effect allows generalized personality reports to sound perfectly accurate and also allows fortune-tellers to make a living. That is, most of us have enough in common so that a fortune-teller’s “revelations” about us may ring true. A Mexican study found that students overwhelmingly endorse generalized personality reports about them, especially when they are favorable (Pulido & Marco, 2000).

P. T. Barnum also once declared, “There’s a sucker born every minute.” The tendency to believe generalized personality reports has made people vulnerable to phonies throughout history. The results of a Gallup Poll (Newport & Strausberg, 2001; reported in Irwin, 2009) show that the following percentages of Americans endorse beliefs in:

- Psychic or spiritual healing 54%
- Extrasensory perception (ESP) 50%
- Haunted houses 42%
- Ghosts 38%



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- Visits to Earth by extraterrestrial beings 33%
- Astrology 28%
- Spirit communication 28%
- Witchcraft 26%
- Reincarnation 25%
- Possession by spirits 15%

Truth or Fiction Revisited: Therefore, it is true that about half of Americans believe in psychic or spiritual healing.

As you can see from this list, more than one person in four in the United States believes in astrology (Irwin, 2009). Astrology is based on the notion that the positions of the sun, the moon, and the stars affect human temperament, human affairs, and destiny. Astrologers prepare forecasts called *horoscopes* that are based on our birthdates and indicate what is safe for us to do. If you get involved with someone who asks for your “sign” (for example, Aquarius or Taurus), he or she is inquiring about your birthdate in astrological terms. Astrologers claim that your sign, which reflects the month during which you were born, indicates whom you will be compatible with.

Although psychologists and other scientists consider astrology to be a pseudoscience, it has millions of followers. The National Science Foundation (2002) found that 43% of Americans check their horoscopes from time to time. Although many people are skeptical, only one in four insists they have “no belief at all” (Irwin, 2009)! Even in an age when science has proved itself capable of making significant contributions to people’s daily lives and health, more people are likely to check their horoscope than seek scientific information when they need to make a decision. How do we account for astrology’s allure? What can we tell people who believe in it?

The allure of astrology is understandable in that people are generally

curious about themselves and the world. One could argue that understanding one’s abilities and limits and the nature of the world fosters the survival of the individual. Evolutionary forces would thus favor the survival of individuals who are curious. It is not much of a stretch to speculate that curiosity is embedded in our genes and transmitted from generation to generation. Research and theory do suggest that people are drawn to astrology and other pseudosciences as a way of understanding the self and the world—especially unexpected events (Fraknoi, 2008). But it becomes a bit self-serving because people are most likely to believe in astrology when the descriptions they hear about their personalities are favorable (Rogers & Soule, 2009). It seems to go like this: The “validity” of astrology is confirmed when the astrologer—or palm reader, reader of tea leaves, reader of Tarot cards, or even the reader of bird droppings—says something positive about the individual. If the message is bad, there goes the validity of the messenger!

Believers in astrology also tend to argue as follows:

- Astrology has been practiced for many centuries and is a time-honored aspect of human history, tradition, and culture.
- Astrology seems to provide a path to the core meaning in the universe for people who are uneducated and, for a fortunate few with limited means, a road to riches.
- People in high positions in government have followed the advice of astrologers. (Nancy Reagan, wife of former President Ronald Reagan, is reported to have consulted an astrologer in arranging her husband’s schedule.)
- One heavenly body (the moon) is powerful enough to sway the tides of the seas. The pulls of heavenly bodies are therefore easily capable of affecting people’s destinies.

- Astrology is a special art and not a science. Therefore, we shouldn’t subject astrology to the rigors of scientific testing.

- Astrology has been shown to work.

But now think critically about the claims of astrologers. Does the fact that there may be a long-standing tradition in astrology affect its scientific merit? Does Nancy Reagan’s (or anyone else’s) belief in astrology affect its scientific merit? Psychology is an *empirical* science. In an empirical science, beliefs about the behavior of cosmic rays, chemical compounds, cells, people—or the meaning of bird droppings or the movements of the stars—must be supported by evidence. Persuasive arguments and reference to authority figures are *not* scientific evidence. Pseudoscientists have made specific forecasts of events, and their accuracy—or lack of it—provides a means of evaluation. Mick Jagger has not been elected to Parliament and Elvis did not come back to planet Earth in 2002. Astrological predictions are no more likely to come true than are predictions based on chance (Narlikar et al., 2009). That is fact, but does it matter?

Maybe not. Magical predictions tend to keep their allure. For one thing, scientists make predictions about groups, not individuals. They may say that obesity heightens the risk of heart disease but may not be able to predict with certainty whether a given individual will develop heart disease. Individuals may turn to a “psychic” to find out—even if they are fed false knowledge. In addition, many people just want some magic in their lives (Munro & Munro, 2000). Sad to say, even in our age of scientific enlightenment, many people are more comfortable with fanciful stories and leaps of faith than they are with objective evidence and statistical probabilities.

But what about you? Will you be more skeptical in the future?

Thinking Like a Psychologist

1. What is critical thinking?

Critical thinking is a hallmark of psychologists and of scientists in general. Critical thinking is associated with skepticism. It involves thoughtfully analyzing the questions, statements, and arguments of others. It means examining the definitions of terms, examining the premises or assumptions behind arguments, and scrutinizing the logic with which arguments are developed. Critical thinking also refers to the ability to inquire about causes and effects, as well as knowledge of research methods. Critical thinkers are cautious in drawing conclusions from evidence. They do not oversimplify or overgeneralize.

How Psychologists Study Behavior and Mental Processes

2. What is the scientific method?

The scientific method is an organized way of expanding and refining knowledge. Psychologists reach conclusions about their research questions or the accuracy of their hypotheses on the basis of their research observations or findings.

3. How do psychologists use samples to represent populations?

The individuals who participate in research are referred to as a sample. A sample is a segment of a population. Samples must accurately represent the population they are intended to reflect. In a *random sample*, each member of a population has an equal chance of being selected to participate. Researchers can also use a *stratified sample*, which is selected so that identified subgroups in the population are represented proportionately in the sample.

4. What methods of observation do psychologists use?

The methods used include the case study, the survey, naturalistic observation, and imaging of the brain. Case studies gather information about the lives of individuals or small groups. The survey method uses interviews, questionnaires, or public records to gather information about behavior that cannot be observed directly. The naturalistic observation method observes behavior where it happens—“in the field.”

5. What is the correlational method?

The correlational method reveals relationships between variables but does not determine cause and effect. In a positive correlation, variables increase simultaneously. In a negative correlation, one variable increases while the other decreases.

6. What is the experimental method?

Experiments are used to discover cause and effect—that is, the effects of independent variables on dependent variables. Experimental groups receive a specific treatment, whereas control groups do not. Blinds and double blinds may be used to control for the effects of the expectations of the participants and the researchers. Results can be generalized only to populations that have been adequately represented in the research samples.

Statistics: How Psychologists Handle Data

7. What is statistics?

Statistics is the science that assembles data in such a way that they provide useful information about measures or scores. Such measures or scores include people’s height, weight, and scores on psychological tests such as IQ tests.

8. What is descriptive statistics?

Descriptive statistics is the branch of statistics that provides information about average scores and how much scores differ from one another.

9. What are measures of central tendency?

Measures of central tendency are “averages” that show the center or balancing points of a frequency distribution. The mean—which is what most people consider the average—is obtained by adding the scores in a distribution and dividing by the number of scores. The median is the score of the middle or central case in a distribution. The mode is the most common score in a distribution.

10. What are measures of variability?

Measures of variability provide information about the spread of scores in a distribution. The range is defined as the difference between the highest and lowest scores. The standard deviation is a statistic that shows how scores cluster around the mean. Distributions with higher standard deviations are more spread out.

11. What is a normal distribution?

The normal or bell-shaped curve is hypothesized to occur when the scores in a distribution occur by chance. In a normal curve, approximately two of three scores (68%) are found within one standard deviation of the mean. Fewer than 5% of cases are found beyond two standard deviations from the mean.

12. What is inferential statistics?

Inferential statistics is the branch of statistics that indicates whether researchers can extend their findings with samples to the populations from which they were drawn.

13. What are statistically significant differences?

Statistically significant differences are believed to represent real differences between groups and not chance fluctuation.

Ethical Issues in Psychological Research and Practice

14. What are the ethical issues that concern psychological research and practice with humans?

The ethical standards of psychologists are intended to protect participants in research and clients in practice from harm. Human participants are required to give informed consent prior to participating in research. Records of human behavior are kept confidential. Ethics review committees judge the harmfulness of proposed research and help make it less harmful.

15. Is it ethical for psychologists to deceive research participants about the methods and objectives of their research?

Deception is only ethical when research cannot be conducted without it. Deceived participants must be debriefed after they have been in a study.

16. What are the ethical issues that concern research with animals?

Some research can be conducted only with animals. Ethical standards require that animals may be harmed only if there is no alternative and the benefits justify the harm.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of this feature.

KEY TERMS

Average (p. 46)

Bimodal (p. 49)

Blind (p. 43)

Case study (p. 37)

Control group (p. 43)

Correlation (p. 34)

Correlational method (p. 41)

Correlation coefficient (p. 41)

Critical thinking (p. 30)

Debrief (p. 56)

Dependent variable (p. 42)

Descriptive statistics (p. 47)

Double-blind study (p. 43)

Empirical science (p. 33)

Ethical (p. 54)

Experiment (p. 42)

Experimental group (p. 43)

Experimenter bias (p. 43)

Hypothesis (p. 33)

Independent variable (p. 42)

Infer (p. 53)

Inferential statistics (p. 52)

Informed consent (p. 55)

Generalize (p. 34)

Mean (p. 48)

Median (p. 48)

Mode (p. 49)

Naturalistic observation (p. 38)

Negative correlation (p. 41)

Normal distribution (p. 51)

Placebo (p. 43)

Population (p. 34)

Positive correlation (p. 41)

Random sample (p. 35)

Range (p. 49)

Replicate (p. 34)

Sample (p. 34)

Scientific method (p. 33)

Selection factor (p. 34)

Standard deviation (p. 49)

Statistically significant difference (p. 53)

Statistics (p. 46)

Stratified sample (p. 35)

Survey (p. 37)

Treatment (p. 42)

Volunteer bias (p. 35)

ACTIVE LEARNING RESOURCES



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3

Biology and Psychology



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MAJOR TOPICS

Evolution and Evolutionary Psychology: “Survivor” Is More than Just a TV Show
Heredity: The Nature of Nature
The Nervous System: On Being Wired
The Brain: The Star of the Human Nervous System
The Endocrine System: Chemicals in the Bloodstream

FEATURES

In Profile: Charles Darwin
A Closer Look—Research: Are You a Human or a Mouse (or a Chimp or a Carrot)? Some Fascinating Facts about Genes
In Profile: Santiago Ramón y Cajal
A Closer Look—Research: Mirror, Mirror, in the Brain: Who’s the Fairest Imitator of Them All?
In Profile: Paul Broca
Concept Review: The Endocrine System
Life Connections: Coping with PMS

TRUTH OR FICTION?

- T F** Charles Darwin was nearly excluded from the voyage that led to the development of his theory of evolution because the captain of the ship did not approve of the shape of his nose.
- T F** Your genetic code overlaps 25% with that of a carrot.
- T F** Neanderthals are not necessarily extinct; they may be lurking in your genes.
- T F** The human brain is larger than that of any other animal.
- T F** One cell can stretch all the way from your spine to your toe.
- T F** Messages travel in the brain by means of electricity.

- T F** A single brain cell can send out hundreds of messages every second—and manage to catch some rest in between.
- T F** Fear can give you indigestion.
- T F** If a surgeon were to electrically stimulate a certain part of your brain, you might swear that someone had stroked your leg.
- T F** A hormone turns a disinterested male rodent into a doting father.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

He almost missed the boat. Literally. British naturalist Charles Darwin had volunteered to serve as the scientist for an expeditionary voyage on H.M.S. *Beagle*, but the captain, Robert Fitz-Roy, objected to Darwin because of the shape of his nose. **Truth or Fiction Revisited:** Thus, it is true that Darwin was nearly prevented from undertaking his historic voyage due to the shape of his nose. Fitz-Roy believed that you could judge a person's character by the outline of his facial features, and Darwin's nose didn't fit the . . . bill. But Fitz-Roy relented, and in the 1830s, Darwin undertook the voyage to the Galápagos Islands that led to the development of his theory of evolution.

Darwin would write,

Afterwards, I heard that I had run a very narrow risk of being rejected [as the *Beagle's* scientist], on account of the shape of my nose! [Fitz-Roy] was convinced that he could judge a man's character by the outline of his features; and he doubted whether anyone with my nose could possess sufficient energy and determination for the voyage. But I think he was afterwards well-satisfied that my nose had spoken falsely.

Darwin's father had also objected to the voyage. He enumerated his reasons:

- He feared that the voyage would reflect badly on Charles's future as a member of the clergy.
- The plan seemed too adventurous and wild.
- He wondered why the position of naturalist was still open so close to the beginning of the voyage and why other naturalists had presumably refused the offer.
- Sailing around the world would prevent Charles from settling down to his "real life."
- The shipboard accommodations would be poor.
- The voyage would give Charles another excuse for changing his direction in life.
- It would be a waste of time.

It wasn't—that is, the trip was not a waste of time.

My nose had spoken falsely.

CHARLES DARWIN

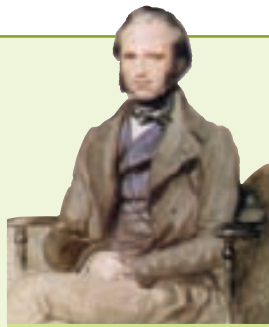
I am turned into a sort of machine for observing facts and grinding out conclusions.

CHARLES DARWIN

In Profile

As far as I can judge of myself I worked to the utmost during the voyage [of the *Beagle*] from the mere pleasure of investigation, and from my strong desire to add a few facts to the great mass of facts in natural science.

—Charles Darwin



CHARLES DARWIN

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Charles Darwin was a dabbler who, in one of history's coincidences, was born on the same day as Abraham Lincoln (February 12, 1809). Darwin's father was a well-known physician, and his mother was Susannah Wedgwood of the chinaware family. His cousin was Sir Francis Galton (see Chapter 2), who made many innovations in psychological measurement. Unlike Galton, Darwin gave no early signs of genius. He did so poorly in school that his father feared he would disgrace himself and the family. Nevertheless, Darwin went on to change the face of modern thought.

Darwin enjoyed collecting and classifying plants, minerals, and animals. He tried medical school, entered Cambridge University to become an Anglican priest, and eventually graduated with a degree in science. Because he was independently wealthy, Darwin undertook the 5-year volunteer position aboard H.M.S. *Beagle*. The ship stopped at the Galápagos Islands, where Darwin observed how species of lizards, tortoises, and plants varied from island to island. Although Darwin undertook his voyage as a believer in the Book of Genesis account of creation, his observations convinced him that the organisms he observed shared common ancestors but had evolved in different directions.

In midlife, Darwin almost missed the boat again. From his observations of sea lions, tortoises, insects, and plants, he was ready to formulate his theory of evolution upon his return from his voyage. Reading Thomas Malthus's "Essay on the Principle of Population," which had been written back in 1798, also helped. Malthus pointed out that Earth's food supply was increasing mathematically (1, 2, 3, 4, 5, 6, and so on) while population was increasing geometrically (1, 2, 4, 8, 16, 32, and so on). Therefore, the world's population would outstrip the world's ability to feed it, except for tragic events such as war, famine, and plague. Darwin applied Malthus's ideas to all species:

In October 1838...I happened to read for amusement Malthus on Population, and being well prepared to appreciate the struggle for existence which everywhere goes on from long-continued observation of the habits of animals and plants, it at once struck me that under these circumstances favourable variations would tend to be preserved and unfavourable ones to be destroyed. The result of this would be the formation of new species. Here, then, I had at last got a theory by which to work; but I was so anxious to avoid prejudice, that I determined not for some time to write even the briefest sketch of it. (C. Darwin, 1892/1958, pp. 42–43)

Because he was "anxious to avoid prejudice," Darwin did not want his theory of evolution to be published until after his death. He feared it would be immensely unpopular because it contradicted religious views, and it would bring scorn on

his family. He shared his ideas with a few fellow scientists, but he finally published his ideas more broadly 20 years later when he learned that other scientists, including Alfred Russel Wallace, a scientist who had worked in the Amazon, were about to publish similar ideas on evolution. Papers by both Darwin and Wallace were read at the Linnaean Society, and Darwin's *On the Origin of Species by Natural Selection* (1859) was published shortly thereafter. The public's interest in evolutionary theory had been aroused, and the first printing of Darwin's book sold out on the first

day. Later, Darwin would publish his book *The Descent of Man*, which claimed that modern-day humans were, like other species, a product of evolution and that humans and apes shared common ancestors. Needless to say, Darwin's views became better known than those of Wallace. (Have you ever heard of Wallace's theory of evolution?)

Darwin, of course, did meet with prejudice. The notion that humans and apes have common ancestors met with ridicule, as suggested by cartoons published in British newspapers and magazines at the time. In fact, many school boards in the United States object to the teaching of evolution to this day.



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Go to Psychology CourseMate at www.cengagebrain.com to access more information about Charles Darwin.

EVOLUTION AND EVOLUTIONARY PSYCHOLOGY: “SURVIVOR” IS MORE THAN JUST A TV SHOW

In 1871, Darwin published *The Descent of Man*, which made the case that humans, like other species, were a product of evolution. He argued that the great apes (chimpanzees, gorillas, and so on) and humans shared a common primate ancestor (see Figure 3.1 ■). Many ridiculed Darwin’s views because they were displeased with the notion that they might share ancestry with apes. Darwin’s theory also contradicted the Book of Genesis, which stated that humans had been created in one day in the image of God.

At the Galápagos Islands, Darwin found himself immersed in the unfolding of a huge game of “Survivor.” But here the game was for real, and the rewards had nothing to do with fame or fortune. The rewards were reaching sexual maturity, mating, and transmitting one’s genes into subsequent generations. **Question 1: What concepts lie at the core of Darwin’s theory of evolution?**

The concept of a *struggle for existence* lies at the core of the theory of evolution. The universe is no bed of roses. Since the beginning of time, the universe has been changing. For billions of years, microscopic particles have been forming immense gas clouds in space. Galaxies and solar systems have been condensing from the clouds, sparkling for some eons, and then winking out. Change has brought life and death and countless challenges to survival. As described by evolutionary theory, some creatures have adapted successfully to these challenges, and their numbers have increased. Others have not met the challenges and have fallen back into the distant mists of time. The species that prosper and those that fade away are thus determined by **natural selection**.

When we humans first appeared on planet Earth, our survival required a different sort of struggle than it does today. We fought or fled from predators such as leopards. We foraged across parched lands for food. We might have warred with humanoid creatures

It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change.

CHARLES DARWIN

Natural selection A core concept of the theory of evolution that holds that adaptive genetic variations among members of a species enable individuals with those variations to survive and reproduce. As a result, such variations tend to be preserved, whereas nonadaptive variations tend to drop out.

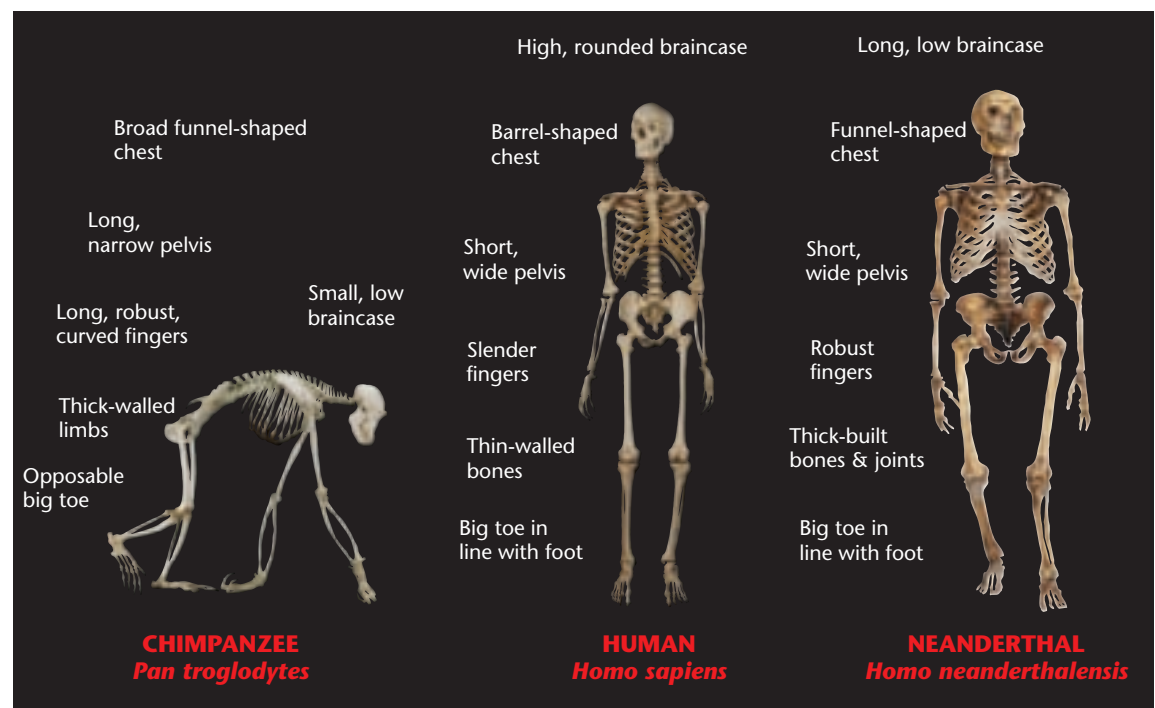


Figure 3.1 ■ The Human Skeleton and the Skeletons of Some Relatives The idea that humans were genetically related to monkeys and other animals was so divergent from other 19th-century views of our species that Darwin was initially reluctant to discuss his theory of evolution. *The Descent of Man*, published in 1871, made the case that humans, like other species, were a product of evolution. Darwin believed that the great apes (chimpanzees, gorillas, and so on) shared a common primate ancestor. We did not descend from Neanderthals, but we coexisted with them for thousands of years. Neanderthals became extinct some 35,000 years ago.



Dinosaurs Long ago and right here on planet Earth, dinosaurs once ruled the day. However, they—along with 99.99% of all species that ever existed—are now extinct. Evidence that they existed, and when they existed, is found in the fossil record.

— ■ —

*The lion and the calf shall lie
down together but the calf
won't get much sleep.*

WOODY ALLEN

— ■ —

Mutation A sudden variation in an inheritable characteristic as distinguished from a variation that results from generations of gradual selection.

Evolutionary psychology The branch of psychology that studies the ways adaptation and natural selection are connected with mental processes and behavior.

Species A category of biological classification consisting of related organisms that are capable of interbreeding. *Homo sapiens*—humans—make up one species.

Instinct A stereotyped pattern of behavior triggered by a particular stimulus and nearly identical among members of a species, even when reared in isolation.

— ■ —

*The very essence of
instinct is that it's followed
independently of reason.*

CHARLES DARWIN

— ■ —

very much like ourselves—creatures who have since become extinct. But because of the evolution of our intellect, not fangs nor wings nor claws, we prevailed. Our numbers have increased. We continue to transmit the traits that led to our selection down through the generations by means of genetic material whose chemical codes are only now being cracked.

Just what is handed down through the generations? The answer is biological, or physiological, structures and processes. Our biology serves as the material base for our behaviors, emotions, and cognitions

(our thoughts, images, and plans). Biology somehow gives rise to specific behavioral tendencies in some organisms, such as the chick's instinctive fear of the shadow of a hawk. But the behavior of many species, especially higher species such as humans, is flexible and affected by environmental factors and choice as well as by heredity.

Doing What Comes Naturally

According to the theory of evolution, there is a struggle for survival as various species and individuals compete for a limited quantity of resources. The combined genetic instructions from parents lead to variations among individuals. No one who ever lived, except, perhaps, for your identical twin, is exactly like you. There are also sharper divergences from parents caused by sudden changes in genetic material called **mutations**. Those individuals whose variations in traits are better adapted to their environments are more likely to survive (that is, to be naturally selected). Survival permits them to reach sexual maturity, to select mates, and to reproduce, thereby transmitting their features or traits to the next generation. What began as a minor variation or a mutation becomes embedded in more and more individuals over the generations—if it fosters survival. Chance variations that hinder survival are likely to disappear from the gene pool.

Evolutionary Psychology

These same concepts of *adaptation* and *natural selection* have also been applied to psychological traits and are key concepts in **evolutionary psychology**. **Question 2: What is evolutionary psychology?** Evolutionary psychology studies the ways adaptation and natural selection are connected with mental processes and behavior (Buss, 2009a). Over the eons, evolution has provided organisms with advantages such as stronger fins and wings, sharper claws, and camouflage. Human evolution has given rise to various physical traits and also to such diverse activities as language, art, committed relationships, and warfare. Evolutionary psychologist David M. Buss (2009a) writes that the field attempts to answer questions such as why do so many struggles have to do with sex? Why is there so much social conflict? What are the mechanisms of the mind that define human nature?

One of the concepts of evolutionary psychology is that not only physical traits but also patterns of behavior, including social behavior, evolve and are transmitted genetically from generation to generation. In other words, behavior patterns that help an organism survive and reproduce are likely to be transmitted to the next generation (Buss, 2009a). Such behaviors are believed to include aggression, strategies of mate selection, and even altruism (that is, self-sacrifice of the individual to help perpetuate the family grouping) (Buss, 2009b; Lukaszewski & Roney, 2009). The behavior patterns are termed *instinctive* or *species-specific* because they evolved within certain **species**.

Question 3: What is an instinct? An **instinct** is a stereotyped pattern of behavior that is triggered in a specific situation. Instinctive behavior is nearly identical among the members of the species in which it appears. It tends to resist modification, even when it serves no purpose (as in the interminable barking of some breeds of dogs) or results in

punishment. Instinctive behavior also appears when the individual is reared in isolation from others of its kind and thus cannot learn the behavior from experience.

Consider some examples of instinctive behavior. If you place an egg from the nest of a goose a few inches in front of her, she will roll it back to the nest with her beak. However, she won't retrieve it if it's farther away—in the “not my egg” zone. If you rear a white-crowned sparrow in isolation from other sparrows, it will still sing a recognizable species-specific song when it matures. The male stickleback fish instinctively attacks fish (or pieces of painted wood) with the kinds of red bellies that are characteristic of other male sticklebacks (Dzieweczynski et al., 2009). Many psychologists consider language to be instinctive in humans, and psychologists are trying to determine whether aspects of human mate selection and aggression are instinctive. However, even instinctive behavior can be modified to some degree by learning, and most psychologists agree that the richness and complexity of human behavior are made possible by human learning ability.

Heredity The transmission of traits from parent to offspring by means of genes.

Genetics The area of biology that focuses on heredity.

Behavioral genetics The area of biology and psychology that focuses on the transmission of traits that give rise to behavior.

LearningConnections • EVOLUTION AND EVOLUTIONARY PSYCHOLOGY: “SURVIVOR” IS MORE THAN JUST A TV SHOW

ACTIVE REVIEW (1) Darwin's first book on evolution was titled *On the Origin of Species by Natural* _____. (2) The concept of a struggle for _____ lies at the core of the theory of evolution. (3) Darwin believed that mutations occur at _____ but are subject to natural selection. (4) Individuals whose traits are better _____ to their environments are more likely to survive and reproduce. (5) _____ psychology studies the ways adaptation and natural selection are connected with mental processes and behavior. (6) Stereotypical behavior patterns that have evolved within certain species are called _____.

REFLECT AND RELATE Have you known family pets that have engaged in instinctive behavior? What was the behavior? Why do you believe it was instinctive?

CRITICAL THINKING Why was Darwin reluctant to publish his theory of evolution? Do you believe that this textbook, and other textbooks, should present the theory of evolution?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

HEREDITY: THE NATURE OF NATURE

Consider some facts of life:

- People cannot breathe underwater (without special equipment).
- People cannot fly (again, without rather special equipment).
- Fish cannot learn to speak French or do an Irish jig even if you rear them in enriched environments and send them to finishing school.
- Chimpanzees and gorillas can use sign language but cannot speak.

People cannot breathe underwater or fly (without oxygen tanks, airplanes, or other devices) because of their heredity. **Question 4: What is heredity?** Heredity defines one's *nature*—which is based on one's biological structures and processes. **Heredity** refers to the biological transmission of traits that have evolved from generation to generation. Fish are limited in different ways by their natural traits. Chimpanzees and gorillas can understand many spoken words and express some concepts through non-verbal symbol systems such as American Sign Language. However, apes cannot speak. They have probably failed to inherit humanlike speech areas of the brain. Their nature differs from ours. Our speech mechanisms have evolved differently.

Genetics and Behavioral Genetics

Heredity both makes behaviors possible and places limits on them. **Question 5: What is genetics?** **Genetics** is the subfield of biology that studies heredity. **Behavioral genetics**



© David Thompson/OSF/Animals, Animals

Instinctive Behavior The male stickleback instinctively attacks fish (or pieces of painted wood) with the kinds of red bellies that are characteristic of other male sticklebacks. Sticklebacks will show the stereotyped instinctive behavior even when they are reared in isolation from other members of their species. We rear an organism in isolation so that we can be certain that it is not learning the targeted behavior from another member of its species.

It's necessary to be slightly underemployed if you are to do something significant.

JAMES D. WATSON, ONE OF THE DISCOVERERS OF DNA

Gene A basic unit of heredity, which is found at a specific point on a chromosome.

Chromosome A microscopic rod-shaped body in the cell nucleus carrying genes that transmit hereditary traits from generation to generation.

DNA Abbreviation for deoxyribonucleic acid, the substance that forms the basic material of chromosomes. It takes the form of a double helix and contains the genetic code.

bridges the sciences of psychology and biology. It is concerned with the genetic transmission of traits that give rise to patterns of behavior.

The field of genetics looks at both species-specific behavior patterns (instincts) and individual differences among the members of a species. Behavioral genetics studies the effects of genetics on animal and human behavior. Psychologists are thinking in terms of behavioral genetics when they ask about the inborn reasons that individuals differ in their behavior and mental processes. For example, some children learn language more quickly than others. Part of the reason may lie in behavioral genetics—their heredity. But some children also experience a richer exposure to language at early ages. Heredity appears to be a factor in almost all aspects of human behavior, personality, and mental processes (Plomin & Asbury, 2005; Plomin & Haworth, 2009). Examples include sociability, anxiety, social dominance, leadership, effectiveness as a parent or a therapist, happiness, and even interest in arts and crafts (Blum et al., 2009; Ebstein et al., 2010; Leonardo & Hen, 2006). **Question 6: What are the roles of genes and chromosomes in heredity?**

Genes and Chromosomes: The Building Blocks of Heredity

Genes are the most basic building blocks of heredity. Genes regulate the development of specific traits. It is estimated that your cells contain 20,000 to 25,000 genes (International Human Genome Sequencing Consortium, 2006).

Genes are segments of **chromosomes**. That is, chromosomes are made up of strings of genes. Each cell in the body contains 46 chromosomes arranged in 23 pairs. Chromosomes are large complex molecules of **DNA** (short for *deoxyribonucleic acid*), which has several chemical components. The tightly wound structure of DNA was first demonstrated in the 1950s by James Watson and Francis Crick. DNA takes the form of a double helix—a twisting molecular ladder (see Figure 3.2 ■). The “rungs” of the ladder are made up of chemicals called *nucleotides* whose names are abbreviated as A, T, C, and G. The nucleotide A always links up with T to complete a rung, and C always combines with G. Therefore, you can describe the *genetic code* in terms of the nucleotides you find along just one of the rungs—for example, CTGAGTCAC and so on. A single gene can contain hundreds of thousands of base pairs. So if you think of a gene as a word, it can be a few hundred thousand letters long and completely unpronounceable.

A group of scientists working together around the globe—referred to as the Human Genome Project—has learned that the sequencing of your DNA consists of about 3 billion DNA sequences spread throughout your chromosomes (Plomin & Schalkwyk, 2007). These sequences—the order of the chemicals we call A, T, C, and G—caused

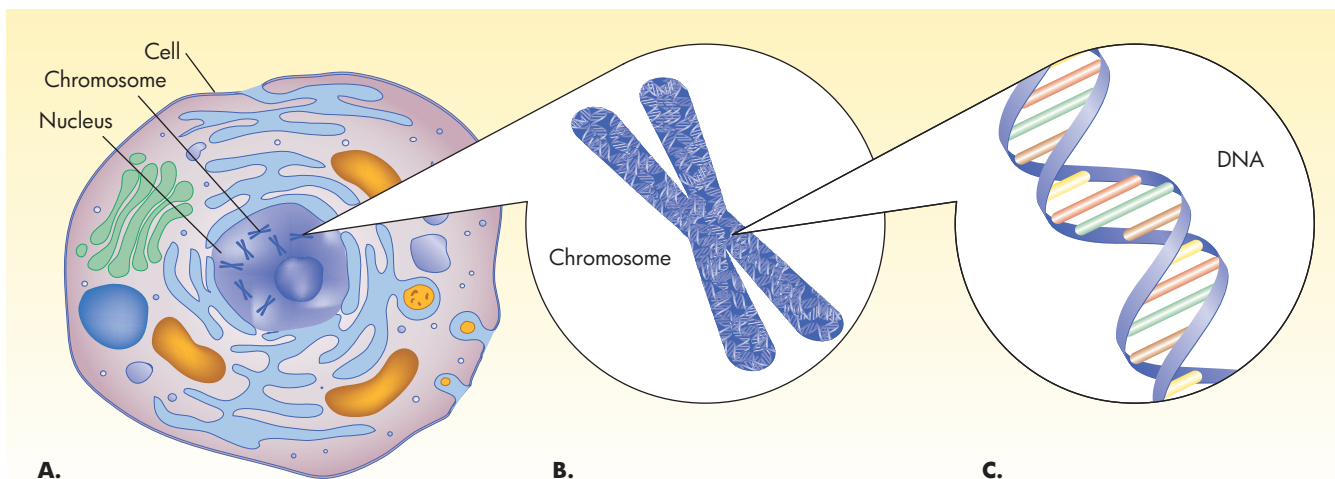


Figure 3.2 ■ Cells, Chromosomes, and DNA A. The nuclei of cells contain chromosomes. B. Chromosomes are made up of DNA. C. Segments of DNA are made up of genes that determine physical traits such as height, eye color, and whether pigs have wings (no, because of their genetic makeup, they don't). Genes are segments of chromosomes that are found with the nuclei of cells. The genetic code—that is, the order of the chemicals A, T, C, and G—determines your species and all those traits that can be inherited, from the color of your eyes to predispositions toward many psychological traits and abilities, including sociability and musical talent.

you to grow arms and not wings and skin rather than scales. Psychologists debate the extent to which genes influence complex psychological traits such as intelligence, aggressiveness, and happiness and the appearance of psychological disorders such as schizophrenia. Some traits, such as eye color, are determined by a single pair of genes. Other traits, especially complex psychological traits such as sociability and aggressiveness, are thought to be **polygenic**—that is, influenced by combinations of genes.

Your genetic code provides your **genotype**—that is, your full genetic potential as determined by the sequencing of the chemicals in your DNA. But the person you see in the mirror was also influenced by your early experiences in the home, injuries, adequacy of nourishment, educational experiences, and numerous other environmental influences. Therefore, you see the outer appearance of your **phenotype**, including the hair styles of the day. Your **phenotype** is the way your genetic code manifests itself because of your experiences and environmental circumstances. Your genotype enables you to acquire language. Your phenotype reveals that you are likely to be speaking English if you were reared in the United States or Spanish if you were reared in Mexico (or both if you are Mexican American).

Your genotype provides what psychologists refer to as your **nature**. Your phenotype represents the interaction of your nature (heredity) and your **nurture** (environmental influences) in the origins of your behavior and mental processes. Psychologists are especially interested in the roles of nature and nurture in intelligence and psychological disorders. Our genotypes provide us with physical traits that set the stage for certain behaviors. But none of us is the result of heredity alone. Environmental factors such as nutrition, learning opportunities, cultural influences, exercise, and (unfortunately) accident and illness also determine our phenotypes and whether genetically possible behaviors will be displayed. Behavior and mental processes represent the interaction of nature and nurture. A potential Shakespeare who is reared in poverty and never taught to read or write will not create a *Hamlet*.

We normally receive 23 chromosomes from our father's sperm cell and 23 chromosomes from our mother's egg cell (ovum). When a sperm cell fertilizes an ovum, the chromosomes form 23 pairs (see Figure 3.3 ■). The 23rd pair consists of **sex chromosomes**, which determine whether we are female or male. We all receive an X sex chromosome (so called because of its X shape) from our mother. If we also receive an X sex chromosome from our father, we develop into a female. If we receive a Y sex chromosome (named after its Y shape) from our father, we develop into a male. In the following section, we observe the unfortunate results that may occur when people do not receive the normal complement of chromosomes from their parents.

DOWN SYNDROME

When people do not have the normal number of 46 chromosomes (23 pairs), physical and behavioral abnormalities may result. Most persons with **Down syndrome**, for example, have an extra, or third, chromosome on the 21st pair. The extra chromosome is usually contributed by the mother, and the condition becomes increasingly likely as the mother's age at the time of pregnancy increases. Persons with Down syndrome have a downward-sloping fold of skin at the inner corners of the eyes, a round face, a

Polygenic Referring to traits that are influenced by combinations of genes.

Genotype One's genetic makeup based on the sequencing of the nucleotides we term A, T, C, and G.

Phenotype One's actual development and appearance based on one's genotype and environmental influences.

Nature The inborn, innate character of an organism.

Nurture The sum total of the environmental factors that affect an organism from conception onward. (In another usage, *nurture* refers to the act of nourishing and otherwise promoting the development of youngsters.)

Sex chromosomes The 23rd pair of chromosomes, whose genetic material determines the sex of the individual.

Down syndrome A condition caused by an extra chromosome on the 21st pair and characterized by mental deficiency, a broad face, and slanting eyes.

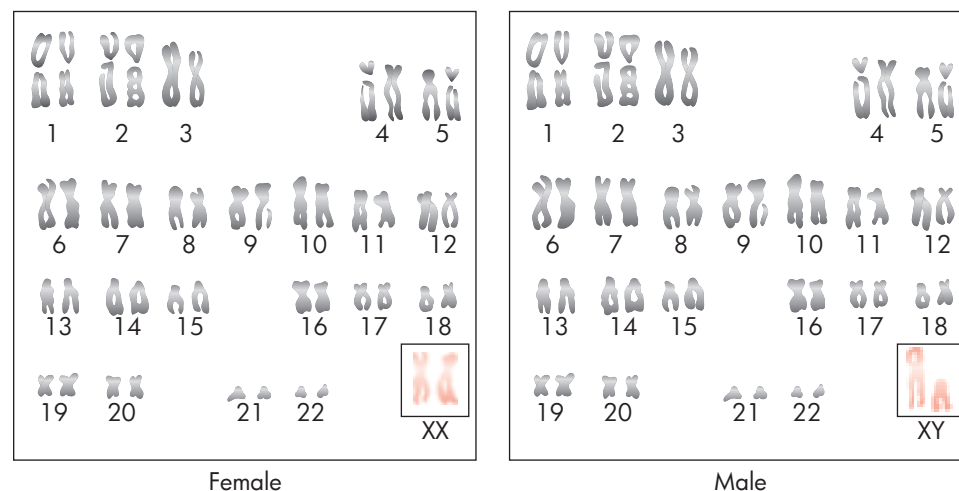


Figure 3.3 ■ The 23 Pairs of Human Chromosomes People normally have 23 pairs of chromosomes. Whether one is female or male is determined by the 23rd pair of chromosomes. Females have two X sex chromosomes, whereas males have an X and a Y sex chromosome.

A CLOSER LOOK • RESEARCH

ARE YOU A HUMAN OR A MOUSE (OR A CHIMP OR A CARROT)? SOME FASCINATING FACTS ABOUT GENES

Truth or Fiction Revisited: Yes, it is true that your genetic code overlaps about 25% with that of a carrot. Don't be concerned. It doesn't mean you're going to turn orange, nor that you are about to enter your "salad days." So, to quote carrot expert Bugs Bunny, "What's up, Doc?" What's "up" is that your genetic code, like the genetic codes of other life forms, is a sequence of four chemicals. By chance alone, then, one of four in the sequence would be repeated in any randomly selected segments of carrot and human DNA.

The house mouse is not only in your pantry; much of it is in your genes. The genomes of humans and mice have been decoded, and of the 20,000 to 25,000 genes possessed by each, about 18,800 to 24,750 genes in one have some counterpart in the other (Gunter & Dhand, 2002). The counterparts are not necessarily the same; for example, the mouse has more

That 0.1% of Difference Can Be Quite a Difference The genetic codes of humans overlap by 99.9%. However, the remaining 0.1% can make quite a difference, as in the cases of cellist Yo Yo Ma (left) and professional football players (right).



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© Kevin C. Cox/Shall/Getty Images

genes related to odor detection and thus a better sense of smell. The genetic difference between mice and humans results from some 75 million years of evolution along different paths from a common mammalian ancestor. When we consider how different we appear to be from the mouse, it is remarkable how similar we are in genetic makeup. But only a few hundred genes apparently explain why mice are pests (and pets). The overlap also makes mice excellent stand-ins for humans in medical research.

Our closest genetic relatives are chimpanzees, with whom we may have shared a common ancestor some 6 to 9 million years ago. Only 1.58% of the genetic code of the chimpanzee differs from our own. Putting it another way: Our genetic codes overlap with those of chimps by more than 98% (Zimmer, 2002–2003)!

The sequence of your own DNA also overlaps about 99.9% with that of other humans (Plomin & Crabbe, 2000). Yet the difference of 0.1% accounts for the differences between Mozart and Nelson Mandela and between Sandra Oh and Oprah Winfrey.

Despite this enormous overlap, people differ greatly in their skin coloration, their body shape, and their psychological makeup, including their talents and skills. Some compose symphonies and others are tone-deaf. Some tackle differential equations and others cannot add or subtract. Some figure skate in the Olympics, and others trip over their own feet. Even though we differ but 0.1% in genetic code from our fellows, it often seems easier to focus on how much we differ rather than on how much we have in common.

Truth or Fiction Revisited: Neanderthals and some other ancient humanoids may not be quite as extinct as has been believed. In fact, they may be "lurking" in your own genetic code. Analysis of DNA suggests that modern humans—that's us—probably interbred with other humanoids rather than simply replacing them (Forhan et al., 2008). When you misbehave, could you now say it's the Neanderthal in you? Of course, the truth could be quite the reverse.

protruding tongue, and a broad, flat nose. They are cognitively impaired and usually have physical problems that cause death by middle age.

Kinship Studies: Is the Behavior of Relatives Related?

Question 7: What are kinship studies? In kinship studies, psychologists compare the presence of traits and behavior patterns in people who are biologically related or unrelated to help determine the role of genetic factors in their occurrence. The more *closely* people are related, the more *genes* they have in common. Identical twins share 100% of their genes. Parents and children have 50% of their genes in common, as do siblings (brothers and sisters). Aunts and uncles related by blood have a 25% overlap with nieces and nephews. First cousins share 12.5% of their genes. If genes are involved in a trait or behavior pattern, people who are more closely related should be more likely to show similar traits or behavior. Psychologists and behavioral geneticists are especially interested in running kinship studies with twins and adopted individuals (Plomin & Haworth, 2009).

Monozygotic (MZ) twins Twins that develop from a single fertilized ovum that divides in two early in prenatal development. MZ twins thus share the same genetic code; also called *identical twins*.

Dizygotic (DZ) twins Twins that develop from two fertilized ova and who are thus as closely related as brothers and sisters in general; also called *fraternal twins*.

TWIN STUDIES: LOOKING INTO THE GENETIC MIRROR

The fertilized egg cell (ovum) that carries genetic messages from both parents is called a *zygote*. Now and then, a *zygote* divides into two cells that separate so that instead of developing into a single person, it develops into two people with the same genetic makeup. Such people are identical, or **monozygotic (MZ), twins**. If the woman releases two ova in the same month and they are both fertilized, they develop into fraternal, or **dizygotic (DZ), twins**. Dizygotic twins, like other siblings, share 50% of their genes. Monozygotic twins are important in the study of the relative influences of nature (heredity) and nurture (the environment) because differences between MZ twins are the result of nurture. (They do not differ in their heredity—that is, their nature—because their genetic makeup is the same.)

Twin studies compare the presence of traits and behavior patterns in MZ twins, DZ twins, and other people to help determine the role of genetic factors in their occurrence. If MZ twins show greater similarity on a trait or behavior pattern than DZ twins, a genetic basis for the trait or behavior is suggested.

Twin studies show how strongly genetic factors influence physical features. Monozygotic twins are more likely to look alike, to be similar in height, and even to have more similar cholesterol levels than DZ twins (Souren et al., 2007). This finding holds even when the identical twins are reared apart and the fraternal twins are reared together (Stunkard et al., 1990).

Other physical similarities between pairs of MZ twins may be more subtle, but they are also strong. For example, research shows that MZ twin sisters begin to menstruate about 1 to 2 months apart, whereas DZ twins begin to menstruate about a year apart. Monozygotic twins are more alike than dizygotic twins in their blood pressure, brain wave patterns, and in their speech patterns, gestures, and mannerisms (Ambrosius et al., 2008; Lykken et al., 1992; Wessel et al., 2007).

Monozygotic twins also resemble one another more strongly than dizygotic twins in psychological traits, such as intelligence, and personality traits, such as sociability, anxiety, friendliness, conformity, and happiness (Lykken, 2007; Markon et al., 2002; McCrae et al., 2000; Veselka et al., 2009). David Lykken and Mike Csikszentmihalyi (2001) suggest that we inherit a tendency toward a certain level of happiness. Despite the ups and downs of life, we tend to drift back to our usual levels of cheerfulness (or irritability). We shall investigate the role of (happy?) genes in happiness in greater depth in Chapter 9. Heredity is also a key contributor to developmental factors, such as cognitive functioning, and early signs of attachment, such as smiling, cuddling, and the expression of fear of strangers (Plomin & Haworth, 2009; Segal, 2009).

Monozygotic twins are more likely than dizygotic twins to share psychological disorders such as autism, depression, schizophrenia, and vulnerability to alcoholism (Dworzynski et al., 2009; Plomin, 2000; Veenstra-Vanderweele & Cook, 2003). In one study on autism, the agreement rate for MZ twins was about 60%. (That is, if one member of a pair of MZ twins was autistic, the other member had a 60% chance of being so.) The concordance rate for DZ twins was only 10% (Plomin et al., 1994).

Of course, twin studies are not perfect. Monozygotic twins may resemble each other more closely than dizygotic twins partly because they are treated more similarly. Monozygotic twins frequently are dressed identically, and parents sometimes have difficulty telling them apart.

One way to get around this difficulty is to find and compare MZ twins who were reared in different homes. Any similarities between MZ twins reared apart cannot be explained by a shared home environment and would appear to be largely a result of heredity. In the fascinating Minnesota Study of Twins Reared Apart (Lykken, 2007), researchers have been measuring the physiological and psychological characteristics of 56 sets of MZ adult twins who were separated in infancy and reared in different homes. Constance Holden (1980) wrote a progress report on the study when it had processed 9 pairs of MZ twins and was about to study 11 other pairs. A team of psychologists, psychiatrists, and other professionals analyzed the twins' life histories, including their interests, medical problems, abilities, and intelligence.



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Down Syndrome Down syndrome is caused by an extra chromosome on the 21st pair and becomes more likely to occur as the mother's age at the time of pregnancy increases. Persons with Down syndrome have characteristic facial features including downward-sloping folds of skin at the inner corners of the eyes, are intellectually deficient, and usually have health problems that lead to death by middle age.



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Twins Monozygotic twins share 100% of their genes, whereas dizygotic twins share 50% of their genes.

*I believe that every person is
born with talent.*

MAYA ANGELOU

*I have no special talent. I am
only passionately curious.*

ALBERT EINSTEIN

*A really great talent finds its
happiness in execution.*

JOHANN WOLFGANG
VON GOETHE

All in all, there were some uncanny similarities between the pairs, except when there were extreme differences in their environment. Consider one pair of twins, both of whom were named Jim. Both were married and divorced. Both had been trained to become police officers. They each named their first sons James Allan. They drove the same kind of car and vacationed at the same beach. They each mentioned carpentry as a hobby; each had constructed a bench around a tree in the yard. There are certainly coincidences in their histories, and they were chosen for this lengthy description because of them. However, the interests in police work and carpentry are probably more than coincidental.

In sum, MZ twins reared apart are about as similar as MZ twins reared together on a variety of measures of intelligence, personality, temperament, occupational and leisure-time interests, and social attitudes. These traits thus would appear to have a genetic underpinning.

ADOPTION STUDIES

The interpretation of kinship studies can be confused when relatives share similar environments as well as genes. Adoption studies offer special insight into the roles of nature and nurture in the development of traits, especially when they compare children who have been separated from their parents at an early age (or in which identical twins are separated at an early age) and reared in different environments. Psychologists look for similarities between children and their adoptive and natural parents. When children reared by adoptive parents are more similar to their natural parents in a particular trait, strong evidence exists for a genetic role in the appearance of that trait.

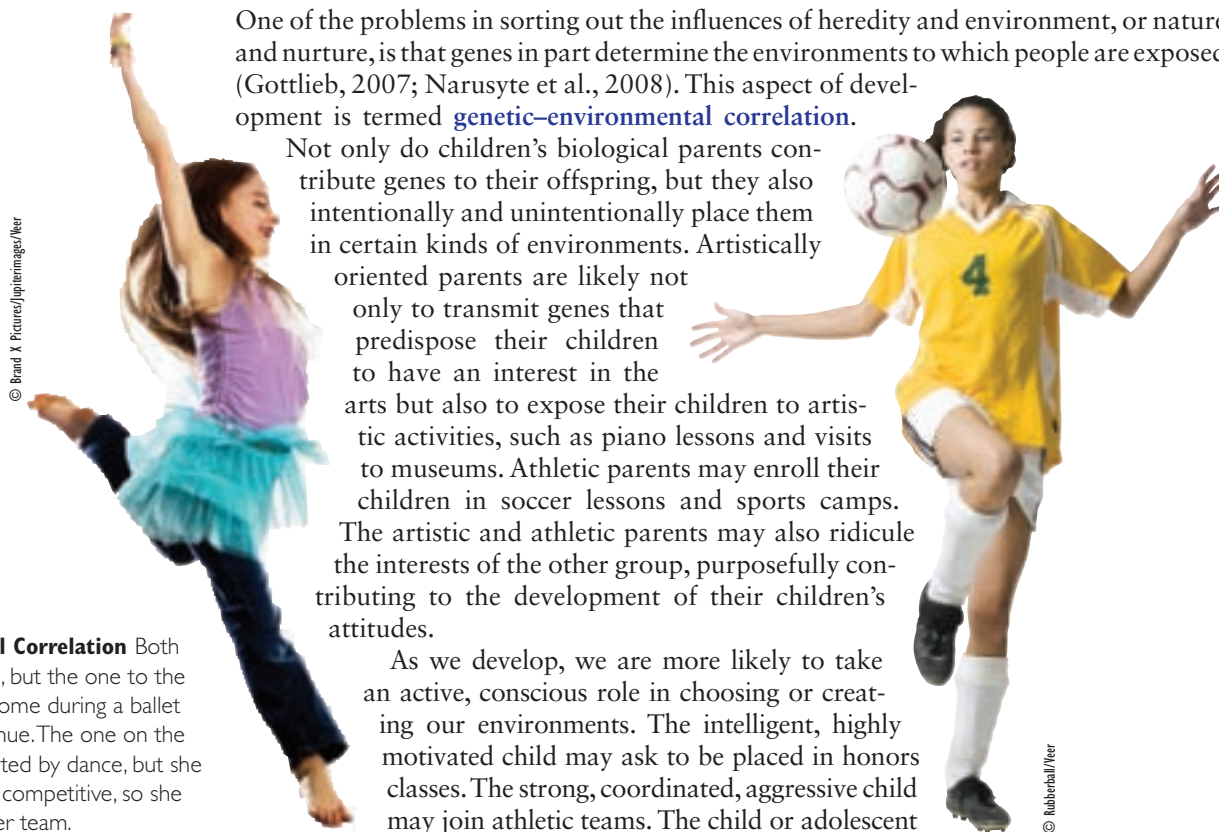
In later chapters, we will see that psychologists have been particularly interested in the use of adoption studies to sort out the effects of nature and nurture in the development of personality traits, intelligence, and various psychological disorders. Such traits and disorders apparently represent the interaction of complex groupings of genes as well as environmental influences.

Genetic–Environmental Correlation: The Interaction of Nature and Nurture

One of the problems in sorting out the influences of heredity and environment, or nature and nurture, is that genes in part determine the environments to which people are exposed (Gottlieb, 2007; Narusyte et al., 2008). This aspect of development is termed **genetic–environmental correlation**.

Not only do children's biological parents contribute genes to their offspring, but they also intentionally and unintentionally place them in certain kinds of environments. Artistically oriented parents are likely not only to transmit genes that predispose their children to have an interest in the arts but also to expose their children to artistic activities, such as piano lessons and visits to museums. Athletic parents may enroll their children in soccer lessons and sports camps. The artistic and athletic parents may also ridicule the interests of the other group, purposefully contributing to the development of their children's attitudes.

As we develop, we are more likely to take an active, conscious role in choosing or creating our environments. The intelligent, highly motivated child may ask to be placed in honors classes. The strong, coordinated, aggressive child may join athletic teams. The child or adolescent



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Genetic–Environmental Correlation Both of these girls are athletic, but the one to the left immediately felt at home during a ballet class and chose to continue. The one on the right was not at all tempted by dance, but she enjoyed soccer and was competitive, so she joined her school's soccer team.

with less academic or athletic talent may choose to be a loner or join a deviant peer group in which friends reinforce his or her behaviors. At some point, children may ask caregivers to help them attend activities that enable them to pursue genetically inspired interests. Adolescents may also select after-school activities that are connected with their academic, artistic, or athletic interests. Choosing environments that allow us to develop inherited preferences is termed **niche-picking** (W. Johnson et al., 2009; Plomin & Daniels, 1987).

THE EPIGENETIC FRAMEWORK

The relationship between genetic and environmental influences is not a one-way street. Instead, it is bidirectional. Although it is true that our genes affect the development of our traits and behaviors, our traits and behaviors also prompt certain kinds of responses from other people and lead us to place ourselves in certain environments. These environments—specialized schools, after-school activities, museums, the theater, certain films and television programs—all affect how genes are expressed. According to what developmental psychologists call **epigenesis**, or the *epigenetic framework*, our development reflects continuing bidirectional exchanges between our genetic heritages and the environments in which we find or place ourselves (Lickliter & Logan, 2007; Vercelli & Piattelli-Palmarini, 2009).

LearningConnections • HEREDITY: THE NATURE OF NATURE

ACTIVE REVIEW (7) The field of _____ genetics deals with the genetic transmission of traits that give rise to patterns of behavior. (8) _____ are the most basic building blocks of heredity. (9) Genes are segments of _____. (10) People with _____ syndrome have an extra chromosome on the 21st pair. (11) The behavior of _____ twins is of special interest to psychologists because their genetic endowment is the same.

REFLECT AND RELATE Which family members seem to be like you physically or psychologically? Which seem

to be very different? How do you explain the similarities and differences?

CRITICAL THINKING Given that people have unique sets of genes (with the exception of identical twins), can people be said to be equal? If so, in what way?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

THE NERVOUS SYSTEM: ON BEING WIRED

As a child, I did not think it was a good thing to have a “nervous” system. After all, if your system were not jittery, you might be less likely to jump at strange noises. Later, I learned that a nervous system is not a system that is nervous. It is a system of nerves involved in thought processes, heartbeat, visual–motor coordination, and so on.

I also learned that the human nervous system is more complex than that of any other animal and that our brains are larger than those of any other animal. Now, this last piece of business is not quite true. A human brain weighs about 3 pounds, but the brains of elephants and whales may be four times as heavy. **Truth or Fiction Revisited:** Thus, it is not true that the human brain is larger than that of any other animal. Still, our brains account for a greater part of our body weight than do those of elephants or whales. Our brains weigh about 1/60th of our body weight. Elephant brains weigh about 1/1,000th of their total weight, and whale brains are a paltry 1/10,000th of their weight. So, humans win the brain-as-a-percentage-of-body-weight contest. Figure 3.4 ■ shows the human brain compared with the brains of some other mammals.

The brain is only one part of the nervous system. We will see that the nervous system serves as the material base for our behaviors, emotions, and cognitions (our thoughts, images, and plans). The nervous system is composed of cells, most of which are neurons, and this is where we begin our study of the nervous system.

Genetic–environmental

correlation The tendency for parents to place children in environments that are consistent with their own preferences or of children to place themselves in such environments.

Niche-picking Choosing environments that allow individuals to develop inherited potentials or preferences.

Epigenesis The fact that children’s development reflects continuing bidirectional exchanges between their genetic heritage and the environments in which they find themselves or place themselves.

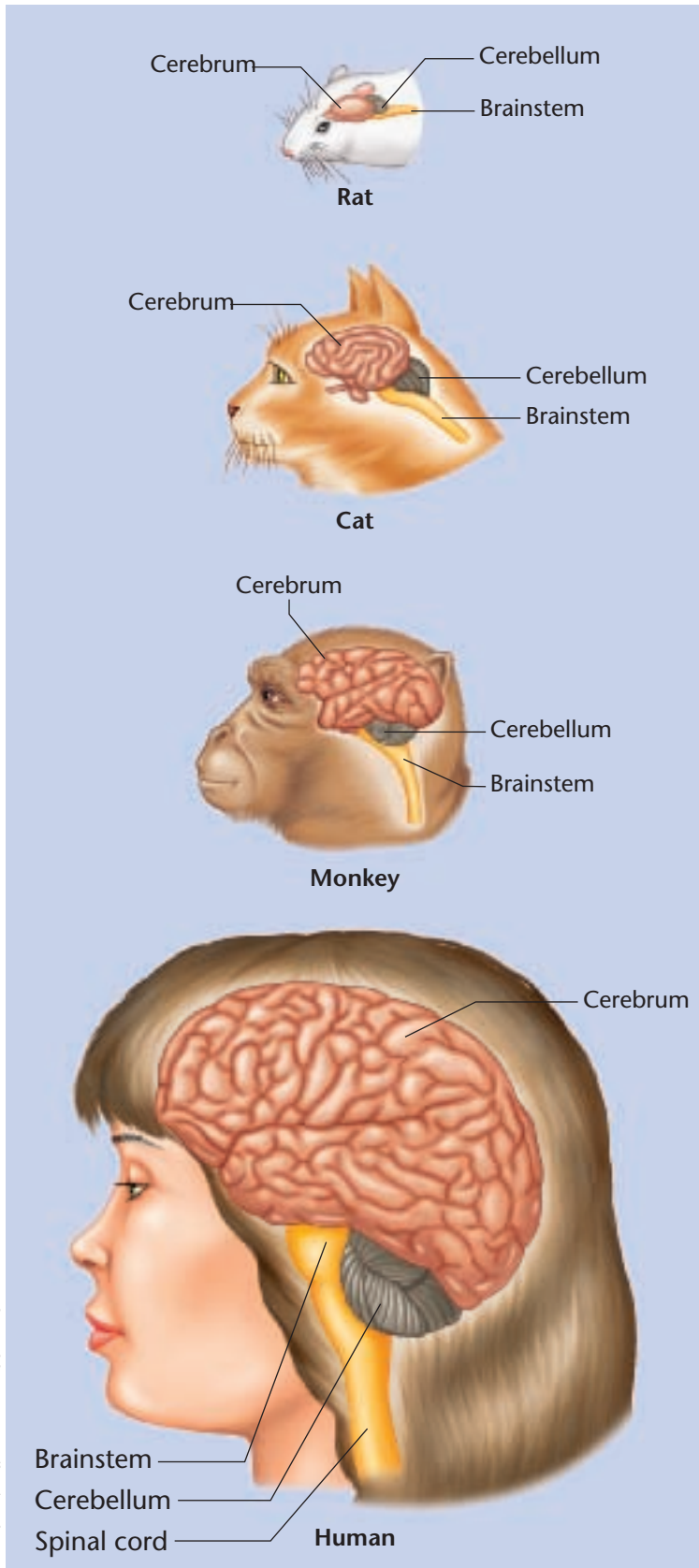


Figure 3.4 ■ Brains of Humans and of Some Other Mammals Other mammals have brains with parts that correspond to the human brain, although they differ in shape and size.

Neurons: Into the Fabulous Forest

Within our brains lies a fabulous forest of nerve cells, or neurons. **Question 8: What are neurons?** Neurons are specialized cells of the nervous system that conduct impulses. Neurons can be visualized as having branches, trunks, and roots—something like trees. As we voyage through this forest, we see that many nerve cells lie alongside one another like a thicket of trees. But neurons can also lie end to end, with their “roots” intertwined with the “branches” of the neurons that lie below. Whereas trees receive sunlight, water, and nutrients from the soil, neurons receive “messages” from a number of sources, such as the senses of vision and touch, and from other neurons, and they can pass these messages along in a complex biological dance.

We are born with more than 100 billion neurons. Most of them are found in the brain. The nervous system also contains glial cells, or **glia**. It has long been known that glia remove dead neurons and waste products from the nervous system, nourish neurons, and direct their growth (Filosa et al., 2009; Gordon et al., 2009). Now we know that glia also synchronize the transmission of messages of nearby neurons, enabling them to transmit messages in waves (Perea et al., 2009).

Neurons occupy center stage in the nervous system. The messages transmitted by neurons somehow account for phenomena ranging from the perception of an itch from a mosquito bite to the coordination of a skier’s vision and muscles to the composition of a concerto to the solution of an algebraic equation.

Neurons vary according to their functions and their location. Neurons in the brain may be only a fraction of an inch in length, whereas others that transmit messages between the spinal cord and the toes are several feet long. **Truth or Fiction Revisited:** Thus, it is true that a single cell can stretch all the way from your spine to your toe. Neurons include a cell body, dendrites, and an axon (see Figure 3.5 ■). The cell body contains the core, or **nucleus**, of the cell. The nucleus uses oxygen and nutrients to generate the energy needed to carry out the work of the cell. Anywhere from a few to several hundred short fibers, or **dendrites**, extend like roots from the cell body to receive incoming messages from thousands of adjoining neurons. Each neuron has an **axon** that extends like a trunk from the cell body. Axons are microscopically thin, but those that carry messages from the toes to the spinal cord extend several feet.

Like tree trunks, axons can branch off in different directions. Axons end in small bulb-shaped structures called **terminals**, or **terminal buttons**. Neurons carry messages in one direction only: from the dendrites or cell body through the axon to the axon terminals. The messages are then transmitted from the terminal buttons to other neurons, muscles, or glands.

As a child matures, the axons of neurons become longer, and the dendrites and terminals proliferate, creating vast interconnected networks for the transmission of complex messages. The number of glial cells also increases as the nervous system develops, contributing to its dense appearance.

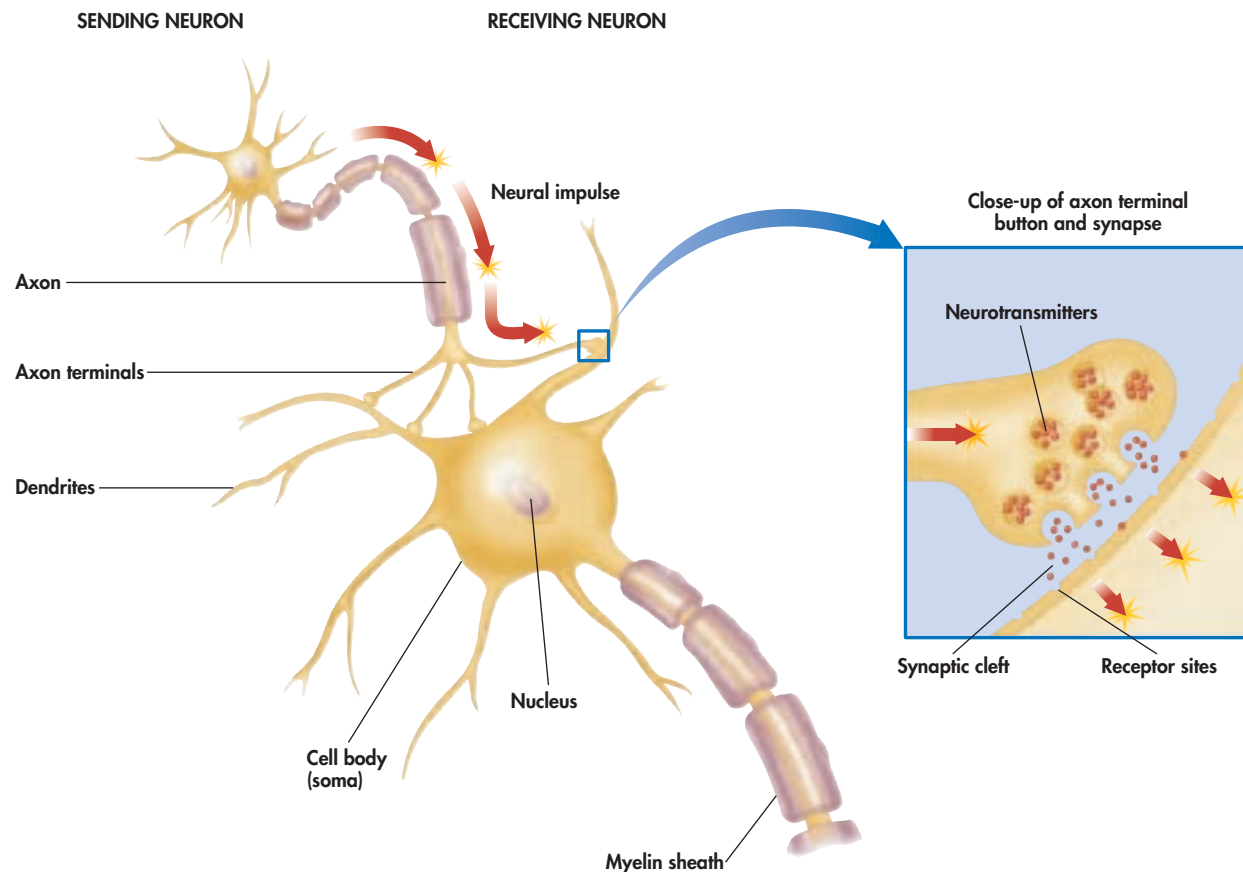


Figure 3.5 ■ The Anatomy of a Neuron “Messages” enter neurons through dendrites, are transmitted along the trunklike axon, and then are sent from axon terminal buttons to muscles, glands, and other neurons. Axon terminal buttons contain sacs of chemicals called *neurotransmitters*. Neurotransmitters are released into the synaptic cleft, where many of them bind to receptor sites on the dendrites of the receiving neuron. Dozens of neurotransmitters have been identified.

MYELIN

The axons of many neurons are wrapped tightly with white, fatty **myelin** that makes them look like strings of sausages under the microscope (bratwurst, actually). The fat insulates the axon from electrically charged atoms, or ions, found in the fluids that surround the nervous system. This myelin sheath minimizes leakage of the electrical current being carried along the axon, thereby allowing messages to be conducted more efficiently.

Myelination is part of the maturation process that leads to the child’s ability to crawl and walk during the first year. Infants are not physiologically “ready” to engage in visual–motor coordination and other activities until the coating process reaches certain levels. In people with the disease multiple sclerosis, myelin is replaced with a hard fibrous tissue that throws off the timing of nerve impulses and disrupts muscular control.

AFFERENT AND EFFERENT NEURONS: FROM THERE TO HERE AND HERE TO THERE

If someone steps on your toes, the sensation is registered by receptors or sensory neurons near the surface of your skin. Then it is transmitted to the spinal cord and brain through **afferent neurons**, which are perhaps 2 to 3 feet long. In the brain, subsequent messages might be conveyed by associative neurons that are only a few thousandths of an inch long. You experience the pain through this process and perhaps entertain some rather nasty thoughts about the perpetrator, who is now apologizing and begging for understanding. Long before you arrive at any logical conclusions, however, motor neurons (**efferent neurons**) send messages to your foot so that you withdraw it and begin an impressive hopping routine. Other efferent neurons stimulate glands so that your heart is beating more rapidly, you are sweating, and the hair on the back of your arms has become erect! Being a good sport, you say, “Oh, it’s nothing.” But considering all the neurons involved, it really is something, isn’t it?

Neuron A specialized cell of the nervous system that transmits messages.

Glia Cells that nourish neurons, remove waste products from the nervous system, and help synchronize the messages sent by neurons.

Dendrites Rootlike structures, attached to the cell body of a neuron, that receive impulses from other neurons.

Axon A long, thin part of a neuron that transmits impulses to other neurons, an organ, or muscle from branching structures called *terminal buttons*.

Myelin A fatty substance that encases and insulates axons, facilitating transmission of neural impulses.

Afferent neurons Neurons that transmit messages from sensory receptors to the spinal cord and brain; also called *sensory neurons*.

Efferent neurons Neurons that transmit messages from the brain or spinal cord to muscles and glands; also called *motor neurons*.

In Profile

It is strange to see how the populace, which nourishes its imagination with tales of witches or saints, mysterious events and extraordinary occurrences, disdains the world around us as commonplace, monotonous and prosaic, without suspecting that at bottom it is all secret, mystery, and marvel.

—Santiago Ramón y Cajal

He was placed in solitary confinement, given one meal a day, and taken out each day for public floggings. Santiago Ramón y Cajal (1852–1934) was 10 years old at the time, and his depraved crime was failure to pay attention in Latin class. (I assume you're doing a better job in psychology . . .)

Cajal's first love was art, but his father—like Charles Darwin's father—prompted him to study medicine because medicine was more prestigious and would guarantee an income. Cajal, however, managed to express his artistic talents even in the medical field. He used the new method of staining nerve cells with salts of silver to study them microscopically and draw them. He became a pioneering investigator of the brain and a superb illustrator, whose renderings of the nervous system sparked a great deal of research, and his drawings are still used for educational purposes today. Some consider Cajal the greatest neuroscientist who ever lived, and he won half the Nobel Prize in physiology or medicine



SANTIAGO RAMÓN Y CAJAL

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in 1906. The other half was awarded to Camillo Golgi, who had innovated the staining technique used by Cajal.



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The Golgi-Stained Retina of a Mouse Embryo, Showing the Neurons in the Eye



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Santiago Ramón Y Cajal

In case you think that afferent and efferent neurons will be hard to distinguish because they sound pretty much the SAME to you, remember that they *are* the SAME. That is, Sensory = Afferent and Motor = Efferent.

The Neural Impulse: Let Us “Sing the Body Electric”¹

In the 18th century, Italian physiologist Luigi Galvani (1737–1798) conducted a shocking experiment in a rainstorm. While his neighbors had the sense to remain indoors, Galvani and his wife were on the porch connecting lightning rods to the heads of dissected frogs whose legs were connected by wires to a well of water. When lightning blazed above, the frogs' muscles contracted. This is not a recommended way to prepare frogs' legs. Galvani was demonstrating that the messages (*neural impulses*) that travel along neurons are electrochemical in nature.

Question 9: What are neural impulses? Neural impulses are messages that travel within neurons at somewhere between 2 miles an hour (in nonmyelinated neurons) and 225 miles an hour (in myelinated neurons). This speed is not impressive when compared with that of an electrical current in a toaster oven or a lamp, which can travel at close to the speed of light—more than 186,000 miles per second. Distances in the body are short, however, and a message will travel from a toe to the brain in perhaps 1/50th of a second.

AN ELECTROCHEMICAL VOYAGE

The process by which neural impulses travel is electrochemical. Neurons generate electricity as a result of chemical changes that cause an electrical charge to be transmitted along the lengths of their axons. The interiors of axons are separated from surrounding

Video Connections—The Action Potential



A neuron's action potential is the electrical impulse that travels along its axon, enabling the conduction of a neural impulse. This concept is explained and illustrated in the video.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

¹ From Walt Whitman's *Leaves of Grass*.

fluids by the cell membrane. The fluids inside and outside the cell membranes contain positively or negatively charged atoms called *ions*. Ions with positive charges (sodium and potassium ions) and negative charges (chloride ions) can flow back and forth across the cell membrane. Yet the flow is not random. The cell membranes of axons have *selective permeability*; that is, gates open and close to allow the movement back and forth of certain ions. In a resting state—that is, when a neuron is not being stimulated by its neighbors—gates prevent the positively charged sodium ions from entering the axon, although potassium can flow. But the overall result is that the concentration of negatively charged chloride (Cl^-) ions inside the cell creates a negative charge in relation to the outside. The axon is said to be **polarized** with a negative **resting potential** of about -70 millivolts in relation to the body fluid outside the cell membrane.

When the resting neuron is adequately stimulated by other neurons, the so-called *sodium-potassium pump* goes into operation. The gates in the part of the axon closest to the cell body allow positively charged sodium ions to enter but also pump out some potassium ions. Since more sodium ions enter than potassium ions leave, there is a net gain in the charge inside the axon, **depolarizing** the area. The influx of sodium ions also positively charges the area with respect to the outside.

The inside of the axon at the disturbed area is said to have an **action potential** of 110 millivolts. This action potential, added to the -70 millivolts that characterize the resting potential, brings the axon's voltage to a positive charge of about $+30$ to $+40$ millivolts in the affected area (see Figure 3.6 ■). The action potential causes the gates in the next part of the cell to open, or become permeable, to sodium ions. At the same time, positively charged sodium ions are being pumped out of the first area of the axon, which returns it to its negative resting potential. In this way, the neural impulse is transmitted continuously along an axon. Because the impulse is generated anew as it progresses, it does not lose strength.

Truth or Fiction Revisited: Thus, it is true that messages travel in the brain by means of electricity. These are messages *within* neurons. However, communication between neurons is carried out quite differently.

Neural impulse The electrochemical discharge of a nerve cell, or neuron.

Polarize To ready a neuron for firing by creating an internal negative charge in relation to the body fluid outside the cell membrane.

Resting potential The electrical potential across the neural membrane when it is not responding to other neurons.

Depolarize To reduce the resting potential of a cell membrane from about -70 millivolts toward zero.

Action potential The electrical impulse that provides the basis for the conduction of a neural impulse along an axon of a neuron.

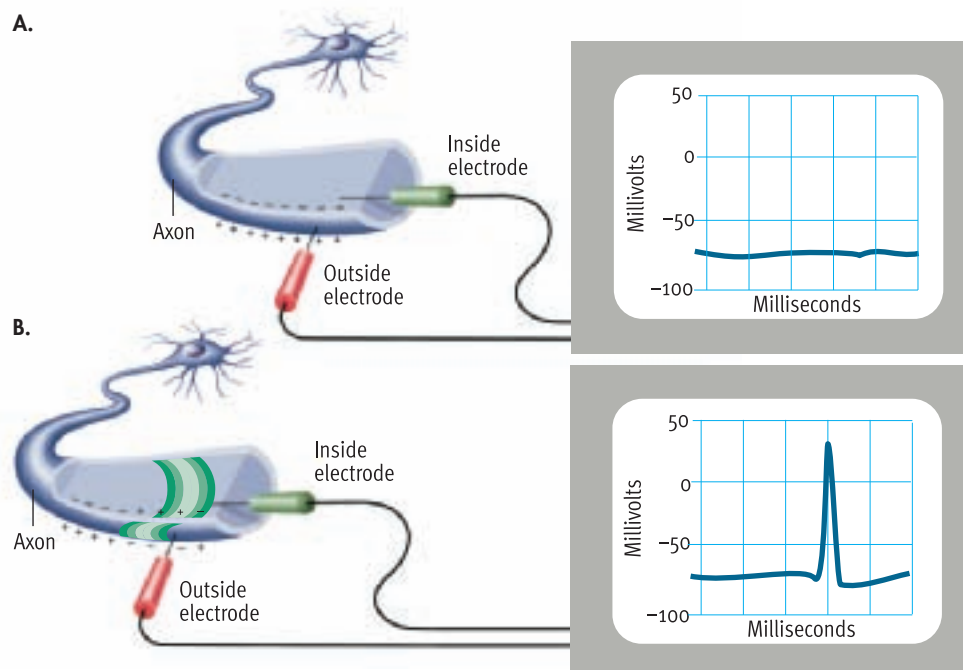


Figure 3.6 ■ Changes in Electrical Charges as a Neural Impulse Is Transmitted Along the Length of an Axon Electrical charges inside and outside axons are measured by microscopic glass tubes placed inside and outside the cell membranes of axons. As shown in part A, when an axon is at rest, it has a negative charge of about -70 millivolts. But when sodium ions enter and the area of entry is depolarized, as shown in part B, the charge in that part of the axon rises to $+30$ to $+40$ millivolts. The change causes the next part of the cell membrane to become permeable to sodium ions, continuing the transmission of the neural impulse along the axon.

FIRING: HOW MESSAGES VOYAGE FROM NEURON TO NEURON

The conduction of the neural impulse along the length of a neuron is what is meant by “firing.” When a rifle fires, it sends a bullet speeding through its barrel and discharges it at more than 1,000 feet per second. **Question 10: What happens when a neuron fires?** Neurons also fire, but instead of a barrel, a neuron has an axon. Instead of discharging a bullet, it releases neurotransmitters.

Some neurons fire in less than 1/1,000th of a second. When they fire, neurons transmit messages to other neurons, muscles, or glands. However, neurons will not fire unless the incoming messages combine to reach a certain strength, which is defined as the *threshold* at which it will fire. A weak message may cause a temporary shift in electrical charge at some point along the cell membrane, but this charge will dissipate if the neuron is not stimulated to its threshold.

Every time a neuron fires, it transmits an impulse of the same strength. This occurrence is known as the **all-or-none principle**. That is, either a neuron fires or it doesn't. Not only can a neuron fire in less than 1/1,000th of a second, but a neuron may also transmit several hundred messages each second. Neurons fire more often when they have been stimulated by larger numbers of other neurons. Stronger stimuli cause more frequent firing, but again, the strength of each firing remains the same.

For a few thousandths of a second after firing, a neuron is insensitive to messages from other neurons and will not fire. It is said to be in a **refractory period**. This period is a time of recovery during which sodium is prevented from passing through the neuronal membrane. When we realize that such periods of recovery might take place hundreds of times per second, it seems a rapid recovery and a short rest indeed. **Truth or Fiction Revisited:** It is therefore true that a single brain cell can send out hundreds of messages each second—and manage to catch some rest in between.

The facts that there are so many neurons and that they can fire so frequently begins to suggest how much information can be transmitted within the brain and to and from the brain. Just think: Billions of cells can each fire hundreds of times per second, sending different kinds of messages to different groups of cells each time. How can any human-made computer we know of today begin to transmit such vast quantities of information? It apparently requires such a complex system of information transmission to begin to understand the particularly human capacities for insight and intuition.

THE SYNAPSE: ON BEING WELL CONNECTED

A neuron relays its message to another neuron across a junction called a **synapse**. **Question 11: What is a synapse?** A synapse consists of an axon terminal button from the transmitting neuron, a dendrite or the body of a receiving neuron, and a fluid-filled gap between the two that is called the synaptic cleft (see Figure 3.5). Although the neural impulse is electrical, it does not jump across the synaptic cleft like a spark. Instead, when a nerve impulse reaches a synapse, axon terminals release chemicals into the synaptic cleft like myriad ships being cast into the sea. Scientists have identified a few dozen of these chemicals to date. In the following section, we consider a few of them that are usually of greatest interest to psychologists.

Neurotransmitters: The Chemical Keys to Communication

Sacs called synaptic vesicles in the axon terminals contain neurotransmitters. When a neural impulse (action potential) reaches the axon terminal, the vesicles release varying amounts of **neurotransmitters**—the chemical keys to communication—into the synaptic cleft. From there, they influence the receiving neuron. **Question 12: What do neurotransmitters do?**

Dozens of neurotransmitters have been identified. Each has its own chemical structure, and each can fit into a specifically tailored harbor, or **receptor site**, on the receiving cell. The analogy of a key fitting into a lock is often used to describe this process. Once released, not all molecules of a neurotransmitter find their way into receptor sites of other neurons. “Loose” neurotransmitters are usually either broken down or reabsorbed by the axon terminal (a process called *reuptake*).

All-or-none principle The fact that a neuron fires an impulse of the same strength whenever its action potential is triggered.

Refractory period A phase following firing during which a neuron is less sensitive to messages from other neurons and will not fire.

Synapse A junction between the axon terminals of one neuron and the dendrites or cell body of another neuron.

Neurotransmitters Chemical substances involved in the transmission of neural impulses from one neuron to another.

Receptor site A location on a dendrite of a receiving neuron tailored to receive a neurotransmitter.

Some neurotransmitters act to *excite* other neurons; that is, they cause other neurons to fire. Other neurotransmitters act to *inhibit* receiving neurons; that is, they prevent them from firing. The sum of the stimulation—excitatory and inhibitory—determines whether a neuron will fire and, if so, when neurotransmitters will be released.

Neurotransmitters are involved in physical processes such as muscle contraction and psychological processes such as thoughts and emotions. Excesses or deficiencies of neurotransmitters have been linked to psychological disorders such as depression and schizophrenia. Let's consider the effects of some neurotransmitters of interest to psychologists: acetylcholine (ACh), dopamine, norepinephrine, serotonin, GABA, and endorphins.

Acetylcholine (ACh) controls muscle contractions. It is excitatory at synapses between nerves and muscles that involve voluntary movement but inhibitory at the heart and some other locations. The effects of curare highlight the functioning of ACh. Curare is a poison that is extracted from plants by native South Americans and used in hunting. If an arrow tipped with curare pierces the skin and the poison enters the body, it prevents ACh from binding to the receptor sites on neurons. Because ACh helps muscles move, curare causes paralysis. The victim is prevented from contracting the muscles used in breathing and therefore dies from suffocation. Botulism, a disease that stems from food poisoning, prevents the release of ACh and has the same effect as curare.

Acetylcholine is also normally prevalent in a part of the brain called the **hippocampus**, a structure involved in the formation of memories. When the amount of ACh available to the brain decreases, memory formation is impaired, as in Alzheimer's disease (Packard, 2009). In one experiment, researchers decreased the ACh available to the hippocampus of laboratory rats. As a result, the rats were incapable of learning their way through a maze, apparently because they could not remember which way to turn at various choice points (Egawa et al., 2002).

Dopamine is involved at the level of the brain and affects voluntary movements, learning and memory, and emotional arousal. Deficiencies of dopamine are linked to Parkinson's disease, in which people progressively lose control over their muscles (Fuentes et al., 2009). They develop muscle tremors and jerky, uncoordinated movements. Muhammad Ali and Michael J. Fox are two of the better-known individuals who are afflicted with Parkinson's disease.

The psychological disorder *schizophrenia* is characterized by confusion and false perceptions, and it has been linked to dopamine. People with schizophrenia may have more receptor sites for dopamine in an area of the brain that is involved in emotional responding. For this reason, they may *overutilize* the dopamine available in the brain (Neve, 2009; Roth et al., 2009). This leads to hallucinations and disturbances of thought and emotion. The phenothiazines, a group of drugs used to treat schizophrenia, inhibit the action of dopamine by blocking some dopamine receptor sites (Neve, 2009). Because of their action, phenothiazines may have Parkinson-like side effects, which are usually treated by lowering the dose, prescribing additional drugs, or switching to another drug.

Norepinephrine is produced largely by neurons in the brain stem. It acts both as a neurotransmitter and as a hormone. It is an excitatory neurotransmitter that speeds up the heartbeat and other body processes and is involved in general arousal, learning and memory, and eating. Excesses and deficiencies of norepinephrine have been linked to mood disorders. Deficiencies of both ACh and norepinephrine are particularly impairing of memory (Qi & Gold, 2009).

The stimulants cocaine and amphetamines ("speed") create excesses of norepinephrine (as well as dopamine) in the nervous system, increasing the firing of neurons and leading to persistent arousal. Amphetamines act by facilitating the release of these neurotransmitters and also prevent their reabsorption by the releasing synaptic vesicles—that is, their reuptake. Cocaine also blocks reuptake.

Serotonin is involved in emotional arousal and sleep. Deficiencies of serotonin have been linked to eating disorders, alcoholism, depression, aggression, and insomnia (Polina et al., 2009; Risch et al., 2009). The drug LSD decreases the action of serotonin



© AFP Photo/Stephen Jaffe/Getty Images

Parkinson's Disease Boxer Muhammad Ali and actor Michael J. Fox are two of the better-known individuals who are afflicted with Parkinson's disease.

Acetylcholine (ACh) A neurotransmitter that controls muscle contractions.

Hippocampus A part of the limbic system of the brain that is involved in memory formation.

Dopamine A neurotransmitter that is involved in Parkinson's disease and that appears to play a role in schizophrenia.

Norepinephrine A neurotransmitter whose action is similar to that of the hormone epinephrine and that may play a role in depression.

Serotonin A neurotransmitter, deficiencies of which have been linked to affective disorders, anxiety, and insomnia.



Runner's High Why have thousands of people taken up long-distance running? Running promotes cardiovascular conditioning, muscle strength, and weight control. But many long-distance runners also experience a "runner's high" that appears to be connected with the release of endorphins. Endorphins are naturally occurring substances that are similar in function to the narcotic morphine.

and may also increase the utilization of dopamine. Overutilization of dopamine may give rise to hallucinations both in people with schizophrenia and users of LSD.

Gamma-aminobutyric acid (GABA) is another neurotransmitter of great interest to psychologists. One reason is that GABA is an inhibitory neurotransmitter that may help calm anxiety reactions (Cunningham et al., 2009). Tranquilizers and alcohol may quell anxiety by binding with GABA receptors and amplifying its effects. One class of antianxiety drug may also increase the sensitivity of receptor sites to GABA. Other studies link deficiencies of GABA to depression (Karolewicz et al., 2009).

Endorphins are inhibitory neurotransmitters. The word *endorphin* is the contraction of *endogenous morphine*. *Endogenous* means "developing from within." Endorphins occur naturally in the brain and in the bloodstream and are similar to the narcotic morphine in their functions and effects. They lock into receptor sites for chemicals that transmit pain messages to the brain. Once the endorphin "key" is in the "lock," the pain-causing chemicals are locked out.

Endorphins may also increase our sense of competence, enhance the functioning of the immune system, and be connected with the pleasurable "runner's high" reported by many long-distance runners (Shah et al., 2009). Table 3.1 ■ reviews much of the information on neurotransmitters.

There you have it—a fabulous forest of neurons in which billions upon billions of axon terminals are pouring armadas of neurotransmitters into synaptic clefts at any given time. The process occurs when you are involved in strenuous activity. It is taking place this moment as you are reading this page. It will happen later on when you have a snack or passively watch television. Moreover, the process is repeated several hundred times every second. The combined activity of all these neurotransmitters determines which messages will be transmitted and which ones will not. You experience your sensations, your thoughts, and your control over your body as psychological events, but the psychological events somehow result from many billions of electrochemical events.

Table 3.1 ■ Key Neurotransmitters and Their Functions

Neurotransmitter	Functions	Comments
Acetylcholine (ACh)	Causes muscle contractions and is involved in formation of memories	Found at synapses between motor neurons and muscles; deficiencies linked with paralysis and Alzheimer's disease
Dopamine	Plays a role in movement, learning, attention, memory, and emotional response	Tremors of Parkinson's disease linked with low levels of dopamine; people with schizophrenia may <i>overutilize</i> dopamine
Norepinephrine	Accelerates the heart rate, affects eating, and is linked with activity levels, learning, and remembering	Imbalances linked with mood disorders such as depression and bipolar disorder
Serotonin	Is involved in behavior patterns and psychological problems, including obesity, depression, insomnia, alcoholism, and aggression	Drugs that block the reuptake of serotonin helpful in the treatment of depression
Gamma-aminobutyric acid (GABA)	An inhibitory neurotransmitter that may lessen anxiety	Tranquilizers and alcohol may counter anxiety by binding with GABA receptors or increasing the sensitivity of receptor sites to GABA
Endorphins	Inhibit pain by locking pain-causing chemicals out of their receptor sites	Endorphins may be connected with some people's indifference to pain, the painkilling effects of acupuncture, and the "runner's high" experienced by many long-distance runners

Gamma-aminobutyric acid (GABA) An inhibitory neurotransmitter that apparently helps calm anxiety.

Endorphins Neurotransmitters that are composed of amino acids and that are functionally similar to morphine.

We can think of neurons as the microscopic building blocks of the nervous system. However, millions upon millions of neurons gather together to form larger visible structures that we think of as the parts of the nervous system. We discuss those parts next, including the most human part—the brain.

The Parts of the Nervous System

Question 13: What are the parts of the nervous system? The nervous system consists of the brain, the spinal cord, and the **nerves** linking them to the sensory organs, muscles, and glands. As shown in Figure 3.7 ■, the brain and spinal cord make up the **central nervous system**. If you compare your nervous system to a computer, your central nervous system would be your central processing unit (CPU).

The sensory (afferent) neurons, which receive and transmit messages to the brain and spinal cord, and the motor (efferent) neurons, which transmit messages from the brain or spinal cord to the muscles and glands, make up the **peripheral nervous system**. In the comparison of the nervous system to a computer, the peripheral nervous system makes up the nervous system's peripheral devices—keyboard, mouse, DVD drive, and so on. You would not be able to feed information to your computer's central processing unit without these *peripheral* devices. Other peripheral devices, such as your monitor and printer, allow you to follow what is happening inside your CPU and to see what it has accomplished.

THE PERIPHERAL NERVOUS SYSTEM: THE BODY'S PERIPHERAL DEVICES

Question 14: What are the divisions and functions of the peripheral nervous system? The peripheral nervous system consists of sensory and motor neurons that transmit messages to and from the central nervous system. Without the peripheral nervous system, our brains would be like isolated CPUs. There would be no keyboards, mouses, discs, or other ways of inputting information. There would be no monitors, printers, modems, or other ways of displaying or transmitting information. We would be detached from the world: We would not be able to perceive it, and we would not be able to act on it. The two main divisions of the peripheral nervous system are the *somatic nervous system* and the *autonomic nervous system*.

The **somatic nervous system** contains sensory (afferent) and motor (efferent) neurons. It transmits messages about sights, sounds, smells, temperature, body positions, and so on to the central nervous system. As a result, we can experience the beauties

Nerve A bundle of axons from many neurons.

Central nervous system The brain and spinal cord.

Peripheral nervous system The part of the nervous system consisting of the somatic nervous system and the autonomic nervous system.

Somatic nervous system The division of the peripheral nervous system that connects the central nervous system with sensory receptors, skeletal muscles, and the surface of the body.

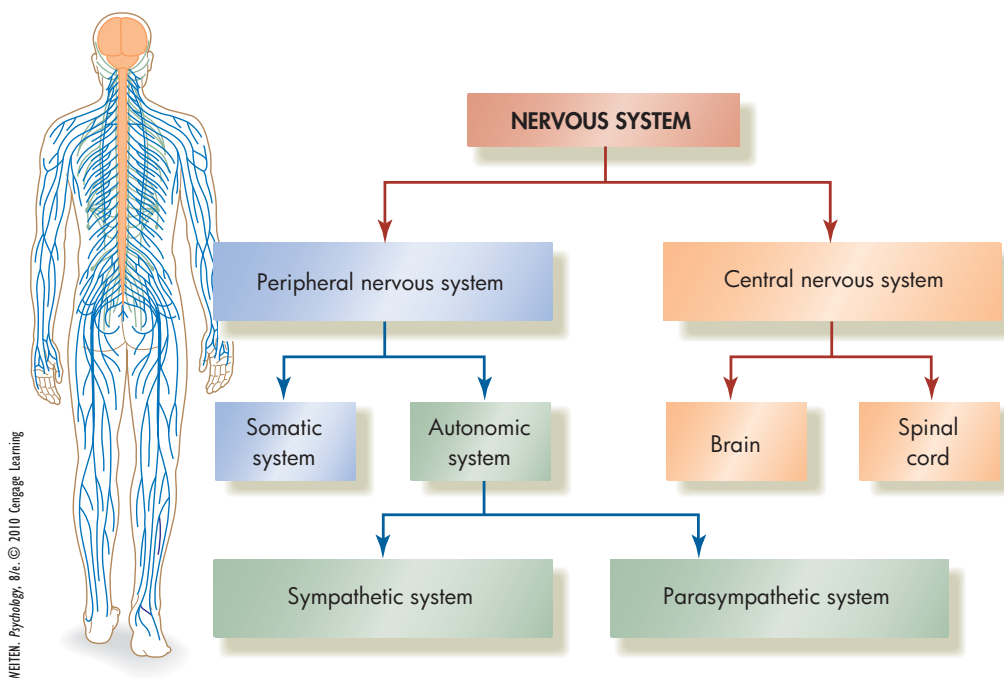


Figure 3.7 ■ The Divisions of the Nervous System The nervous system contains two main divisions: the central nervous system and the peripheral nervous system. The central nervous system consists of the brain and spinal cord. The peripheral nervous system contains the somatic and autonomic systems. In turn, the autonomic nervous system has sympathetic and parasympathetic divisions.

Autonomic nervous system (ANS) The division of the peripheral nervous system that regulates glands and activities such as heartbeat, respiration, digestion, and dilation of the pupils.

Sympathetic The branch of the ANS that is most active during emotional responses, such as fear and anxiety, that spend the body's reserves of energy.

Parasympathetic The branch of the ANS that is most active during processes such as digestion that restore the body's reserves of energy.

and the horrors of the world, its physical ecstasies and agonies. Messages transmitted from the brain and spinal cord to the somatic nervous system control purposeful body movements such as raising a hand, winking, or running, as well as the tiny, almost imperceptible movements that maintain our balance and posture.

Autonomic means “acting independently”—without conscious control. The **autonomic nervous system (ANS)** regulates the glands and the muscles of internal organs. Thus, the ANS controls activities such as heartbeat, respiration, digestion, and dilation of the pupils of the eyes. These activities can occur automatically, while we are asleep. But some of them can be overridden by conscious control. You can breathe at a purposeful pace, for example. Methods like biofeedback and yoga also help people gain voluntary control of functions such as heart rate and blood pressure.

The ANS also has two branches, or divisions: sympathetic and parasympathetic. These branches have largely opposing effects. Many organs and glands are stimulated by both branches of the ANS (see Figure 3.8 ■). When organs and glands are simultaneously stimulated by both divisions, their effects can average out to some degree. In general, the **sympathetic** division is most active during processes that involve spending body energy from stored reserves, such as a fight-or-flight response to a predator or when you find out that your rent is going to be raised. The **parasympathetic** division is most active during processes that replenish reserves of energy, such as eating. When we are afraid, the sympathetic division of the ANS accelerates the heart rate. When we relax, the parasympathetic division decelerates the heart rate. The parasympathetic division stimulates digestive processes, but the sympathetic branch inhibits digestion.

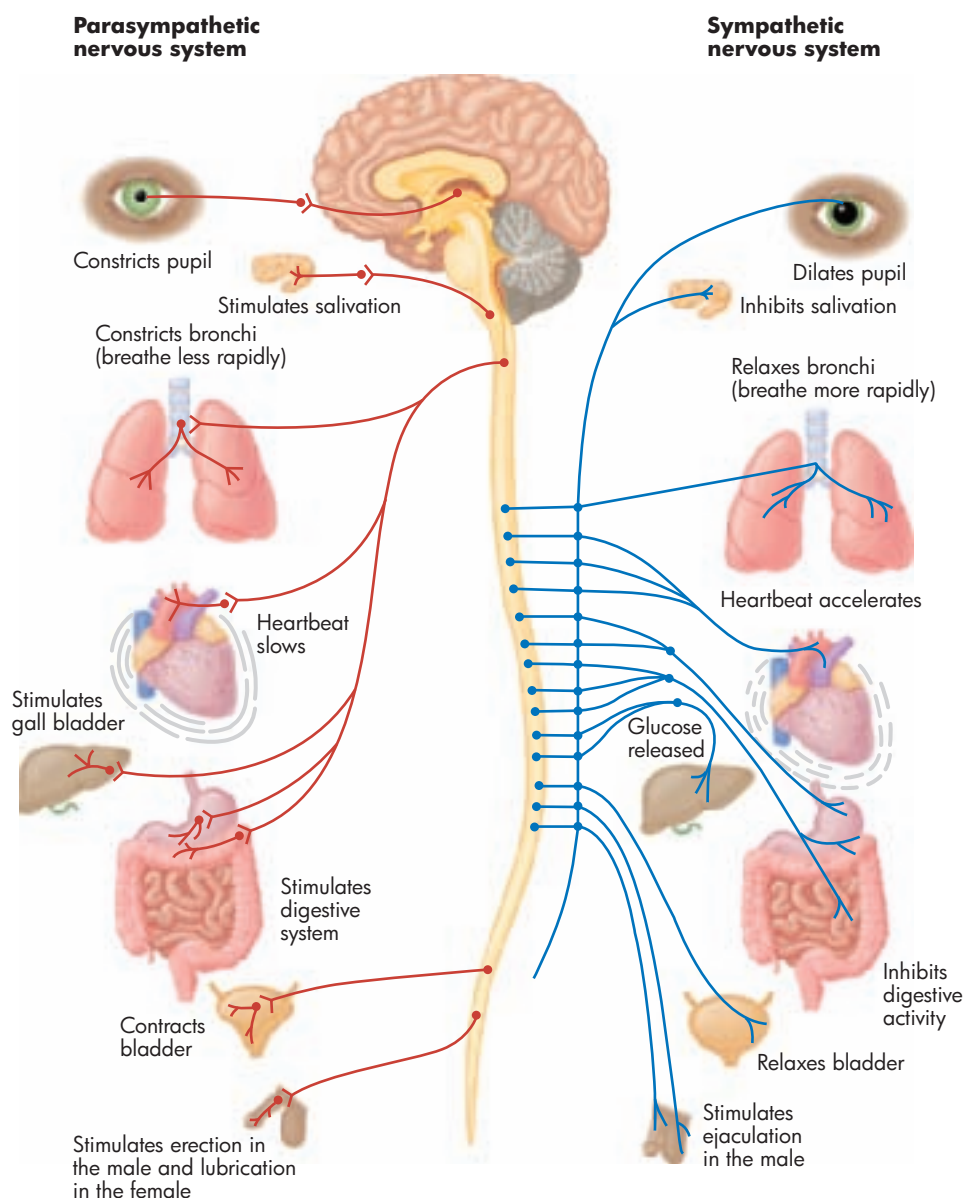


Figure 3.8 ■ The Branches of the Autonomic Nervous System (ANS) The parasympathetic branch of the ANS generally acts to replenish stores of energy in the body. The sympathetic branch is most active during activities that expend energy. The two branches of the ANS frequently have antagonistic effects on the organs they service.

Have you ever tried to eat a meal when you're worried or anxious about something, like a big test or a speech you will have to present to the class? At such times, food usually has no appeal, and if you force yourself to eat, it may seem to land in your stomach like a rock. This is the sympathetic division of your ANS in action. The sympathetic division of the ANS predominates when we feel fear or anxiety, and these feelings can therefore cause indigestion. **Truth or Fiction Revisited:** Thus, it is true that fear can give you indigestion.

The ANS is of particular interest to psychologists because its activities are linked to various emotions such as anxiety and love. Some people seem to have overly reactive sympathetic nervous systems. In the absence of external threats, their bodies still respond as though they were faced with danger. Psychologists often help them learn to relax when there is no external reason for them to feel so “wound up tight.”

THE CENTRAL NERVOUS SYSTEM: THE BODY'S CENTRAL PROCESSING UNIT

It is your central nervous system that makes you so special. Other species see more sharply, smell more keenly, and hear more acutely. Other species run faster, fly through the air, or swim underwater without the benefit of artificial devices, such as airplanes and submarines. But it is your central nervous system that enables you to use symbols and language, the abilities that allow people not only to adapt to their environment but also to create new environments and give them names (Bandura, 1999).

Question 15: What are the divisions and functions of the central nervous system? As noted earlier, the central nervous system consists of the spinal cord and the brain.

The **spinal cord** is a true “information superhighway”—a column of nerves about as thick as a thumb. It transmits messages from sensory receptors to the brain and from the brain to muscles and glands throughout the body. The spinal cord is also capable of some “local government.” That is, it controls some responses to external stimulation through **spinal reflexes**. A spinal reflex is an unlearned response to a stimulus that may involve only two neurons—a sensory (afferent) neuron and a motor (efferent) neuron (see Figure 3.9 ■). In some reflexes, a third neuron, called an **interneuron**, transmits the neural impulse from the sensory neuron through the spinal cord to the motor neuron.

The spinal cord (and the brain) consists of gray matter and white matter. The **gray matter** is composed of nonmyelinated neurons. Some of these are involved in spinal reflexes. Others send their axons to the brain. The **white matter** is composed of bundles of longer, myelinated (and thus whitish) axons that carry messages to and from the brain. As you can see in Figure 3.9, a cross section of the spinal cord shows that the gray matter, which includes cell bodies, is distributed in a butterfly pattern.

The spinal cord is also involved in reflexes. We have many reflexes: We blink in response to a puff of air in our faces. We swallow when food accumulates in the mouth.

Spinal cord A column of nerves within the spine that transmits messages from sensory receptors to the brain and from the brain to muscles and glands.

Spinal reflex A simple, unlearned response to a stimulus that may involve only two neurons.

Interneuron A neuron that transmits a neural impulse from a sensory neuron to a motor neuron.

Gray matter In the spinal cord, the grayish neurons and neural segments that are involved in spinal reflexes.

White matter In the spinal cord, axon bundles that carry messages from and to the brain.

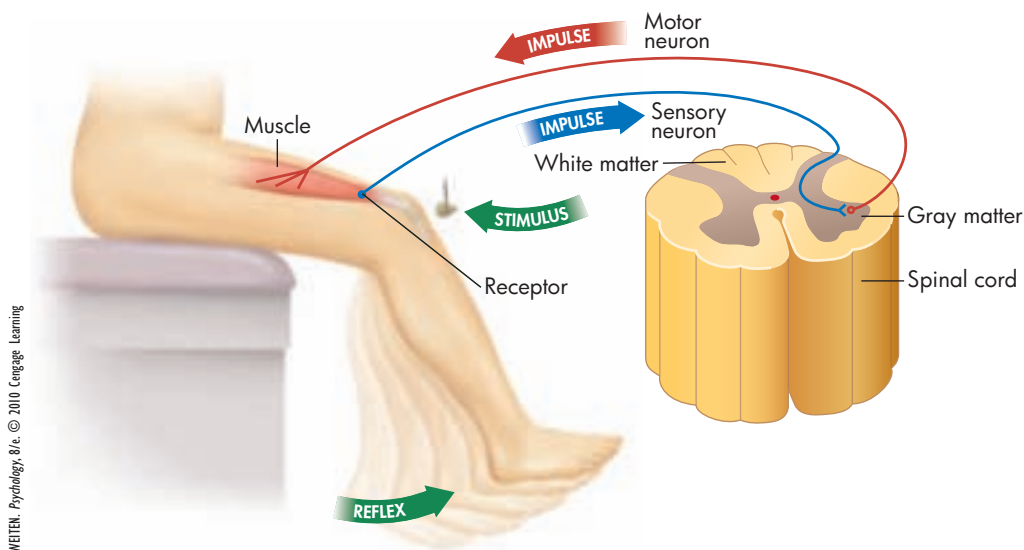


Figure 3.9 ■ The Reflex Arc Reflexes are inborn, stereotyped behavior patterns that have apparently evolved because they help individuals adapt to the environment even before they can understand and purposefully manipulate the environment. Here we see a cross section of the spinal cord highlighting a sensory neuron and a motor neuron, which are involved in the knee-jerk reflex. In some reflexes, interneurons link sensory and motor neurons.

A physician may tap the leg below the knee to elicit the knee-jerk reflex, a sign that the nervous system is operating adequately. Urinating and defecating are reflexes that occur in response to pressure in the bladder and the rectum. Parents typically spend weeks or months toilet-training toddlers—in other words, teaching them to involve their brains in the process of elimination. Learning to inhibit these reflexes makes civilization possible.

Sexual response also involves many reflexes. Stimulation of the genital organs leads to the reflexes of erection in the male and vaginal lubrication in the female (reflexes that make sexual intercourse possible) and to the reflexive muscle contractions of orgasm. As reflexes, these processes need not involve the brain, but most often they do. Feelings of passion, memories of an enjoyable sexual encounter, and sexual fantasies usually contribute to sexual response by transmitting messages from the brain to the genitals through the spinal cord.

LearningConnections • THE NERVOUS SYSTEM: ON BEING WIRED

ACTIVE REVIEW (12) Neurons transmit messages to other neurons by means of chemical substances called _____. (13) Neurons have a cell body, or soma; dendrites, which receive “messages”; and a(n) _____, which extends from the cell body. (14) The axons of many neurons have a fatty insulating sheath called _____. (15) _____ neurons conduct messages from the central nervous system that stimulate glands or cause muscles to contract. (16) The conduction of the neural impulse along the length of the neuron is called _____. (17) A(n) _____ consists of an axon terminal, a dendrite, and a fluid-filled gap between them. (18) Acetylcholine (ACh) is normally prevalent in a brain structure essential to the formation of memories: the _____. (19) It is theorized that people with _____ overutilize dopamine. (20) Deficiencies of _____

are linked to anxiety, depression, and insomnia. (21) The _____ nervous system (ANS) regulates the glands and involuntary activities such as heartbeat and digestion.

REFLECT AND RELATE Reflexes are automatic, involuntary responses. Yet the great majority of the time we engage in sexual behavior voluntarily. How, then, do we explain the fact that sexual responses like erection, vaginal lubrication, and orgasm are reflexes?

CRITICAL THINKING Psychology is the study of behavior and mental processes. Why, then, are psychologists interested in the nervous system?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

THE BRAIN: THE STAR OF THE HUMAN NERVOUS SYSTEM

— ■ —
*The Brain—is wider than
the Sky—
For—put them side by side—
The one the other will contain
With ease—and You—beside—*

EMILY DICKINSON
— ■ —

Every show has a star, and the brain is the undisputed star of the human nervous system. The size and shape of your brain are responsible for your large, delightfully rounded head. In all the animal kingdom, you (and about 6 billion other people) are unique because of the capacities for learning and thinking residing in the human brain.

The brains of men are about 8% to 10% larger than those of women (Lenroot et al., 2007), which is related to the difference in body size. However, it may be that how well connected one is (in terms of synapses) is more important than size in the human brain. After all, Albert Einstein’s brain was only average in size (Abraham, 2002). Moreover, women’s brains “run hotter” than men’s. Women metabolize more glucose (sugar) and appear to use more of their brains on a given task (Cosgrove et al., 2007; McCarthy et al., 2009).

Scientists who have engaged in brain research generally agree that the mind is a function of the brain (American Psychological Association, 2008; Block, 2009).

Question 16: How do researchers learn about the functions of the brain?

Seeing the Brain Through the Eyes of the Psychologist

Philosophers and scientists have wondered about the functions of the brain throughout history. Sometimes, they have engaged in careful research that attempts to pinpoint exactly what happens in certain parts of the brain. At other times—as in the case of

Phineas Gage, who, as you learned in Chapter 2, had the accident with the tamping rod—knowledge has almost literally fallen into their laps. From injuries to the head—some of them minimal, some horrendous—we have learned that brain damage can impair consciousness and awareness. Brain damage can result in loss of vision and hearing, confusion, or loss of memory. In some cases, the loss of large portions of the brain may result in little loss of function. Ironically, the loss of smaller portions in particularly sensitive locations can result in language problems, memory loss, or death. It has been known for about two centuries that damage to the left side of the brain is connected with loss of sensation or movement on the right side of the body, and vice versa. Thus, it has been assumed that the brain's control mechanisms must cross over from right to left, and vice versa, as they descend into the body.

Accidents provide unplanned and uncontrolled opportunities of studying the brain. Scientists have learned more about the brain, however, through methods like experimentation, use of the electroencephalograph, and brain scans.

EXPERIMENTING WITH THE BRAIN

The results of disease and accidents have shown us that brain injuries can be connected with changes in behavior and mental processes. Scientists have also purposefully experimented with the brain to observe the results. For example, **lesioning** (damaging) part of the brain region called the hypothalamus causes rats to overeat. Damaging another part of the hypothalamus causes them to stop eating. It is as if parts of the brain contain on-off switches for certain kinds of behavior, at least in lower animals.

Surgeon Wilder Penfield (1969) stimulated parts of human brains with electrical probes, and as a result, his patients reported the occurrence of certain kinds of memories. Similar experiments in electrical stimulation of the brain have found that parts of the brain are connected with specific kinds of sensations (as of light or sound) or motor activities (such as movement of an arm or leg).

THE ELECTROENCEPHALOGRAPH: FOLLOWING THE ELECTRIC FOOTPRINTS OF BRAINPOWER

Penfield stimulated parts of the brain with an electrical current and asked people to report what they experienced as a result. Researchers have also used the electroencephalograph (EEG) to record the natural electrical activity of the brain. The EEG detects minute amounts of electrical activity—called brain waves—that pass between the electrodes. Certain brain waves are associated with feelings of relaxation and with the stages of sleep.

As described in Chapter 2, researchers today use the computer to generate images of the parts of the brain from various sources of radiation. Computerized axial tomography (CAT scan) passes an X-ray beam through the head and measures the structures that reflect the X-rays from various angles, generating a three-dimensional image of the brain. Positron emission tomography (PET scan) forms a computer-generated image of the activity of parts of the brain by tracing the amount of glucose used (or metabolized) by these parts. More glucose is metabolized in more active parts of the brain. In functional magnetic resonance imaging (fMRI), the person lies in a magnetic field and is exposed to radio waves that cause parts of the brain to emit signals that are measured from various angles.

Imaging with the PET scan and fMRI suggests that the prefrontal cortex is the “executive center” of the brain—where we process much of the information involved in making plans and solving problems (Mansouri et al., 2009; Tanji & Hoshi, 2008). Figure 3.10 ■ shows the prefrontal cortex. One prefrontal region is found in each hemisphere, a bit above the outer edge of the eyebrow.

A Voyage Through the Brain: Revealing the Central Processing Unit

Perhaps you never imagined yourself as going off to foreign territory to unearth evidence about the history and functioning of the human species. But pack your traveling gear because we are about to go off on a voyage of discovery—a voyage within your own skull. We will be traveling through your brain—a fascinating archeological site.

*The brain is a wonderful organ;
it starts working the moment
you get up in the morning
and does not stop until you
get into the office.*

ROBERT FROST

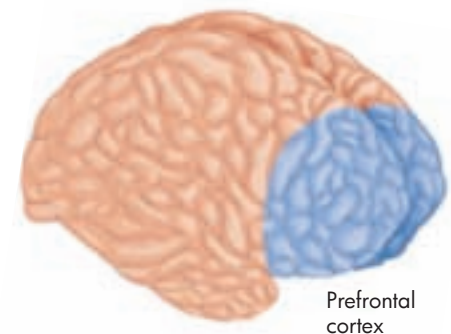


Figure 3.10 ■ The Prefrontal Cortex of the Brain The prefrontal cortex comes in pairs. One is found in each hemisphere, a bit above the outer edge of the eyebrow. The prefrontal cortex is highly active during visual and spatial problem solving. Your sense of self—your continuous sense of being in and operating on the world—may also reside largely in the prefrontal cortex.

Lesion An injury that results in impaired behavior or loss of a function.

Your brain reveals much of what is so special about you. It also holds a record of your connectedness with animals that have walked, swum, and flown the Earth for hundreds of millions of years. In fact, the “older” parts of your brain—those that we meet first on our tour—are not all that different from the corresponding parts of the brains of other mammals. These parts of your brain, evolutionarily speaking, also have functions very similar to those of these other species. They are involved in basic survival functions such as breathing, feeding, and the regulation of cycles of sleeping and waking. **Question 17: What are the structures and functions of the brain?**

Let’s now begin our tour of the brain (see Figure 3.11 ■). We begin with the oldest part of our “archeological dig”—the hindbrain, where the spinal cord rises to meet the brain. Here we find three major structures: the medulla, the pons, and the cerebellum. Many pathways that connect the spinal cord to higher levels of the brain pass through the **medulla**. The medulla regulates vital functions such as heart rate, blood pressure, and respiration. The medulla also plays a role in sleeping, sneezing, and coughing. The **pons** is a bulge in the hindbrain that lies forward of the medulla. *Pons* is the Latin word for “bridge.” The pons is so named because of the bundles of nerves that pass through it. The pons transmits information about body movement and is involved in functions related to attention, sleep and alertness, and respiration.

Medulla An oblong area of the hindbrain involved in regulation of heartbeat and respiration.

Pons A structure of the hindbrain involved in breathing, attention, sleep, and dreams.

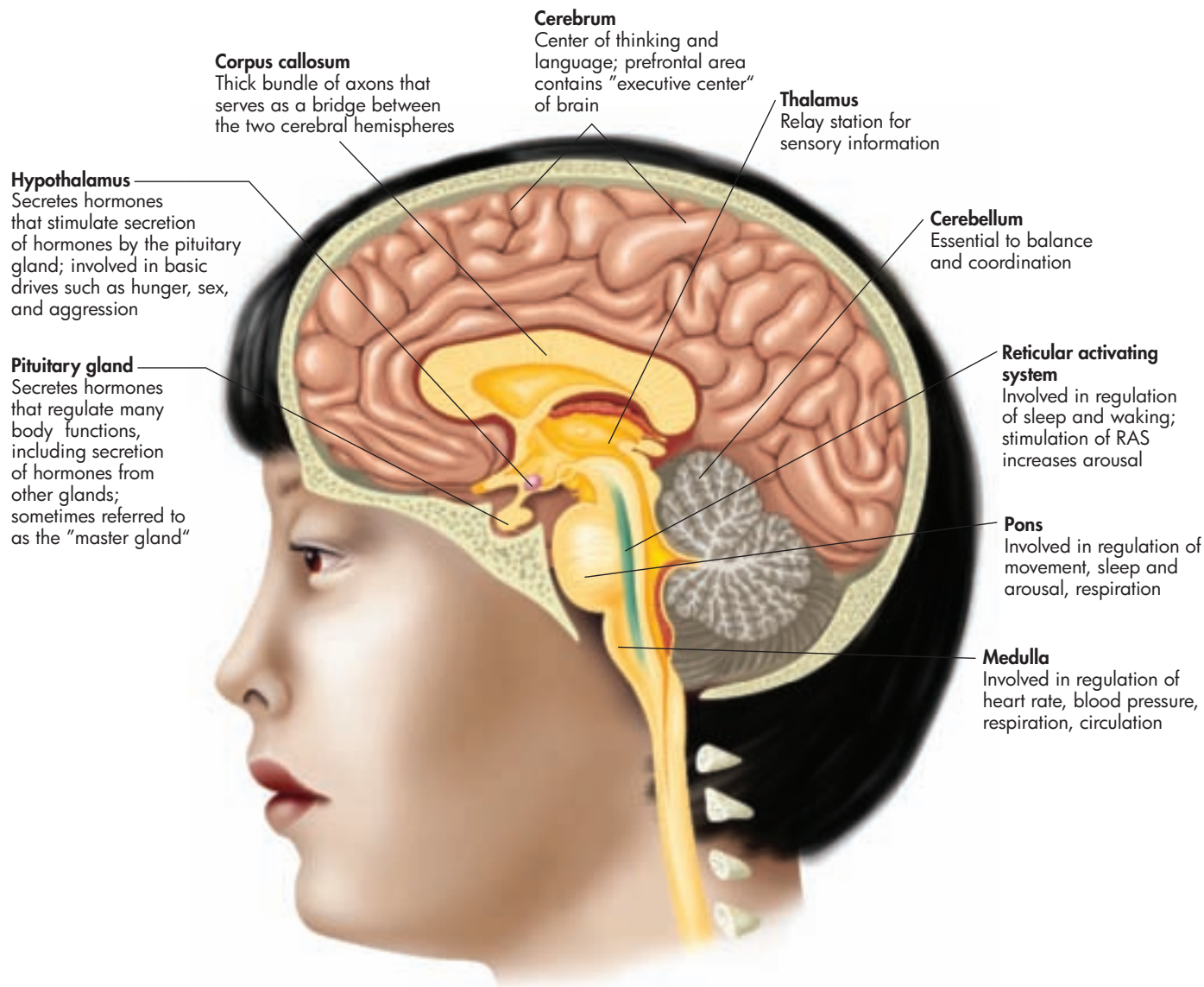


Figure 3.11 ■ The Parts of the Brain This view of the brain, split top to bottom, shows some of the most important structures. Note how close the hypothalamus is to the pituitary gland. The proximity allows the hypothalamus to readily influence the pituitary gland. The “valleys” in the cerebrum are called *fissures*.

Behind the pons lies the **cerebellum** (“little brain” in Latin). The cerebellum has two hemispheres that are involved in maintaining balance and controlling motor (muscle) behavior. You may send a command from your forebrain to get up and walk to the refrigerator, but your cerebellum is key to organizing the information that enables you to engage in these movements. The cerebellum allows you to place one leg in front of the other and reach your destination without tipping over. Injury to the cerebellum may lead to lack of motor coordination, stumbling, and loss of muscle tone. Alcohol depresses the functioning of the cerebellum, so police often ask drivers suspected of drinking too much to engage in tasks that involve the cerebellum, such as touching their noses with their fingers or walking a straight line.

As we tour the hindbrain, we also find the lower part of the **reticular activating system (RAS)**. That is where the RAS begins, but it ascends through the midbrain into the lower part of the forebrain. The RAS is vital in the functions of attention, sleep, and arousal. Injury to the RAS may result in a coma. Stimulation of the RAS causes it to send messages to the cerebral cortex (the large wrinkled mass that you think of as your brain), making us more alert to sensory information. In classic neurological research, Giuseppe Moruzzi and Horace Magoun (1949) discovered that electrical stimulation of the reticular formation of a sleeping cat caused it to awaken at once. But when the reticular formation was severed from higher parts of the brain, the animal fell into a coma from which it would not awaken. Drugs known as central nervous system depressants, such as alcohol, are thought to work, in part, by lowering RAS activity.

Sudden loud noises stimulate the RAS and awaken a sleeping animal or person. But the RAS may become selective through learning. That is, it comes to play a filtering role. It may allow some messages to filter through to higher brain levels and awareness while screening others out. For example, the parent who has primary responsibility for child care may be awakened by the stirring sounds of an infant, while the sounds of traffic or street noise are filtered out, even though they are louder. The other parent, in contrast, may sleep through loud crying by the infant. If the first parent must be away for several days, however, the second parent’s RAS may quickly become sensitive to noises produced by the child. This sensitivity may rapidly fade again when the first parent returns.

Let’s move onward and upward. Key areas of the forebrain are the *thalamus*, the *hypothalamus*, the *limbic system*, and the *cerebrum* (see Figure 3.11). The **thalamus** is located near the center of the brain. It consists of two joined egg- or football-shaped structures. The thalamus serves as a relay station for sensory stimulation. Nerve fibers from the sensory systems enter from below; the information carried by them is then transmitted to the cerebral cortex by way of fibers that exit from above. For instance, the thalamus relays sensory input from the eyes to the visual areas of the cerebral cortex. The thalamus is also involved in controlling sleep and attention in coordination with other brain structures, including the RAS.

The **hypothalamus** lies beneath the thalamus and above the pituitary gland. It weighs only 4 grams, yet it is vital in the regulation of body temperature, concentration of fluids, storage of nutrients, and various aspects of motivation and emotion. Experimenters learn many of the functions of the hypothalamus by implanting electrodes in parts of it and observing the effects of an electrical current. They have found that the hypothalamus is involved in hunger, thirst, sexual behavior, caring for offspring, and aggression. Among lower animals, stimulation of various areas of the hypothalamus can trigger instinctual behaviors such as fighting, mating, or even nest building.

Canadian psychologists James Olds and Peter Milner (1954) made a wonderful mistake in the 1950s. They were attempting to implant an electrode in a rat’s reticular formation to see how stimulation of the area might affect learning. Olds, however, was primarily a social psychologist and not a biological psychologist. He missed his target and found a part of the animal’s hypothalamus instead. Olds and Milner dubbed this area the “pleasure center” because the animal would repeat whatever it was doing when it was stimulated. The term *pleasure center* is not used too frequently because it appears to attribute human emotions to rats. Yet the pleasure centers must be doing something right because rats stimulate themselves in these centers by pressing a pedal several thousand times an hour until they are exhausted (Olds, 1969).

The hypothalamus is just as important to humans as it is to lower animals. Unfortunately (or fortunately), our pleasure centers are not as clearly defined as those



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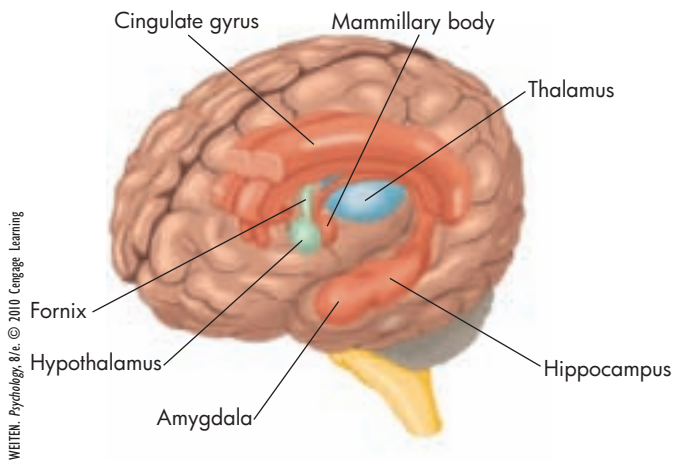
Walking the Line The cerebellum plays a key role in your ability to keep to the straight and narrow—that is, to walk a straight line. Because alcohol depresses the functioning of the cerebellum, police may ask suspected drivers to walk a straight line as a test of whether they have drunk too much to drive their cars safely.

Cerebellum A part of the hindbrain involved in muscle coordination and balance.

Reticular activating system (RAS) A part of the brain involved in attention, sleep, and arousal.

Thalamus An area near the center of the brain involved in the relay of sensory information to the cortex and in the functions of sleep and attention.

Hypothalamus A bundle of nuclei below the thalamus involved in body temperature, motivation, and emotion.



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Figure 3.12 ■ The Limbic System

The limbic system is made up of structures that include the amygdala, the hippocampus, and parts of the hypothalamus. It is evolved fully only in mammals and forms a fringe along the inner edge of the cerebrum. The limbic system is involved in memory and emotion and in the drives of hunger, sex, and aggression.

— ■ —

The brain is the organ that sets us apart from any other species. It is not the strength of our muscles or of our bones that makes us different, it is our brain.

PASKO T. RAKIC

— ■ —

Limbic system A group of structures involved in memory, motivation, and emotion that forms a fringe along the inner edge of the cerebrum.

Amygdala A part of the limbic system that apparently facilitates stereotypical aggressive responses.

Cerebrum The large mass of the fore-brain, which consists of two hemispheres.

Cerebral cortex The wrinkled surface area (gray matter) of the cerebrum.

Corpus callosum A thick fiber bundle that connects the hemispheres of the cortex.

Frontal lobe The lobe of the cerebral cortex that lies in front of the central fissure.

Parietal lobe The lobe that lies just behind the central fissure.

Temporal lobe The lobe that lies below the lateral fissure, near the temples of the head.

Occipital lobe The lobe that lies behind and below the parietal lobe and behind the temporal lobe.

of the rat. Then, too, our responses to messages from the hypothalamus are less automatic and relatively more influenced by higher brain functions—that is, cognitive factors such as thought, choice, and value systems. It is all a part of being human.

The **limbic system** forms a fringe along the inner edge of the cerebrum and is fully evolved only in mammals. (Dig in from the surface a little to find it; see Figure 3.12 ■). It is made up of several structures, including the *amygdala*, *hippocampus*, and parts of the *hypothalamus*. It is involved in memory and emotion and in the drives of hunger, sex, and aggression. People in whom surgical operations have damaged the hippocampus can retrieve old memories but cannot permanently store new information. As a result, they may reread the same newspaper day in and day out without recalling that they read it before. Or they may have to be perpetually reintroduced to people they have met just hours earlier (Squire, 1993, 1996).

The **amygdala** is near the bottom of the limbic system and looks like two little almonds. Studies using lesioning and electrical stimulation show that the amygdala is connected with aggressive behavior in monkeys, cats, and other animals. Early in the 20th century, Heinrich Klüver and Paul Bucy (1939) lesioned part of the amygdala of a rhesus monkey. Rhesus monkeys are normally a scrappy lot and try to bite or grab at intruders, but destruction of this animal’s amygdala made it docile. No longer did it react aggressively to people. It even allowed people to poke and pinch it. Electrical stimulation of the part of the amygdala that Klüver and Bucy had destroyed, however, triggers a “rage response.” For example, it causes a cat to hiss and arch its back in preparation to attack. The amygdala is also connected with a fear response (Ahs et al., 2009). If you electrically stimulate another part of the amygdala, the cat cringes in fear when you cage it with a mouse. Not very tigerlike.

The amygdala is also connected with vigilance. It is involved in emotions, learning, and memory, and it behaves like a spotlight, focusing attention on matters that are novel and important to know more about. In studies reported in 2000, researchers used fMRI to scan the amygdala while subjects were shown faces of European Americans and African Americans. One study flashed the photos by four men and four women, half European American and half African American (Hart et al., 2000). The subjects showed less activity in the amygdala when they viewed faces belonging to people of their own ethnic group, suggesting that they were more comfortable with “familiar” faces.

Other studies attempted to connect the “lighting up” of the amygdala with other racially oriented responses. In one, European American subjects were shown photos of young European Americans and African Americans (Phelps et al., 2000). Days later, the subjects were given tests to measure their responses to African Americans. For example, one test involved sitting at a computer and classifying the photos by race at the same time they were classifying words flashing on the screen such as “good” or “bad.” Most of the European American subjects tend to associate positive words like joy, love, and peace with European Americans and negative words like cancer, bomb, and devil with African Americans. It turned out that subjects who were more likely to associate African Americans with negative words also showed greater activity in the amygdala when presented with faces of African Americans. The researchers do not suggest that the amygdala activity—or even the word-association test—is a sign of conscious prejudice. They offer the alternative hypothesis that European Americans may simply be less familiar with faces of African Americans and that the relative lack of familiarity could trigger activity in the amygdala and negative feelings (fear of the unknown). The researchers find evidence for this interpretation in the fact that European Americans did *not* show the heightened activity of the amygdala when photos of familiar African Americans—Michael Jordan and Denzel Washington—flashed by.

And now we journey upward to the cerebrum. The **cerebrum** is the crowning glory of the brain. Only in humans does the cerebrum make up such a large part of the brain (see Figure 3.13 ■). The cerebrum is responsible for thinking and language.

The surface of the cerebrum—the **cerebral cortex**—is wrinkled, or convoluted, with ridges and valleys. The convolutions allow a great deal of surface area to be packed into the brain—and surface area is apparently connected with cognitive ability. Valleys in the cortex are called *fissures*. A key fissure almost divides the cerebrum in half, creating two hemispheres with something of the shape of a walnut. The hemispheres are connected by the **corpus callosum** (Latin for “thick body” or “hard body”), a bundle of some 200 million nerve fibers.

The Cerebral Cortex: The “Bark” That Reasons

The cerebral cortex is the part of the brain that you usually think of as your brain. *Cortex* is a Latin word meaning “bark,” as in the bark of a tree. Just as the bark is the outer coating of a tree, the cerebral cortex is the outer coating of the cerebrum. Despite its extreme importance and its creation of a world of civilization and culture, it is only about one-eighth of an inch thick. It is the outer edge of the brain that brings humans to their outer limits.

The cerebral cortex is involved in almost every bodily activity, including most sensations and most responses. It is also the part of the brain that frees people from the tyranny of genetic dictates and instinct. It is the seat of thinking and language, and it enables humans to think deeply about the world outside and make decisions. Other organisms run faster than we do, are stronger, or bite more sharply. Yet humans think faster, are intellectually “stronger,” and we might add, have a “biting” wit—all of which is made possible by the cerebral cortex. **Question 18: What are the parts of the cerebral cortex?**

The cerebral cortex has two hemispheres, left and right. Each of the hemispheres is divided into four lobes, as shown in Figure 3.13. The **frontal lobe** lies in front of the central fissure, and the **parietal lobe** is behind it. The **temporal lobe** lies below the side, or lateral, fissure—across from the frontal and parietal lobes. The **occipital lobe** lies behind the temporal lobe and behind and below the parietal lobe.

When light strikes the eyes, neurons in the occipital lobe fire, and as a result, we “see” (that is, the image is projected in the brain). Direct artificial stimulation of the occipital lobe also produces visual sensations. If neurons in the occipital region of the cortex were stimulated with electricity, you would “see” flashes of light even if

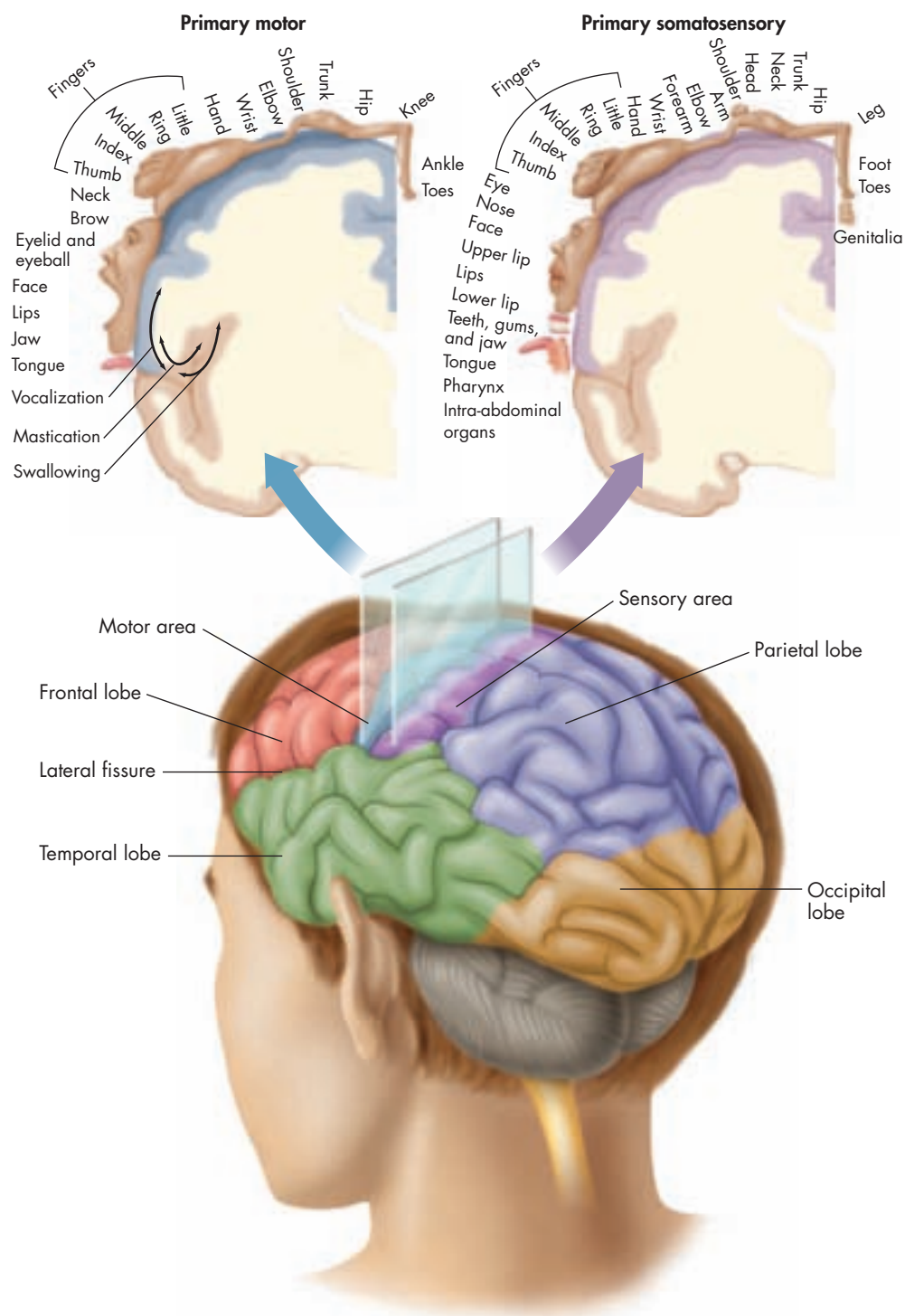


Figure 3.13 ■ The Geography of the Cerebral Cortex The cortex is divided into four lobes: frontal, parietal, temporal, and occipital. The visual area of the cortex is located in the occipital lobe. The hearing or auditory cortex lies in the temporal lobe. The sensory and motor areas face each other across the central fissure. What happens when a surgeon stimulates areas of the sensory or motor cortex during an operation?

it were pitch black or your eyes were covered. The hearing or auditory area of the cortex lies in the temporal lobe along the lateral fissure. Sounds cause structures in the ear to vibrate. Messages are relayed from those structures to the auditory area of the cortex, and when you hear a noise, neurons in this area are firing.

Just behind the central fissure in the parietal lobe lies an area called the **somatosensory cortex**, which receives messages from skin senses all over the body. These sensations include warmth and cold, touch, pain, and movement. Neurons in different parts of the sensory cortex fire depending on whether you wiggle your finger or raise your leg. **Truth or Fiction Revisited:** It is quite true that, if a brain surgeon were to stimulate the proper area of your somatosensory cortex with an electrical probe, it might seem as if someone were touching your arm or leg. A Swedish MRI study found that just the expectation of being tickled in a certain part of the body activates the corresponding area of the somatosensory cortex (Carlsson et al., 2000).

But Figure 3.13 shows that the ways in which our bodies are situated or represented on the somatosensory cortex make for strange-looking humans, indeed. Our faces and our hands are huge compared with, say, our trunk and our legs. This overrepresentation is one of the reasons that our face, head, and hands are more sensitive to touch than other parts of the body.

Many years ago, it was discovered that patients with injuries to one hemisphere of the brain would show sensory or motor deficits on the opposite side of the body below the head. This led to the recognition that sensory and motor nerves cross in the brain and elsewhere. The left hemisphere acts on, and receives inputs from, the right side of the body. The right hemisphere acts on, and receives inputs from, the left side of the body.

How do you make a monkey smile? One way is by inserting an electrical probe in its motor cortex and giving it a burst of electricity. Let's see what we mean by this.

The **motor cortex** lies in the frontal lobe, just across the valley of the central fissure from the somatosensory cortex. Neurons firing in the motor cortex cause parts of our body to move. More than 100 years ago, German scientists electrically stimulated the motor cortex in dogs and observed that muscles contracted in response (Fritsch & Hitzig, 1870/1960). Since then, neuroscientists have mapped the motor cortex in people and lower animals by inserting electrical probes and seeing which muscles contract. For example, José Delgado (1969) caused one patient to make a fist even though he tried to prevent his hand from closing. The patient said, "I guess, doctor, that your electricity is stronger than my will" (Delgado, 1969, p. 114). Delgado also made a monkey smile in this manner many thousands of times in a row. If a surgeon were to stimulate a certain area of the right hemisphere of the motor cortex with an electrical probe, you would raise your left leg. This action would be sensed in the somatosensory cortex, and you might have a devil of a time trying to figure out whether you had intended to raise that leg!

We find the same overrepresentation of the face, head, and hands in the motor cortex as we find in the somatosensory cortex. The "detail" of these body parts on the cortex would appear to enable us to engage in fine muscle control over these areas of our bodies. Think of the possible human nuances of facial expression. Think of the fine motor (muscle) control we can exert as our fingers fly over the piano keyboard or the fine motor control of the surgeon engaged in a delicate operation.

THINKING, LANGUAGE, AND THE CORTEX

Areas of the cerebral cortex that are not primarily involved in sensation or motor activity are called *association areas*. They make possible the breadth and depth of human learning, thought, memory, and language. **Question 19: What parts of the cerebral cortex are involved in thinking and language?** As noted earlier, the association areas in the prefrontal region of the brain—that is, in the frontal lobes, near the forehead—could be called the brain's executive center. It appears to be where we solve problems and make plans and decisions.

Executive functions like problem solving also require memory, like the memory in your computer. Association areas also provide the core of your working memory (Rawley & Constantinidis, 2008). They are connected with various sensory areas in the brain and can tap whatever kind of sensory information is needed or desired. The prefrontal region of the brain thus retrieves visual, auditory, and other kinds of memories

Somatosensory cortex The section of cortex in which sensory stimulation is projected. It lies just behind the central fissure in the parietal lobe.

Motor cortex The section of cortex that lies in the frontal lobe, just across the central fissure from the sensory cortex. Neural impulses in the motor cortex are linked to muscular responses throughout the body.

A CLOSER LOOK • RESEARCH

MIRROR, MIRROR, IN THE BRAIN: WHO'S THE FAIREST IMITATOR OF THEM ALL?

If we want to survive, we must understand the actions of others. Furthermore, without action understanding, social organization is impossible. In the case of humans, there is another faculty that depends on the observation of others' actions: imitation learning. Unlike most species, we are able to learn by imitation, and this faculty is at the basis of human culture.

—Rizzolatti and Craighero, 2004

According to Giacomo Rizzolatti and Laila Craighero (2004), social organization and human culture, as we know it, are made possible by the presence of certain kinds of neurons. And these neurons, like so many other important psychological discoveries, were found by accident.

A research team in Parma, Italy, headed by Vittorio Gallese and including Giacomo Rizzolatti (Gallese et al., 1996), was recording the activity of individual neurons in monkeys' brains as the animals reached for objects. One of the researchers reached for an object that had been handled by a monkey, and quite to his surprise, a neuron in the monkey's brain fired in the same way it had fired when the animal had picked up the object. The research team followed up the phenomenon and discovered many such neurons in the frontal lobes of the monkeys, just before the motor cortex, which they dubbed *mirror neurons*. Mirror neurons in monkeys, and in humans, are activated by performing a motor act or by observing another monkey or human engage in the same act (Cattaneo & Rizzolatti, 2009; Cattaneo et al., 2010). Mirror neurons also operate in apes such as chimpanzees.

Mirror neurons are not limited to motor acts; in humans, they are also connected with emotions. Certain regions of the brain—particularly in the frontal lobe—are active when people experience emotions such as disgust, happiness, pain, and the like and also when they observe another person experiencing an emotion (Iacoboni, 2009a, 2009b). It thus appears that there is a neural basis for empathy—that is, the

A Newborn Rhesus Monkey Imitates Protrusion of the Tongue, a Feat Made Possible by Mirror Neurons, Not by Learning



© Gross L (2006) Evolution of Neuronal Imitation. *PLoS Biol* 4(9): e311. doi:10.1371/journal.pbio.0140311

identification or vicarious experiencing of feelings in other people based on the observation of visual and other cues.

Some researchers believe that there is a connection between mirror neuron dysfunction and autistic disorders in children, which are characterized by impaired communication and emotional detachment from other people (Baron-Cohen & Belmonte, 2005). Activity in motor areas of the brain is suppressed in normal children when they observe another person move, which is thought to be an indication of mirror neuron activity. But such suppression is less prevalent in children with autism. Children with autistic disorders also show less mirror neuron activity when they imitate other people. This hypothesis has been developed further in that mirror neurons facilitate the modeling—or imitation—of the behavior of others by internally representing the bodily states linked to actions and emotions. Such internal representation could provide a direct way to experience and understand other people. Deficient mirror neuron activity would prevent such understanding of other people and lead to the social deficits associated with autism.

It has also been suggested that mirror neurons are connected with the built-in human capacity to acquire language. In later chapters, we will see that mirror neurons are connected with observational learning and, perhaps, with sex differences in empathy (Cheng et al., 2008, 2009).

and manipulates them—similar to the way a computer retrieves information from files in storage and manipulates it in working memory.

Certain neurons in the visual area of the occipital lobe fire in response to the visual presentation of vertical lines. Others fire in response to the presentation of horizontal lines. Although one group of cells may respond to one aspect of the visual field and another group of cells may respond to another, association areas put it all together. As a result, we see a box or an automobile or a road map and not a confusing array of verticals and horizontals.

LANGUAGE FUNCTIONS

In some ways, the left and right hemispheres of the brain duplicate each other's functions. In other ways, they differ. The left hemisphere contains language functions for nearly all right-handed people and for two of three left-handed people (Pinker, 2007). However, the brain remains “plastic,” or changeable, through about the age of 13. As a result, children who lose the left hemisphere of the brain because of medical problems may largely transfer speech functions to the right hemisphere (Mbwana et al., 2008; Mercado, 2008).

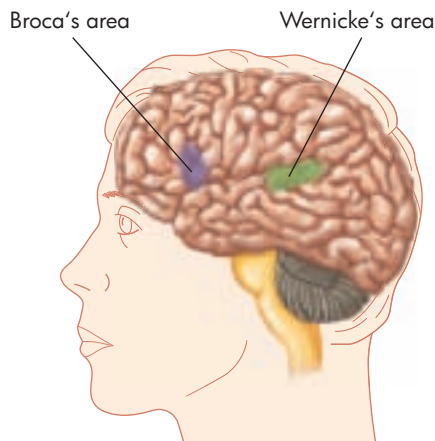


Figure 3.14 ■ Broca's and Wernicke's Areas of the Cerebral Cortex The areas that are most involved in speech are Broca's area and Wernicke's area. Damage to either area can produce an aphasia—a disruption of the ability to understand or produce language.

Aphasia A disruption in the ability to understand or produce language.

Wernicke's aphasia A language disorder characterized by difficulty comprehending the meaning of spoken language.

Broca's aphasia A language disorder characterized by slow, laborious speech.

Two key language areas lie within the hemisphere of the cortex that contains language functions (usually the left hemisphere): Broca's area and Wernicke's area (see Figure 3.14 ■). Damage to either area is likely to cause an **aphasia**—that is, a disruption of the ability to understand or produce language.

Wernicke's area lies in the temporal lobe near the auditory cortex. It responds mainly to auditory information (sounds). As you are reading this page, however, the visual information is registered in the visual cortex of your occipital lobe. It is then recoded as auditory information as it travels to Wernicke's area. Broca's area is located in the frontal lobe, near the section of the motor cortex that controls the muscles of the tongue, throat, and other areas of the face used when speaking. Broca's area processes the information and relays it to the motor cortex. The motor cortex sends the signals that cause muscles in your throat and mouth to contract. If you are “subvocalizing”—saying what you are reading “under your breath”—that is because Wernicke's area transmits information to Broca's area via nerve fibers.

People with damage to Wernicke's area may show **Wernicke's aphasia**, which impairs their abilities to comprehend speech. Even so, they usually speak freely and with proper syntax. Wernicke's area is essential to understanding the relationships between words and their meanings. When Broca's area is damaged, people usually understand language well enough but speak slowly and laboriously in simple sentences. This pattern is termed **Broca's aphasia**.

Some people with Broca's aphasia utter short meaningful phrases that omit small but important grammatical words such as *is*, *and*, and *the*. Such an individual may laboriously say “walk dog.” The phrase can have various meanings, such as “I want to take the dog for a walk” or “Take the dog out for a walk.” Carroll (2004) reports the laborious, agrammatical speech of one individual with Broca's aphasia: “Yes . . . ah . . . Monday . . . er Dad and Peter H. . . (his own name), and Dad . . . er hospital . . . and ah . . . Wednesday . . . Wednesday nine o'clock . . . and oh . . . Thursday . . . ten o'clock, ah doctors . . . two . . . an' doctors . . . and er . . . teeth . . . yah.”

A part of the brain called the *angular gyrus* lies between the visual cortex and Wernicke's area. The angular gyrus “translates” visual information, as in perceiving written words, into auditory information (sounds) and sends it on to Wernicke's area. Research using MRI suggests that problems in the angular gyrus can give rise to *dyslexia*, or serious impairment in reading, because it becomes difficult for the reader to segment words into sounds (Milne et al., 2002).

In Profile

One of French surgeon Paul Broca's (1824–1880) hobbies was craniometry, or measurement of the skull. He believed that the size of the brain was related to intelligence. (Generally speaking, it isn't.) He argued that the brains of people who belong to “superior” races are larger than those of people who belong to “inferior” races, that the brains of men are larger than those of women, and that the brains of accomplished men are larger than those of average men. Broca was well aware of evidence that contradicted his views. He knew that the brains of Asians were generally smaller than those of Europeans, although Asians were at least as bright. He knew of extremely intelligent women and of criminals with large brains. Nevertheless, he and his fellow craniometrists touted their views. Upon his death, it was discovered that Broca's own brain was only a bit above average in size—nothing to brag about.



PAUL BROCA

© Cengage Pictures

Despite his only slightly above-average-sized brain, Broca was the first to observe a behavior problem and then locate the area of the brain that caused it. In 1861, Leborgne, a 51-year-old patient at La Bicêtre, the Paris asylum, came down with gangrene in the leg and was admitted to the surgical ward. Leborgne could understand what was said to him but could only utter the meaningless sound “tan” and sometimes blurt out “Sacred name of God!” in frustration. Leborgne had entered the asylum 21 years earlier, when he had lost the ability to speak.

Leborgne died 6 days later, and Broca performed an autopsy. He discovered that an egg-sized area just in front of the region of the motor cortex that regulates movement of the face on the left side of the brain had deteriorated. Broca concluded that this part of the brain was the seat of speech, and we now refer to it as Broca's area.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Paul Broca.

Left Brain, Right Brain?

We often hear of individuals being “left-brained” or “right-brained.” **Question 20: What would it mean to be left-brained or right-brained?** The notion is that the hemispheres of the brain are involved in very different kinds of intellectual and emotional functions and responses. According to this view, left-brained people would be primarily logical and intellectual. Right-brained people would be intuitive, creative, and emotional. Those of us who are fortunate enough to have our brains “in balance” would presumably have the best of it—the capacity for logic combined with emotional richness.

Like so many other popular ideas, the left-brain–right-brain notion is at best exaggerated. Research does suggest that in right-handed individuals, the left hemisphere is relatively more involved in intellectual undertakings that require logical analysis and problem solving, language, and mathematical computation (Corballis, 2009). The other hemisphere (usually the right hemisphere) is usually superior in visual–spatial functions (it’s better at putting puzzles together), recognition of faces, discrimination of colors, aesthetic and emotional responses, understanding metaphors, and creative mathematical reasoning. Despite these differences, the hemispheres of the brain do not act independently such that some people are truly left-brained and others right-brained (American Psychological Association, 2008; Baynes & Gazzaniga, 2000). The functions of the left and right hemispheres overlap to some degree, and they tend to respond simultaneously as we focus our attention on one thing or another.

Now let’s consider another issue involving sidedness: left-handedness. People who are left-handed are different from people who are right-handed in terms of the way they write, throw a ball, and so on. But there are interesting questions as to whether people who are left-handed are psychologically different from righties.

Handedness: Is Being Right-Handed Right?

What do Michelangelo, Leonardo da Vinci, Angelina Jolie, and John McEnroe have in common? No, they are not all artists. Only one was a tennis player. But they all are left-handed. **Question 21: Does it matter whether one is left-handed?**

Despite the vast success of these individuals, being left-handed was once viewed as a deficiency. Left-handed students were compelled to learn to write with the right hand, and today, the English language still swarms with slurs on lefties. We speak of “left-handed compliments,” of having “two left feet,” and of strange events as “coming out of left field.” The word *sinister* means “left-hand or unlucky side” in Latin. *Gauche* is a French word that literally means “left,” though in English it is used to mean clumsy. The English word *adroit*, meaning “skillful,” derives from the French *à droit*, “to the right.” Also consider positive usages such as “being righteous” or “being on one’s right side.”

Overall, 8% to 10% of us are lefties. Left-handedness is more common in boys than girls (Papadatou-Pastou et al., 2008). We are usually labeled right-handed or left-handed on the basis of our handwriting preferences, yet some people write with one hand and pass a football with the other. Some people even swing a tennis racket and pitch a baseball with different hands.



© AP Photo/Karl Hammik, File

Lefties and Righties Ambidextrous Yankees’ prospect Pat Venditte tosses the ball with either hand.

Being left-handed appears to provide a somewhat greater than average probability of language problems, such as dyslexia and stuttering, and health problems, such as migraine headaches and allergies (Fasmer et al., 2008; Goez & Zelnik, 2008; Lengen et al., 2008). But there may also be advantages to being left-handed. Left-handed people are more likely than right-handed people to be numbered among the ranks of artists, musicians, and mathematicians (Preti & Vellante, 2007). The downside of that creative tendency is a greater proneness to developing serious psychological disorders (Preti & Vellante, 2007).

Does handedness run in families? It does to some degree. In the English royal family, Queen Elizabeth II and Princes Charles and William are all left-handed, as was the Queen Mother. On the other hand, a recent study of more than 27,000 Dutch and Australian twin families found that heritability makes only about a 24% contribution to the likelihood of being right- or left-handed (Medland et al., 2008).

Whether we are talking about language functions, being left-brained or right-brained, or handedness, we are talking about people whose hemispheres of the cerebral cortex communicate back and forth. Now let's see what happens when the major avenue of communication between the hemispheres shuts down.

Split-Brain Experiments: How Many Brains Do You Have?

A number of people with severe cases of **epilepsy** have split-brain operations in which much of the corpus callosum is severed. The purpose of the operation is to confine seizures to one hemisphere of the cerebral cortex rather than allowing a neural tempest to reverberate. Split-brain operations do seem to help people with epilepsy. **Question 22: What happens when the brain is split in two?**

People who have undergone split-brain operations can be thought of as winding up with two brains, yet under most circumstances, their behavior remains ordinary enough. Still, some aspects of hemispheres that have stopped talking to each other are intriguing.

As reported by pioneering brain surgeon Joseph Bogen (1969, 2000), each hemisphere may have a “mind of its own.” One split-brain patient reported that her hemispheres frequently disagreed on what she should be wearing. What she meant was that one hand might undo her blouse as rapidly as the other was buttoning it. A man reported that one hemisphere (the left hemisphere, which contained language functions) liked reading but the other one did not. If he shifted a book from his right hand to his left hand, his left hand would put it down. The left hand is connected with the right hemisphere of the cerebral cortex, which in most people—including this patient—does not contain language functions.

Another pioneer of split-brain research, Michael Gazzaniga (American Psychological Association, 2008), found that people with split brains whose eyes are closed may be able to verbally describe an object such as a key when they hold it in one hand but not when they hold it in the other hand. As shown in Figure 3.15 ■, if a person with a split brain handles a key with his left hand behind a screen, tactile impressions of the key are projected into the right hemisphere, which has little or no language ability. Thus, he will not be able to describe the key. If he holds it in his right hand, he will have no trouble describing it because sensory impressions are projected into the left hemisphere of the cortex, which contains language functions. To further confound matters, if the word *ring* is projected into the left hemisphere while the person is asked what he is handling, he will say “ring,” not “key.”

However, this discrepancy between what is felt and what is said occurs only in people with split brains. Even so, people who have undergone split-brain operations tend to lead largely normal lives. And for the rest of us, the two hemispheres work together most of the time, even when we are playing the piano or solving math problems.

Now that we have discussed the structures and the functioning of the brain, we will return to matters of chemistry. In the next section, we see the effects on behavior and mental processes of chemicals—*hormones*—that are secreted by glands and poured directly into the bloodstream.

It seems that half of the scientific world sees the human animal as on a continuum with other animals, and others see a sharp break between animals and humans, see two distinct groups. The argument has been raging for years, and it surely won't be settled in the near future. After all, we humans are either lumpers or splitters. We either see the similarities or prefer to note the differences.

MICHAEL S. GAZZANIGA

Epilepsy Temporary disturbances of brain functions that involve sudden neural discharges.

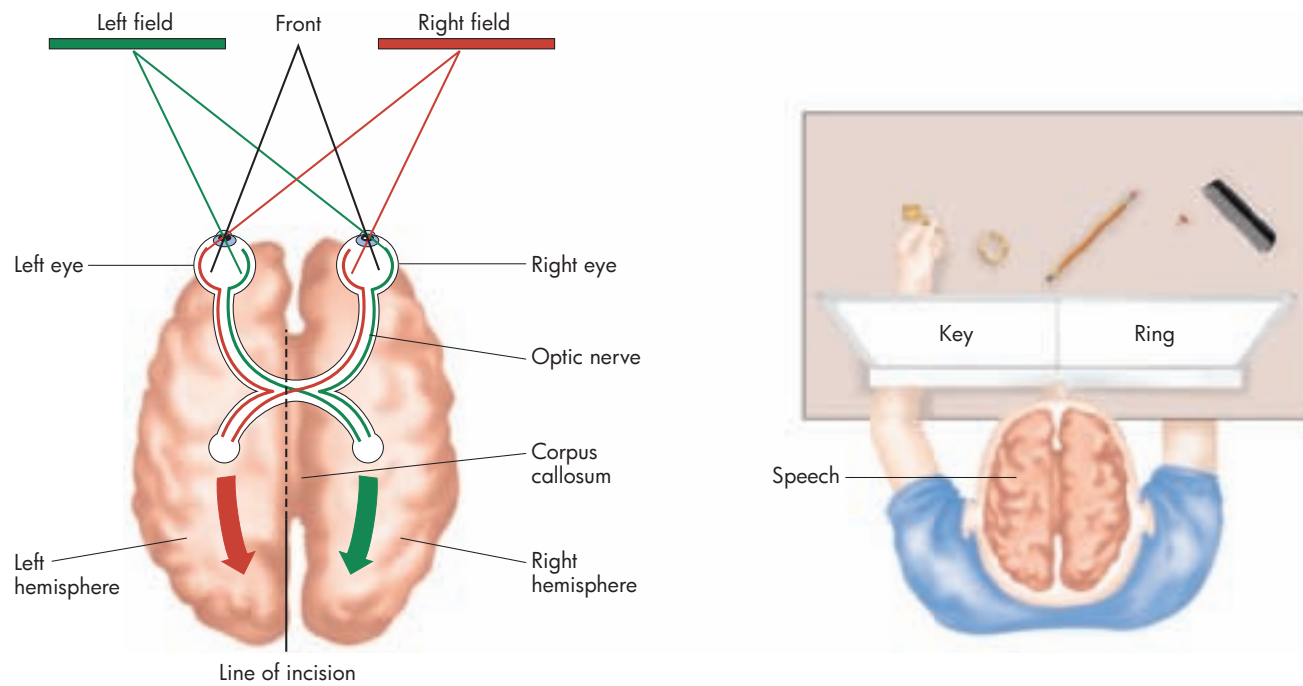


Figure 3.15 ■ A Divided-Brain Experiment In the drawing on the left, we see that visual sensations in the left visual field are projected in the occipital cortex of the right hemisphere. Visual sensations from the right visual field are projected in the occipital cortex in the left hemisphere. In the divided-brain experiment diagrammed on the right, a person with a severed corpus callosum handles a key with his left hand and perceives the written word “key” in his left visual field. The word “key” is projected in the right hemisphere. Speech, however, is usually a function of the left hemisphere. The written word “ring,” perceived by the right visual field, is projected in the left hemisphere. So, when asked what he is handling, the divided-brain subject reports “ring,” not “key.”

LearningConnections • THE BRAIN: THE STAR OF THE HUMAN NERVOUS SYSTEM

ACTIVE REVIEW (22) The _____ records the electrical activity of the brain. (23) In magnetic _____ imaging, radio waves cause parts of the brain to emit signals. (24) The _____ is involved in balance and coordination. (25) The _____ is involved in body temperature, motivation, and emotion. (26) The hemispheres of the cerebrum are connected by the corpus _____. (27) The executive center of the brain is found in the _____ lobe. (28) Language areas are usually found in the (left or right?) hemisphere of the brain. (29) Left-handed people are (more or less?) likely than right-handed people to be artists,

musicians, and mathematicians. (30) Split-brain operations sever much of the corpus callosum to control _____.

REFLECT AND RELATE Would you consider yourself to be more left-brained or right-brained? Explain.

CRITICAL THINKING Does the research evidence reported in this section demonstrate that the mind is a function of the brain? Why or why not?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

THE ENDOCRINE SYSTEM: CHEMICALS IN THE BLOODSTREAM

The body contains two types of **glands**: glands with ducts and glands without ducts. A *duct* is a passageway that carries substances to specific locations. Saliva, sweat, tears, and breast milk all reach their destinations through ducts. **Question 23: What is the endocrine system?** The ductless glands constitute the **endocrine system**, and they secrete **hormones** (from the Greek *horman*, meaning “to stimulate” or “to excite”). Psychologists are interested in the substances secreted by ductless glands because of their behavioral effects.

Hormones are released into the bloodstream and circulate through the body. Like neurotransmitters, hormones have specific receptor sites. That is, they act only on receptors in certain locations. Some hormones that are released by the hypothalamus

Gland An organ that secretes one or more chemical substances such as hormones, saliva, or milk.

Endocrine system The body’s system of ductless glands that secrete hormones and release them directly into the bloodstream.

Hormone A substance secreted by an endocrine gland that regulates various body functions.

*What is the cuddle hormone?
The cuddle hormone is oxytocin, a chemical produced by the human body that has been linked to maternal affection and the feelings of attachment between couples.*

CUDDLEHORMONE.COM

influence only the **pituitary gland**. Other hormones released by the pituitary influence the adrenal cortex; still others influence the testes and ovaries and so on (see the nearby Concept Review of the endocrine system).

Much hormonal action helps the body maintain steady states, as in fluid levels, blood sugar levels, and so on. Bodily mechanisms measure current levels; when these levels deviate from optimal, they signal glands to release hormones. The maintenance of steady states requires feedback of bodily information to glands. This type of system is referred to as a *negative feedback loop*. That is, when enough of a hormone has been secreted, the gland is signaled to stop.

The Hypothalamus: Master of the Master Gland

The hypothalamus secretes a number of releasing hormones, or factors, that influence the pituitary gland to secrete related hormones. For example, growth hormone–releasing factor (hGRF) causes the pituitary to produce growth hormone. A dense network of blood vessels between the hypothalamus and the pituitary gland provides a direct route of influence for these factors.

The Pituitary Gland: The Pea-Sized Governor

The pituitary gland lies below the hypothalamus. Although the pituitary is only about the size of a pea, it produces so many hormones that it has been referred to as the “master gland.” Because the hypothalamus regulates much pituitary activity, it could

Pituitary gland The gland that secretes growth hormone, prolactin, antidiuretic hormone, and other hormones.

CONCEPT REVIEW THE ENDOCRINE SYSTEM

Hypothalamus

- Releasing hormones or factors; e.g., growth hormone–releasing factor, corticotrophin releasing hormone (influences the pituitary gland to secrete corresponding hormones, e.g., growth hormone, adrenocorticotrophic hormone)

Pituitary

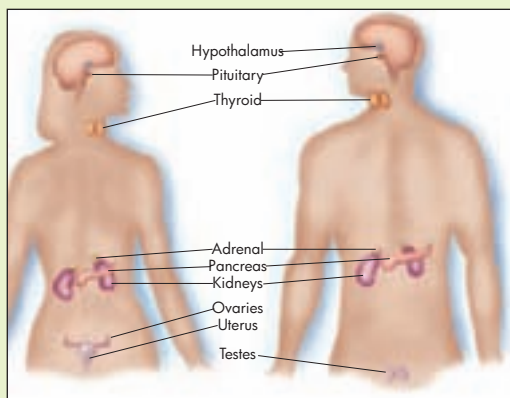
- Growth hormone (causes growth of muscles, bones, and glands)
- Adrenocorticotrophic hormone (ACTH) (regulates adrenal cortex)
- Thyrotrophin (causes thyroid gland to secrete thyroxin)
- Follicle-stimulating hormone (causes formation of egg and sperm cells)
- Luteinizing hormone (causes ovulation, maturation of egg and sperm cells)
- Prolactin (stimulates production of milk)
- Antidiuretic hormone (ADH) (inhibits production of urine)
- Oxytocin (stimulates uterine contractions during delivery and ejection of milk during nursing)

Pineal

- Melatonin (involved in regulation of sleep–wake cycle; possibly connected with aging)

Pancreas

- Insulin (enables body to metabolize sugar; regulates storage of fats)



Thyroid

- Thyroxin (increases metabolic rate)

Adrenal

- Corticosteroids (increase resistance to stress; regulate carbohydrate metabolism)
- Epinephrine (adrenaline) (increases metabolic activity—heart and respiration rates, blood sugar level, etc.)
- Norepinephrine (noradrenaline) (raises blood pressure; acts as a neurotransmitter)

Testes

- Testosterone (promotes development of male sex characteristics; involved in sex drive and aggressiveness)

Ovaries

- Estrogen (regulates menstrual cycle; promotes development of female sex characteristics; connected with feelings of well-being)



Go to Psychology CourseMate at www.cengagebrain.com to access an interactive version of this Concept Review designed to help you test yourself on the topics presented here.

be dubbed the “master of the master gland.” The anterior (front) and posterior (back) lobes of the pituitary gland secrete many hormones. **Growth hormone** regulates the growth of muscles, bones, and glands. Children whose growth patterns are abnormally slow may catch up to their age mates when they obtain growth hormone. **Prolactin** largely regulates maternal behavior in lower mammals such as rats and stimulates the production of milk in women. As a water conservation measure, **antidiuretic hormone (ADH)** inhibits production of urine when fluid levels in the body are low.

Oxytocin stimulates labor in pregnant women and is connected with maternal behavior (cuddling and caring for young) in some mammals (Champagne et al., 2009). Obstetricians may induce labor by injecting pregnant women with oxytocin. During nursing, stimulation of nerve endings in and around the nipples sends messages to the brain that cause the secretion of oxytocin. Oxytocin then causes the breasts to eject milk. Antidiuretic hormone and oxytocin are apparently also connected with stereotypical paternal behavior patterns in some mammals. **Truth or Fiction Revisited:** For example, ADH and oxytocin can transform unconcerned male voles (mouse-like rodents) into affectionate and protective mates and fathers (Donaldson & Young, 2008; Lim & Young, 2006; Parker et al., 2001). The hormone is not known to have such a powerful effect with humans, however.

The Pineal Gland

The pineal gland secretes the hormone **melatonin**, which helps regulate the sleep–wake cycle and may affect the onset of puberty. Some researchers speculate that melatonin is also connected with aging. However, it appears that melatonin is a mild sedative that fosters sleep, and some people use it as a sleeping pill (Ismail & Mowafi, 2009). Melatonin may also help people adjust to jet lag (Arendt, 2009).

The Thyroid Gland: The Body’s Accelerator

The thyroid gland could be considered the body’s accelerator. It produces **thyroxin**, which affects the body’s *metabolism*—the rate at which the body uses oxygen and produces energy. Some people are overweight because of *hypothyroidism*, a condition that results from too little thyroxin. Thyroxin deficiency in children can lead to *cretinism*, a condition characterized by stunted growth and mental retardation. Adults who secrete too little thyroxin may feel tired and sluggish and may put on weight. People who produce too much thyroxin may develop *hyperthyroidism*, which is characterized by excitability, insomnia, and weight loss.

The Adrenal Glands: Coping With Stress

The adrenal glands, located above the kidneys, have an outer layer, or cortex, and an inner core, or medulla. The adrenal cortex is regulated by the pituitary hormone ACTH (adrenocorticotrophic hormone). The adrenal cortex secretes hormones known as **corticosteroids**, or cortical steroids. These hormones increase resistance to stress, promote muscle development, and cause the liver to release stored sugar, making more energy available in emergencies, as when you see another car veering toward your own. Epinephrine and norepinephrine are secreted by the adrenal medulla. **Epinephrine**, also known as adrenaline, is manufactured exclusively by the adrenal glands, but norepinephrine (noradrenaline) is also produced elsewhere in the body. (We saw that norepinephrine acts as a neurotransmitter in the brain.) The sympathetic branch of the autonomic nervous system causes the adrenal medulla to release a mixture of epinephrine and norepinephrine that helps arouse the body to cope with threats and stress. Epinephrine is of interest to psychologists because it has emotional as well as physical effects. It intensifies most emotions and is crucial to the experience of fear and anxiety.

The Testes and the Ovaries

The testes and ovaries also produce steroids, among them testosterone and estrogen. If it were not for the secretion of the male sex hormone **testosterone** about 6 weeks

Growth hormone A pituitary hormone that regulates growth.

Prolactin A pituitary hormone that regulates production of milk and, in lower animals, maternal behavior.

Antidiuretic hormone (ADH) A pituitary hormone that conserves body fluids by increasing reabsorption of urine and is connected with paternal behavior in some mammals; also called *vasopressin*.

Oxytocin A pituitary hormone that stimulates labor and lactation.

Melatonin A pineal hormone that helps regulate the sleep–wake cycle and may affect the onset of puberty.

Thyroxin The thyroid hormone that increases metabolic rate.

Corticosteroids Steroids produced by the adrenal cortex that regulate carbohydrate metabolism and increase resistance to stress by fighting inflammation and allergic reactions; also called *cortical steroids*.

Epinephrine A hormone produced by the adrenal medulla that stimulates sympathetic ANS activity; also called *adrenaline*.

Testosterone A male sex hormone produced by the testes that promotes growth of male sexual characteristics and sperm.

after conception, we would all develop the external genital organs of females. Testosterone is produced not only by the testes but in smaller amounts by the adrenal glands. A few weeks after conception, testosterone causes the male sex organs to develop. During puberty, testosterone stokes the growth of muscle and bone and the development of primary and secondary sex characteristics. *Primary sex characteristics* such as the increased size of the penis and the sperm-producing ability of the testes are directly involved in reproduction. *Secondary sex characteristics* such as presence of a beard and a deeper voice differentiate males from females but are not directly involved in reproduction.

The ovaries produce **estrogen** and **progesterone** as well as small amounts of testosterone. Estrogen is also produced in smaller amounts by the testes. Estrogen fosters female reproductive capacity and secondary sex characteristics such as accumulation of fat in the breasts and hips. Progesterone stimulates growth of the female reproductive organs and prepares the uterus to maintain pregnancy.

Estrogen, like testosterone, has psychological as well as biological effects. For one thing, higher levels of estrogen seem to be connected with optimal cognitive functioning and feelings of well-being among women (Rocca et al., 2008; Wild, 2007). Women are also more interested in sexual activity when estrogen levels are high—particularly during ovulation, when they are fertile. Female mammals placed on estrogen replacement following menopause show improved memory functioning and visual-spatial abilities (Talboom et al., 2008; Voytko et al., 2009).

Estrogen and progesterone levels vary and regulate the woman's menstrual cycle. Following menstruation—the monthly sloughing off of the lining of the uterus—estrogen levels increase, leading to the ripening of an ovum (egg cell) and the growth of the lining of the uterus. Ovulation (release of the ovum by an ovary) occurs when estrogens reach peak blood levels. Then the lining of the uterus thickens in response to the secretion of progesterone, gaining the capacity to support an embryo if fertilization should occur. If the ovum is not fertilized, estrogen and progesterone levels drop suddenly, triggering menstruation once more.

STERIODS, BEHAVIOR, AND MENTAL PROCESSES

Steroids increase muscle mass, heighten resistance to stress, and increase the body's energy supply by signaling the liver to release sugar into the bloodstream. The steroid testosterone is connected with the sex drive in both males and females (females secrete some testosterone in the adrenal glands) (Roland & Incrocci, 2008).

Anabolic steroids (synthetic versions of the male sex hormone testosterone) have been used, sometimes in tandem with growth hormone, to enhance athletic prowess. Not only do they enhance athletic prowess, but they are also connected with self-confidence, aggressiveness, and even memory functioning (Janowsky et al., 2000). However, anabolic steroids are generally outlawed in sports. The lure of steroids is understandable. Sometimes, the difference between an acceptable athletic performance and a great one is rather small. Thousands of athletes try to make it in the big leagues, and the edge offered by steroids—even if minor—can spell the difference between a fumbling attempt and a smashing success. If steroids help, why the fuss? Some of it is related to the ethics of competition—the idea that athletes should “play fair.” But steroid use is also linked to liver damage, other health problems, and possibly to outbursts of aggression that have been dubbed “roid rage” (Kanayama et al., 2009).

Estrogen and testosterone even affect women's perceptions of who is attractive (Welling et al., 2008). (Really.) One study found that British women prefer feminized male faces, as shown in Figure 3.16B ■, during most phases of the menstrual cycle (Penton-Voak & Perrett, 2000). Women apparently associate such facial features with personality traits like warmth and honesty. However, they prefer the masculinized faces, as shown in Figure 3.16A ■, when estrogen levels are highest and they are ovulating. Perhaps they unconsciously interpret such features as indicative of reproductive capacity; that is, they instinctively see these men as more likely to father children.



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Professional Wrestler Chris Benoit and Nancy Benoit—Before His Double Murder and Suicide That Took Their Lives and the Life of Their 7-Year-Old Son

Benoit had a number of explosive outbursts, and it has been suggested that he might have been experiencing “roid rage” due to his use of anabolic steroids to pump up his muscle mass and his competitiveness.

Estrogen A generic term for several female sex hormones that promote growth of female sex characteristics and regulate the menstrual cycle.

Progesterone A female sex hormone that promotes growth of the sex organs and helps maintain pregnancy.



Figure 3.16 ■ Which One Is Mr. Right? The answer may depend on the phase of the woman's menstrual cycle. Women are apparently more attracted to men with masculinized features when they are capable of conceiving (part A) and men with more feminized features (part B) when they are not.

Thus, there are important links between biological factors, behavior, and mental processes. Thoughts and mental images may seem to be intangible pictures that float in our heads, but they have substance. They involve billions of brain cells (neurons) and the transmission of thousands of chemicals from one neuron to another—repeated hundreds of times per second. These countless bits of microscopic activity give rise to feelings, plans, computation, art and music, and all the cognitive activities that make us human. We pour chemicals called hormones into our own bloodstreams, and they affect our activity levels, our anxiety levels, and even our sex drives. We inherit traits that make us human and that enable us to think more deeply and act more cleverly than any other organism (after all, we write the textbooks). An understanding of biology helps us grasp many psychological events that might otherwise seem elusive and without substance.

— ■ —
*Testosterone does not have to
be toxic.*

ANNA QUINDLEN

— ■ —

LearningConnections • THE ENDOCRINE SYSTEM: CHEMICALS IN THE BLOODSTREAM

ACTIVE REVIEW (31) The _____ secretes hormones that regulate the pituitary gland. (32) The pituitary hormone _____ regulates maternal behavior in lower animals and stimulates production of milk in women. (33) The thyroid hormone _____ affects the metabolism. (34) Epinephrine is secreted by the adrenal _____ and is involved in emotional arousal.

REFLECT AND RELATE Have you heard that adolescents are “hormonal” or affected by “glands”? If so, which glands would they be?

CRITICAL THINKING If so many behaviors and mental processes are affected by glands, do people have free will?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections COPING WITH PMS

In this Life Connections feature, we discuss an important issue that is related to sex hormones: premenstrual syndrome, or PMS. Psychologists study the effects of menstruation because of stereotypes about menstruating women and to help women with the discomfort that many experience. For several days prior to and during menstruation, according to the outmoded stereotype, “raging hormones” doom women to irritability and poor judgment—two traits alleged to be part of PMS. Women have historically been assumed to be more likely to commit suicide or crimes, call in sick at work, or develop physical and emotional problems during the 8-day period prior to and during menstruation. Moreover, the ability of college women to focus on academic tasks during this period has been called into question.

Now for a few facts: Studies in the United States find that up to 90% of women who are of reproductive age experience at least some symptoms of PMS (Fife & Schrager, 2009), including depression, anxiety, and headaches, during the 4 to 6 days that precede menstruation (Clayton, 2008). However, only a small minority of women have symptoms severe enough to impair their academic, occupational, or social functioning. Women readers may complete the nearby self-assessment to gain insight as to whether they experience PMS and, if they do, how severely.

The causes of PMS are not fully understood. It was once believed that psychological factors such as negative

attitudes toward menstruation played a crucial role. Now the prevailing view is that attitudes toward menstruation—for example, conceptualizing the menstrual flow as unclean—can worsen menstrual problems but that PMS has a biological basis. Researchers are searching for relationships between menstrual problems, including PMS, and chemical imbalances in the body. They have found that peak estrogen levels are connected with optimal cognitive functioning and psychological well-being in women (Talboom et al., 2008; Voytko et al., 2009). If peaks in female sex hormones are connected with psychological well-being, then perhaps the precipitous drop-off in hormones that precedes and accompanies menstruation is connected with discomfort (De Berardis et al., 2007). But PMS is also linked with imbalances in neurotransmitters such as serotonin and beta-endorphins (Reed et al., 2008). Serotonin imbalances are also linked to changes in appetite, so women with PMS tend to be hungrier during part of the cycle than other women. Premenstrual syndrome may reflect a complex interaction between ovarian hormones and neurotransmitters (Clayton, 2008).

A generation ago, PMS was seen as something a woman must tolerate. No longer. Today, there are many treatment options. These include exercise, diet (for example, eating several small meals a day rather than two or three large meals; limiting salt and sugar; and taking vitamin supplements), hormone treatments (usually progesterone), and medications

that affect levels of neurotransmitters in the nervous system. Premenstrual syndrome is connected with drops in serotonin levels, and drugs called selective serotonin reuptake inhibitors (SSRIs) have helped many women with PMS (Brown et al., 2009). Selective serotonin reuptake inhibitors are also known as “antidepressants” because depression is also connected with low serotonin levels. But the fact that these drugs help many women with PMS does not mean that the women are suffering from underlying depression; it only suggests that serotonin is involved in both. Women who use SSRIs to help with PMS do not take them continuously, as people do to fight depression, but rather for about 2 weeks each month.

How to Handle Menstrual Discomfort

Most women experience some degree of menstrual discomfort. Women with persistent menstrual distress may profit from the following suggestions. Why not adopt the techniques that sound right for you?

1. Don't blame yourself. Menstrual problems were once erroneously attributed to women's “hysterical” nature. This is nonsense. Menstrual problems appear to largely reflect supersensitivity to fluctuations in levels of hormones and neurotransmitters. Researchers have not yet fully pinpointed the causal elements and patterns, but there is no evidence that women with PMS are hysterical.

2. Keep track of your menstrual symptoms to help you (and your doctor) identify patterns.
3. Develop strategies for dealing with days on which you experience the most distress—strategies that will enhance pleasure and minimize stress. Try things that will distract you. Go to a movie or get into that novel you’ve been meaning to read.
4. Ask yourself whether you harbor self-defeating attitudes that might be compounding distress. Do close relatives or friends see menstruation as an illness, a time of “pollution,” or a “dirty thing”? Have you adopted any of these attitudes—if not verbally, then in ways that affect your behavior, as by restricting social activities during your period?
5. See a doctor about your symptoms. Severe discomfort can be caused or worsened by health problems such as endometriosis and pelvic inflammatory disease (PID). Check it out.
6. Develop nutritious eating habits—and continue them throughout the entire cycle (that means *always*). Consider limiting intake of alcohol, caffeine, fats, salt, and sweets.
7. If you feel bloated, eat smaller meals (or nutritious snacks) throughout the day rather than a couple of highly filling meals.
8. Vigorous exercise—jogging, swimming, bicycling, fast walking, dancing, skating, jumping rope—helps relieve premenstrual and menstrual discomfort in some women (Daley, 2009). Try it out. But why limit exercise to days prior to and during your period? Weave it into your lifestyle.
9. Check with your doctor about herbal, vitamin, and mineral supplements (chaste berry, calcium, evening primrose, magnesium, vitamin E, wild yams, and so on) (Lloyd & Hornsby, 2009).
10. Over-the-counter anti-inflammatory medicines such as aspirin, acetaminophen, and ibuprofen may be helpful for cramping (Clayton, 2008). Prescription drugs such as tranquilizers (e.g., alprazolam) and SSRIs may be of help (Brown et al., 2009; Clayton, 2008). Ask your doctor for a recommendation. *In these cases, you are not taking the tranquilizer to treat anxiety or the SSRI to treat depression. You are taking the drugs to treat imbalances in neurotransmitters that can also give rise to anxiety and depression.*
11. Speaking of medicines, remember that menstruation is triggered by a sharp drop-off in sex hormones. Some gynecologists prescribe estrogen replacement as a method of relieving symptoms of PMS, although this approach is not free of hazards. One method is simply to continue certain oral contraceptives for 28 days rather than 21 days and thus to forgo menstruation altogether (Fife & Schrager, 2009). However, the pills chosen for this approach are not the same as those used for 21 days. Check with your gynecologist.
12. Remind yourself that menstrual problems are time limited. Don’t worry about getting through life or a career. Just get through the next couple of days.



Exercise and PMS Many women find that vigorous exercise helps them manage premenstrual symptoms.

Evolution and Evolutionary Psychology: “Survivor” Is More Than Just a TV Show

1. What concepts lie at the core of Darwin’s theory of evolution?

The struggle for existence refers to the competition among species and among members within a species to survive and reproduce. Variations among individuals, including mutations, affect organisms’ ability to adapt. Changes that enhance survival are likely to be preserved. Natural selection refers to the finding that organisms that are better adapted to their environments tend to survive and transmit their genes to subsequent generations.

2. What is evolutionary psychology?

Evolutionary psychology studies the ways adaptation and natural selection are connected with mental processes and behavior. Evolutionary psychologists suggest that not only physical traits but also patterns of behavior, including social behavior, evolve and are transmitted from generation to generation.

3. What is an instinct?

An instinct is a stereotypical behavior pattern that is nearly identical among the members of a species in which it appears. It occurs even when the individual is reared in isolation from others of its kind.

Heredity: The Nature of Nature

4. What is heredity?

Heredity involves the biological transmission of traits from generation to generation.

5. What is genetics?

Genetics is the subfield of biology that studies heredity. Behavioral genetics is concerned with the genetic transmission of traits that give rise to behavior and focuses on individual differences.

6. What are the roles of genes and chromosomes in heredity?

Genes are the biochemical materials that regulate the development of traits. Genes are segments of chromosomes. Humans have 46 chromosomes arranged in 23 pairs. Chromosomes are molecules of DNA, which takes the form of a twisting ladder. We normally receive 23 chromosomes from each parent. People with Down syndrome have an extra chromosome on the 21st pair.

7. What are kinship studies?

Psychologists conduct kinship studies to help determine the influences of genetic and environmental factors on behavior and mental processes. Twin studies are useful because identical (monozygotic) twins share the same genetic code; therefore, differences reflect environmental factors. When children reared by adoptive parents are more similar to their natural parents in a particular trait, evidence exists for a genetic role in the expression of that trait.

The Nervous System: On Being Wired

8. What are neurons?

Neurons are cells that transmit information through neural impulses and glial cells, which mainly serve support functions. Neurons have a cell body; dendrites, which receive messages; and trunklike axons, which conduct and then transmit messages to other cells by means of chemicals called neurotransmitters. Many neurons have a myelin coating that insulates their axons, allowing for more efficient conduction of messages. Afferent neurons transmit sensory messages to the central nervous system. Efferent neurons conduct messages from the central nervous system that stimulate glands or cause muscles to contract.

9. What are neural impulses?

Neural impulses are electrical charges that are conducted along axons through processes that allow sodium ions to enter cells and then pump them out. The neuron has a resting potential of -70 millivolts and an action potential of about $+40$ millivolts.

10. What happens when a neuron fires?

Neurons fire (transmit messages to other neurons, muscles, or glands) by releasing neurotransmitters. They fire according to an all-or-none principle up to hundreds of times per second. Each firing is followed by a refractory period during which neurons are insensitive to messages from other neurons.

11. What is a synapse?

Neurons fire across synapses, which consist of an axon terminal from the transmitting neuron, a dendrite or the body of a receiving neuron, and a fluid-filled synaptic cleft between the two.

12. What do neurotransmitters do?

Acetylcholine is involved in muscle contractions and memory; imbalances of dopamine have been linked to Parkinson’s disease and schizophrenia; norepinephrine accelerates the heartbeat and other body processes; serotonin is involved in eating, sleeping, and emotional arousal; GABA inhibits anxiety; and endorphins are naturally occurring painkillers.

13. What are the parts of the nervous system?

The nervous system is one of the systems that regulates the body. It is made up of neurons and divided into the central and peripheral nervous systems.

14. What are the divisions and functions of the peripheral nervous system?

The peripheral nervous system has two main divisions: somatic and autonomic. The somatic nervous system transmits sensory information about skeletal muscles, skin, and joints to the central nervous system. It also controls skeletal muscular activity. The autonomic nervous system (ANS) regulates the glands and activities such as heartbeat, digestion, and dilation of the pupils. The sympathetic division of the ANS helps expend the body’s resources, such as when fleeing from a predator, and the parasympathetic division helps build the body’s reserves.

15. What are the divisions and functions of the central nervous system?

The central nervous system consists of the brain and spinal cord. Reflexes involve the spinal cord but not the brain. The central nervous system has gray matter, which is composed of nonmyelinated neurons, and white matter, which is composed of bundles of myelinated (and thus whitish) axons.

The Brain: The Star of the Human Nervous System

16. How do researchers learn about the functions of the brain?

Researchers historically learned about the brain by studying the effects of accidents. They have also studied the effects of purposeful damage to the brain made by lesions. They have seen how animals and people respond to electrical stimulations of certain parts of the brain. They have studied the waves emitted by the brain with the electroencephalograph. With CAT scans, PET scans, and MRIs, computer-generated images are made by passing radiation of some sort through the brain.

17. What are the structures and functions of the brain?

The hindbrain includes the medulla, which regulates the heart rate, blood pressure, and respiration; the pons, which is involved in movement, attention, and respiration; and the cerebellum, which is involved in balance and coordination. The reticular activating system, which is involved in wakefulness and sleep, begins in the hindbrain and continues through the midbrain into the forebrain. Important structures of the forebrain include the thalamus, which serves as a relay station for sensory stimulation; the hypothalamus, which regulates body temperature and various aspects of motivation and emotion, such as eating and sexual behavior; the limbic system, which is involved in memory, emotion, and motivation; and the cerebrum, which is the brain's center of thinking and language.

18. What are the parts of the cerebral cortex?

The outer fringe of the cerebrum is the cerebral cortex, which is divided into two hemispheres and four lobes: frontal, parietal, temporal, and occipital. When light strikes the eyes, neurons in the occipital lobe fire. The somatosensory cortex lies behind the central fissure in the parietal lobe, and the motor cortex lies in the frontal lobe, across the central fissure from the somatosensory cortex. The prefrontal cortex may be the executive center of the brain—making plans, solving problems, and drawing upon sensory information from other areas of the cortex as needed.

19. What parts of the cerebral cortex are involved in thinking and language?

Language areas of the cortex usually lie in the left hemisphere, near the intersection of the frontal, temporal, and parietal lobes. Wernicke's area in the temporal lobe

responds mainly to auditory information. Broca's area in the frontal lobe is mainly responsible for speech. Damage to either area can result in an aphasia—a problem in understanding (Wernicke's aphasia) or producing (Broca's aphasia) language.

20. What would it mean to be left-brained or right-brained?

The left hemisphere is usually relatively more involved in cognitive functions involving logical analysis and problem solving, whereas the right hemisphere is usually superior in visual-spatial functions, aesthetic and emotional responses, and creative mathematical reasoning. But the notion that some people are left-brained (that is, only logical and lacking completely in functions involving visual-spatial responses and the like) and others are right-brained is exaggerated.

21. Does it matter whether one is left-handed?

About one person in ten is left-handed. Learning disabilities are somewhat more common among left-handed people, but so is creativity, as shown in the arts. Handedness appears to have a genetic component.

22. What happens when the brain is split in two?

For the most part, the behavior of people who have had split-brain operations (which sever most of the corpus callosum) is perfectly normal. However, although they may verbally be able to describe a screened-off object such as a pencil held in the hand connected to the hemisphere that contains language functions, they cannot do so when the object is held in the other hand.

The Endocrine System: Chemicals in the Bloodstream

23. What is the endocrine system?

The endocrine system consists of ductless glands that secrete hormones. The pituitary gland secretes growth hormone; prolactin regulates maternal behavior in lower animals and stimulates production of milk in women; and oxytocin stimulates labor in pregnant women. The pineal hormone melatonin is connected with the sleep-wake cycle and the onset of puberty. Thyroxine affects the body's metabolism, and its deficiency in childhood is connected with mental retardation. The adrenal cortex produces steroids, which promote the development of muscle mass and increase activity levels. The adrenal medulla secretes epinephrine (adrenaline), which increases the metabolic rate and is involved in general emotional arousal. The sex hormones are responsible for prenatal sexual differentiation. Female sex hormones regulate the menstrual cycle.





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KEY TERMS

- Acetylcholine (ACh) (p. 79)
Action potential (p. 77)
Afferent neurons (p. 75)
All-or-none principle (p. 78)
Amygdala (p. 88)
Antidiuretic hormone (ADH) (p. 97)
Aphasia (p. 92)
Autonomic nervous system (ANS) (p. 82)
Axon (p. 74)
Behavioral genetics (p. 67)
Broca's aphasia (p. 92)
Central nervous system (p. 81)
Cerebellum (p. 87)
Cerebral cortex (p. 89)
Cerebrum (p. 88)
Chromosome (p. 68)
Corpus callosum (p. 89)
Corticosteroids (p. 97)
Dendrites (p. 74)
Depolarize (p. 77)
Dizygotic (DZ) twins (p. 71)
DNA (p. 68)
Dopamine (p. 79)
Down syndrome (p. 69)
Efferent neurons (p. 75)
Endocrine system (p. 95)
Endorphins (p. 80)
Epigenesis (p. 73)
Epilepsy (p. 94)
Epinephrine (p. 97)
Estrogen (p. 98)
Evolutionary psychology (p. 66)
Frontal lobe (p. 89)
Gamma-aminobutyric acid (GABA) (p. 80)
Gene (p. 68)
Genetic–environmental correlation (p. 72)
Genetics (p. 67)
Genotype (p. 69)
Gland (p. 95)
Glial cell (p. 74)
Gray matter (p. 83)
Growth hormone (p. 97)
Heredity (p. 67)
Hippocampus (p. 79)
Hormone (p. 95)
Hypothalamus (p. 87)
Instinct (p. 66)
Interneuron (p. 83)
Lesion (p. 85)
Limbic system (p. 88)
Medulla (p. 86)
Melatonin (p. 97)
Monozygotic (MZ) twins (p. 70)
Motor cortex (p. 90)
Myelin (p. 75)
Mutation (p. 66)
Natural selection (p. 65)
Nature (p. 69)
Nerve (p. 81)
Neural impulse (p. 76)
Neuron (p. 74)
Neurotransmitters (p. 78)
Niche-picking (p. 73)
Norepinephrine (p. 79)
Nurture (p. 69)
Occipital lobe (p. 89)
Oxytocin (p. 97)
Parasympathetic (p. 82)
Parietal lobe (p. 89)
Peripheral nervous system (p. 81)
Phenotype (p. 69)
Pituitary gland (p. 96)
Polarize (p. 77)
Polygenic (p. 69)
Pons (p. 86)
Progesterone (p. 98)
Prolactin (p. 97)
Receptor site (p. 78)
Refractory period (p. 78)
Resting potential (p. 77)
Reticular activating system (RAS) (p. 87)
Serotonin (p. 79)
Sex chromosomes (p. 69)
Somatic nervous system (p. 81)
Somatosensory cortex (p. 90)
Species (p. 66)
Spinal cord (p. 83)
Spinal reflex (p. 83)
Sympathetic (p. 82)
Synapse (p. 78)
Temporal lobe (p. 89)
Testosterone (p. 97)
Thalamus (p. 87)
Thyroxine (p. 97)
Wernicke's aphasia (p. 92)
White matter (p. 83)

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4

Sensation and Perception



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MAJOR TOPICS

Sensation and Perception: Your Tickets of Admission to the World Outside

Vision: Letting the Sun Shine In
Visual Perception: How Perceptive?

Hearing: Making Sense of Sound
The Chemical Senses: Smell and Taste

The Skin Senses (Yes, It Does)
Kinesthesia and the Vestibular Sense

Extrasensory Perception: Is There Perception Without Sensation?

FEATURES

In Profile: Gustav Theodor Fechner

In Profile: Ernst Heinrich Weber

Controversy in Psychology: What Happens in the Eye and in the Brain When Lights with Different Wavelengths Stimulate the Retina? How Many Kinds of Color Receptors Are There?

Concept Review: Monocular Clues for Depth Perception

A Closer Look—Real Life: How Did the Animals Know the Tsunami Was Coming?

A Closer Look—Real Life: iPods on Campus: The Sounds of Oblivion?

Controversy in Psychology: How Do We Explain Pitch Perception? What Happens When the Basilar Membrane Runs Out of Places to Vibrate? What Happens When It Cannot Vibrate Fast Enough?

A Closer Look—Research: Advances in Science? The Case of the Aromatic T-Shirts

Concept Review: The Senses

Life Connections: Pain, Pain, Go Away—Don't Come Again Another Day

TRUTH OR FICTION?

- T F** People have five senses.
- T F** If we could see waves of light with slightly longer wavelengths, warm-blooded animals would glow in the dark.
- T F** People sometimes hear what they want to hear.
- T F** When we mix blue and yellow light, we obtain green light.
- T F** The bodies of catfish are covered with taste buds.
- T F** The skin is a sensory organ as well as a protective coating for the body.
- T F** Many people experience pain “in” limbs that have been amputated.
- T F** You have a sense that keeps you an upright person.
- T F** Some people can read other people’s minds.



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Avatars abound in our electronic lives. We use avatars in video games when we identify with a character and control the progress of the character through the game. SecondLife.com is a virtual world where users create their own avatars and carry on life in their forms. In these forms, **avatars** are digital personas that users select or create and customize. *Avatar* derives from a Sanskrit word used in Hindu mythology to describe forms taken by the gods when they descend to Earth. In video games and virtual worlds like SecondLife, the user plays the game or tours the world as the avatar.

The movie *Avatar* takes the concept farther. The mind of the main character, Jake Sully, is projected into the body of a part human/part humanoid being on a moon that revolves around a Jupiter-like gas giant in a distant solar system. Sully, a marine who was wounded in combat and is paralyzed from the waist down, senses and perceives the world of his avatar and acts on it through his avatar. The avatar has a healthy brain and spinal column, enabling Jake to once more “sense” his legs and make use of them.

In *The Matrix* film series, the people we touch, the food we taste, the distant hills we see, the sunshine we feel on our skin, the voices and traffic we hear, the perfumes and exhaust we smell, the buildings that shelter us from the wetness of the rain and the bite of winter ice—all these are nothing but software. We—that is, you and I—are also software. Flesh-and-blood people have been plugged into pods that harvest their energy and have been given software avatars that lead simulated lives in the virtual world we sense around us. We cannot distinguish the world made of software—the Matrix—from reality. We sense the virtual world as we would sense the real world—through the transmission of sensory information to the brain. Cells in our brains fire in patterns that create illusions of reality. We think we see because cells involved in vision are firing. We think we hear because cells involved in hearing are firing. And so on for all our senses. Only a very few sense that something is wrong, but they are not sure what it is.

The real world and *The Matrix* are very different, but for most people, virtual reality is real enough. Whether we are in a virtual world or the real world, we receive sensory information in the brain and interpret it according to its physical features and, as we will see, according to our memories, hopes, and dreams.



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A Second Life Avatar In the virtual world SecondLife.com, users create and customize their avatars. Some users create avatars similar in appearance to themselves; others create idealized avatars. They then control their avatars as they interact with the avatars of other users. What is the appeal of SecondLife? What type of avatar would you create to represent you?

Avatar In video games and virtual environments, a persona that a person uses to play or otherwise interact with the environment.



In the film *Avatar*, Jake Sully, a wounded paraplegic marine, is given the body of a native of a moon revolving around a Jupiter-like planet. In that avatar, he can once more sense and use his legs.

— ■ —
Good writing is supposed to evoke sensation in the reader—not the fact that it is raining, but the feeling of being rained upon.

E. L. DOCTOROW
 — ■ —

SENSATION AND PERCEPTION: YOUR TICKETS OF ADMISSION TO THE WORLD OUTSIDE

Question 1: What are sensation and perception?

Sensation is the stimulation of sensory receptors and the transmission of sensory information to the central nervous system (the spinal cord or brain). Sensory receptors are located in sensory organs such as the eyes and ears, the skin, and elsewhere in the body. Stimula-

tion of the senses is a mechanical process. It results from sources of energy, like light and sound, or from the presence of chemicals, as in smell and taste. In *The Matrix*, a step is skipped: There is no stimulation of sensory receptors in the eyes, the nose, the skin, and so on. There is, instead, direct transmission of sensory information to the central nervous system.

Perception is not mechanical. It is an *active* process in which sensations are organized and interpreted to form an inner representation of the world (Rouder & Morey, 2009). Perception may begin with sensation, but it also reflects our experiences and expectations as it makes sense of sensory stimuli. A person standing 15 feet away and a 12-inch-tall doll may cast similar-sized images on the back of your eye, but whether you interpret the shape to be a foot-long doll or a full-grown person 15 feet away is a matter of perception that depends on your experience with dolls, people, and distance.

In this chapter, you will see that your personal map of reality—your ticket of admission to a world of changing sights, sounds, and other sources of sensory input—depends largely on the so-called five senses: vision, hearing, smell, taste, and touch. We will see, however, that touch is just one of several “skin senses,” which also include pressure, warmth, cold, and pain. There are also senses that alert you to your own body position without your having to watch every step you take. As we explore the nature of each of these senses, we will find that similar sensations may lead to different perceptions in different people—or within the same person in different situations. **Truth or Fiction Revisited:** People actually have *more* than five senses.

Before we begin our voyage through the senses, let’s consider a number of concepts that apply to all of them: *absolute threshold*, *subliminal stimulation*, *difference threshold*, *signal-detection theory*, *feature detectors*, and *sensory adaptation*. In doing so, we will learn why we can dim the lights gradually to near darkness without anyone noticing. (Sneaky?) We will also learn why we might become indifferent to the savory aromas of delightful dinners. (Disappointing?) **Question 2: How do we know when something is there?** How do we know when something has changed?

Sensation The stimulation of sensory receptors and the transmission of sensory information to the central nervous system.

Perception The process by which sensations are organized into an inner representation of the world.

Absolute threshold The minimal amount of energy that can produce a sensation.

Psychophysicist A person who studies the relationships between physical stimuli (such as light or sound) and their perception.

Absolute Threshold: So, Is It There or Not?

Gustav Fechner used the term **absolute threshold** to refer to the weakest amount of a stimulus that a person can distinguish from no stimulus at all. For example, the absolute threshold for light would be the minimum brightness (physical energy) required to activate the visual sensory system.

Psychophysicists look for the absolute thresholds of the senses by exposing individuals to progressively stronger stimuli until they find the minimum stimuli that the person can detect no more (and no less) than 50% of the time. However, it has been discovered that these absolute thresholds are not really absolute. That is, some people are more sensitive than others, and even the same person might have a slightly different response from one occasion to another (Rouder & Morey, 2009).

In Profile

Gustav Theodor Fechner (1801–1887) was interested in the occult and reported attending séances in which a bed, a table, and he himself moved in response to strange forces. He was interested in spiritual phenomena and wrote a bereaved friend that death is but a transition to another state of existence in which one's soul merges with others to join the Supreme Spirit. Yet he advocated scientific rigor in all other matters and contributed to the precise measurement of the senses. Under the pen name of “Dr. Mises,” he ridiculed unscientific thought by a tongue-in-cheek argument: (a) Insects have six legs; (b) mammals have four; and (c) birds, who ascend closest to heaven, only two. (d) Therefore, angels, higher yet, must have none. In contrast to his humorous treatise on legless angels, Fechner insisted on actually measuring things rather than just arguing about them.

The son and grandson of German village pastors, Fechner, like his father, combined religious faith with a skeptical scientific outlook. His father scandalously installed a lightning rod on the local church at a time when it was assumed that God would take



GUSTAV THEODOR FECHNER

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care of heavenly threats to faithful parishes. His father also ignored tradition and preached without a wig, arguing that Jesus had done the same.

Fechner obtained a degree in medicine at the University of Leipzig, but his interests turned to physics and math. He founded the discipline known as psychophysics, which deals with the ways we translate physical events such as lights and sounds into psychological experiences. For example, light and sound are types of physical energy. It may surprise you that we do not sense them directly, powerful as they may seem to us. Instead, these sources of energy are converted into neural impulses by our sensory receptors—our eyes and ears and so on. The process of transforming physical energy (in the cases of light, sound, and touch) or chemicals (in the cases of odors and tastes) into neural impulses is called transduction. Many of Fechner's laboratory methods remain in use today.



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Nevertheless, under ideal conditions, our ability to detect stimuli is amazingly sensitive. The following are measures of the absolute thresholds for the senses of vision, hearing, taste, smell, and touch:

- **Vision:** a candle flame viewed from about 30 miles on a clear, dark night.
- **Hearing:** a watch ticking from about 20 feet away in a quiet room.
- **Taste:** 1 teaspoon of sugar dissolved in 2 gallons of water.
- **Smell:** about one drop of perfume diffused throughout a small house (1 part in 500 million).
- **Touch:** the pressure of the wing of a fly falling on a cheek from a distance of about 0.4 inch.

It's interesting to imagine how our lives would differ if the absolute thresholds for the human senses differed. For example, if your ears were more sensitive to sounds that are low in **pitch**, you might hear the collisions among molecules of air. If you could see light with slightly longer wavelengths, you would see infrared light waves. Your world would be transformed because heat generates infrared light. **Truth or Fiction Revisited:** Moreover, if we could see waves of light with slightly longer wavelengths, warm-blooded animals would glow in the dark. In addition, the worlds of those who are blind, deaf, or have other variations in their sensory capabilities can be substantially different. These different experiences of reality may not be viewed as losses, either. For example, some deaf people have advocated against artificial restoration of hearing through surgical means because of the beauty and value of a world of silence and sign language.

Subliminal Stimulation

Do TV commercials contain words or sexual images that are flashed so briefly on the screen that we do not become conscious of them but they influence us? Behaviorist John B. Watson was a pioneer in associating appealing stimuli with products, as auto ads frequently associate attractive women with cars. But most ads make the associations openly. **Question 3: Would ads that show an appealing image or a command—such as “Buy!”—for only a fraction of a second influence us?** Perhaps they would.

Pitch The highness or lowness of a sound as determined by the frequency of the sound waves.

The great art of life is sensation, to feel that we exist, even in pain.

LORD BYRON



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Subliminal Stimulation Will flashing the word “buy” too briefly to enable conscious recognition influence you to buy a product in a TV commercial?

Sensory stimulation that is below a person’s absolute threshold for conscious perception is termed **subliminal stimulation**—and its perception is called *subliminal perception*. Visual stimuli can be flashed too briefly to enable us to process them. Auditory stimuli can be played at a volume too low to consciously hear or can be played backward.

Classical research with a photo advertisement suggests that subliminal stimulation by single words may be modestly effective in modifying people’s behavior or emotions (Key, 1973). The ad showed four different types of rum. The phrase “U Buy” was embedded backward in the part of the ad that portrayed one kind of rum.

Participants were asked to try to locate any hidden message in the ad, but they were unable to do so. However, 80% of the participants apparently perceived the backward message unconsciously because they showed a preference for the kind of rum associated with the message.

In more recent research, Johan Karremans and his colleagues (2006) repeatedly flashed “Lipton Ice” for 24 milliseconds (about 1/50th of a second) on a computer screen that was watched by an experimental group of study participants. A control group was flashed with a message that did not contain a brand name. The researchers found that thirsty participants showed a preference for Lipton Ice, but participants who were not thirsty did not show a preference between Lipton Ice and other tea. Researchers use the term *priming* to explain the effects of subliminal stimulation. That is, the participants were *primed* to prefer Lipton Ice.

Even the most fleeting experiences can have emotional consequences for us. In one experiment, participants were shown fearful, happy, or neutral faces for 30 milliseconds (about 1/30th of a second), too briefly to recognize consciously (Sweeny et al., 2009). A day later, they were shown faces of the same people, all with neutral expressions. Faces that had been subliminally primed with happy faces were rated more positively by the participants, even though the first set of faces had been flashed too rapidly to enable conscious recognition.

Difference Threshold: Is It the Same, or Is It Different?

How much of a difference in intensity between two lights is required before you will detect one as brighter than the other? The minimum difference in *magnitude* of two stimuli required to tell them apart is their **difference threshold**. As with the absolute threshold, psychologists have agreed to the criterion of a difference in magnitudes that can be detected 50% of the time.

Psychophysicist Ernst Weber discovered through laboratory research that the threshold for perceiving differences in the intensity of light is about 2% (actually closer to 1/60th) of their intensity. This fraction, 1/60th, is known as **Weber’s constant** for light. A closely related concept is the **just noticeable difference (jnd)**, the minimum difference in stimuli that a person can detect. For example, at least 50% of the time, most people can tell if a light gets just 1/60th brighter or dimmer. Weber’s constant for light holds whether we are comparing two quite bright lights or two moderately dull lights. However, it becomes inaccurate when we compare extremely bright or extremely dull lights.

Weber’s constant for noticing differences in lifted weight is 1/53rd. (Round it off to 1/50th.) That means if you are strong enough to heft a 100-pound barbell, you would not notice that it was heavier until about 2 pounds were added. Yet if you are a runner who carries 1-pound dumbbells, you would definitely notice if someone slipped you dumbbells even a pound heavier because the increase would be 100%, not a small fraction.

What about sound? People are most sensitive to changes in the pitch (frequency) of sounds. The Weber constant for pitch is 1/333, meaning that on average, people can tell when a tone rises or falls in pitch by an extremely small one-third of 1%. (Singers have to be right on pitch. The smallest error makes them sound sharp or flat.) Remember this when friends criticize your singing—you may not be “tone deaf” but just slightly off.

The sense of taste is much less sensitive. On average, people cannot detect differences in saltiness of less than 20%. That is why those low-salt chips that have 15% less salt than your favorite do not taste so bad.

Subliminal stimulation Sensory stimulation that is below a person’s absolute threshold for conscious perception.

Difference threshold The minimal difference in intensity required between two sources of energy so that they will be perceived as different.

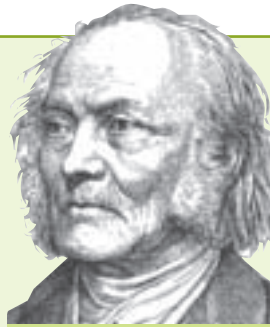
Weber’s constant The fraction of the intensity by which a source of physical energy must be increased or decreased so that a difference in intensity will be perceived.

Just noticeable difference (jnd) The minimal amount by which a source of energy must be increased or decreased so that a difference in intensity will be perceived.

In Profile

His research tools included knitting needles, lamps, and the little weights druggists use to measure powders and potions. He showed that the sense of touch actually consists of several senses: pressure, temperature, and pain. He also showed that there is a “muscle sense” (kinesthesia) that people use to sense the movements of their arms, legs, and so on even when their eyes are closed.

Born in Wittenberg, Germany, Ernst Heinrich Weber (1795–1878) devoted himself to the study of sensation and perception. He was the third of thirteen children and one of three sons who became distinguished scientists. (If the times had



ERNST HEINRICH WEBER

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been different, one wonders what the sisters would have accomplished.) He obtained his doctorate in physiology at the University of Leipzig and taught there until his retirement.

The knitting needles were used to touch people’s backs. Weber would ask them to place a finger where the needle had been as a way of assessing their sensitivity to touch. Using a series of weights, he assessed the smallest difference—the just noticeable difference (jnd)—that people could perceive and discovered that the jnd differs for each sense.



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Signal-Detection Theory: Is Being Bright Enough?

From the discussion so far, it might seem as if people are simply switched on by certain amounts of stimulation. This is not quite true. People are influenced by psychological factors as well as by external changes. **Signal-detection theory** considers the human aspects of sensation and perception. **Question 4: What is signal-detection theory?**

According to signal-detection theory, the relationship between a physical stimulus and a sensory response is not just mechanical. People’s ability to detect stimuli such as meaningful blips on a radar screen depends not only on the intensity of the blips but also on their training (learning), motivation (desire to perceive meaningful blips), and psychological states such as fatigue or alertness (Rouder & Morey, 2009).

The intensity of the signal is just one factor that determines whether people will perceive sensory stimuli (signals) or a difference between signals. Another is the degree to which the signal can be distinguished from background noise. It is easier to hear a friend in a quiet room than in a room where people are talking loudly and clinking glasses. The sharpness or acuteness of a person’s biological sensory system is still another factor. Is sensory capacity fully developed? Is it diminished by advanced age?

Truth or Fiction Revisited: It is true that people sometimes hear what they want to hear. That is, we tend to detect stimuli we are searching for. Signal-detection theory also considers psychological factors such as motivation, expectations, and learning. For example, the place where you are reading this book may be abuzz with signals. If you are outside, perhaps a breeze is blowing against your face. Perhaps the shadows of passing clouds darken the scene now and then. If you are inside, perhaps there are the occasional clanks and hums emitted by a heating system. Perhaps the aromas of dinner are hanging in the air, or the voices from a TV set suggest a crowd in another room. Yet you are focusing your attention on this page (I hope). Thus, the other signals recede into the background of your consciousness. One psychological factor in signal detection is the focusing or narrowing of attention to signals that the person deems important.



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Signal Detection The detection of signals is determined not only by the physical characteristics of stimuli but also by psychological factors such as motivation and attention. The woman in this photo is engrossed by her newspaper, and the man is focusing on the PDA. Neither notices the people around them or the noise and buffeting about of the subway.

Feature Detectors in the Brain: Firing on Cue

Imagine you are standing by the curb of a busy street as a bus approaches. When neurons in your sensory organs—in this case, your eyes—are stimulated by the

Signal-detection theory The view that the perception of sensory stimuli involves the interaction of physical, biological, and psychological factors.

III

approach of the bus, they relay information to the sensory cortex in the brain. Nobel Prize winners David Hubel and Torsten Wiesel (1979) discovered that various neurons in the visual cortex of the brain fire in response to particular features of the visual input. **Question 5: What are feature detectors?** Many cells in the brain detect (fire in response to) lines presented at various angles—vertical, horizontal, and in between. Other cells fire in response to specific colors. Because they respond to different aspects or features of a scene, these brain cells are termed **feature detectors**. In the example of the bus, visual feature detectors respond to the bus's edges, depth, contours, textures, shadows, speed, and kinds of motion (up, down, forward, and back). There are also feature detectors for other senses. Auditory feature detectors, for example, respond to the pitch, loudness, and other aspects of the sounds of the bus.

Sensory Adaptation: Where Did It Go?

Our sensory systems are admirably suited to a changing environment. **Question 6: How do our sensory systems adapt to a changing environment?** **Sensory adaptation** refers to the processes by which we become more sensitive to stimuli of low magnitude and less sensitive to stimuli that remain the same (such as the background noises outside the window).

Consider how the visual sense adapts to lower intensities of light. When we first walk into a darkened movie theater, we see little but the images on the screen. As we search for our seats, however, we become increasingly sensitive to the faces around us and to the features of the theater. The process of becoming more sensitive to stimulation is referred to as **sensitization**, or positive adaptation.

But we become less sensitive to constant stimulation. Sources of light appear to grow dimmer as we adapt to them. In fact, if you could keep an image completely stable on the retinas of your eyes—which is virtually impossible to accomplish without a motionless image and stabilizing equipment—the image would fade within a few seconds and be very difficult to see. Similarly, at the beach, we soon become less aware of the lapping of the waves. When we live in a city, we become desensitized to traffic sounds except for the occasional backfire or siren. And as you may have noticed from experiences with freshly painted rooms, sensitivity to disagreeable odors fades quite rapidly. The process of becoming less sensitive to stimulation is referred to as **desensitization**, or negative adaptation.

Our sensitivities to stimulation provide our brains with information that we use to understand and control the world outside. This information influences our behavior and mental processes. Therefore, it is not surprising that psychologists study the ways we sense and perceive this information—through vision, hearing, the chemical senses, and yet other senses, as we see throughout the remainder of the chapter.

Feature detectors Neurons in the sensory cortex that fire in response to specific features of sensory information such as lines or edges of objects.

Sensory adaptation The processes by which organisms become more sensitive to stimuli that are low in magnitude and less sensitive to stimuli that are constant or ongoing in magnitude.

Sensitization The type of sensory adaptation in which we become more sensitive to stimuli that are low in magnitude; also called positive adaptation.

Desensitization The type of sensory adaptation in which we become less sensitive to constant stimuli; also called negative adaptation.

LearningConnections • SENSATION AND PERCEPTION: YOUR TICKETS OF ADMISSION TO THE WORLD OUTSIDE

ACTIVE REVIEW (1) _____ is a mechanical process that involves the stimulation of sensory receptors and the transmission of sensory information to the central nervous system. (2) _____ is the organization of sensations into an inner representation of the world; it reflects learning and expectations as well as sensations. (3) The _____ threshold for a stimulus, such as light, is the lowest intensity at which it can be detected. (4) The minimum difference in intensity that can be discriminated is the _____ threshold. (5) According to _____-detection theory, many factors determine perception of a stimulus: the sensory stimuli, the biological sensory system of the person, and psychological factors such as motivation and attention.

REFLECT AND RELATE Think of times when you have been so involved in something that you didn't notice the heat or the cold. Think of times you have grown so used to sounds like those made by crickets or trains at night that you fall asleep without hearing them. How do these experiences relate to signal-detection theory?

CRITICAL THINKING Which factors in sensation and perception reflect our nature? Which reflect nurture?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

VISION: LETTING THE SUN SHINE IN

Our eyes are literally our “windows on the world.” Vision is our most dominant sense. Vision provides the most reliable spatial information and plays the largest role in guiding goal-directed behavior (Fiehler et al., 2008; Hagler et al., 2007). Blindness, therefore, is considered by many to be the most debilitating type of sensory loss. To understand vision, let’s first consider the nature of light.

Light: How Dazzling?

Light is fascinating stuff. It radiates. It illuminates. It dazzles. It glows. It beckons like a beacon. We speak of the “light of reason.” We speak of genius as “brilliance.” In almost all cultures, light is a symbol of goodness and knowledge. People who aren’t in the know are said to be “in the dark.” **Question 7: Just what is light?**

It is **visible light** that triggers visual sensations. Yet visible light is just one small part of a spectrum of electromagnetic energy that surrounds us (see Figure 4.1 ■). All forms of electromagnetic energy move in waves, and different kinds of electromagnetic energy have signature wavelengths as follows:

- **Cosmic rays:** The wavelengths of these rays from outer space are only a few *trillionths* of an inch long.
- **Radio waves:** Some radio signals extend for miles.
- **Visible light:** Different colors have different wavelengths, with violet the shortest at about 400 *billionths* of a meter in length and red the longest at 700 billionths of a meter.

Have you seen rainbows or light that has been broken down into several colors as it filtered through your windows? Sir Isaac Newton, the British scientist, discovered that sunlight could be broken down into different colors by means of a triangular solid of glass called a *prism* (see Figure 4.1). When I took introductory psychology, I was taught to remember the colors of the spectrum, from longest to shortest wavelengths, by using the mnemonic device *Roy G. Biv* (red, orange, yellow, green, blue, indigo, violet). The wavelength of visible light determines its color, or **hue**. The wavelength for red is longer than the wavelength for orange, and so on through the spectrum.

*It is a terrible thing to see
and have no vision.*

HELEN KELLER

Visible light The part of the electromagnetic spectrum that stimulates the eye and produces visual sensations.

Hue The color of light as determined by its wavelength.

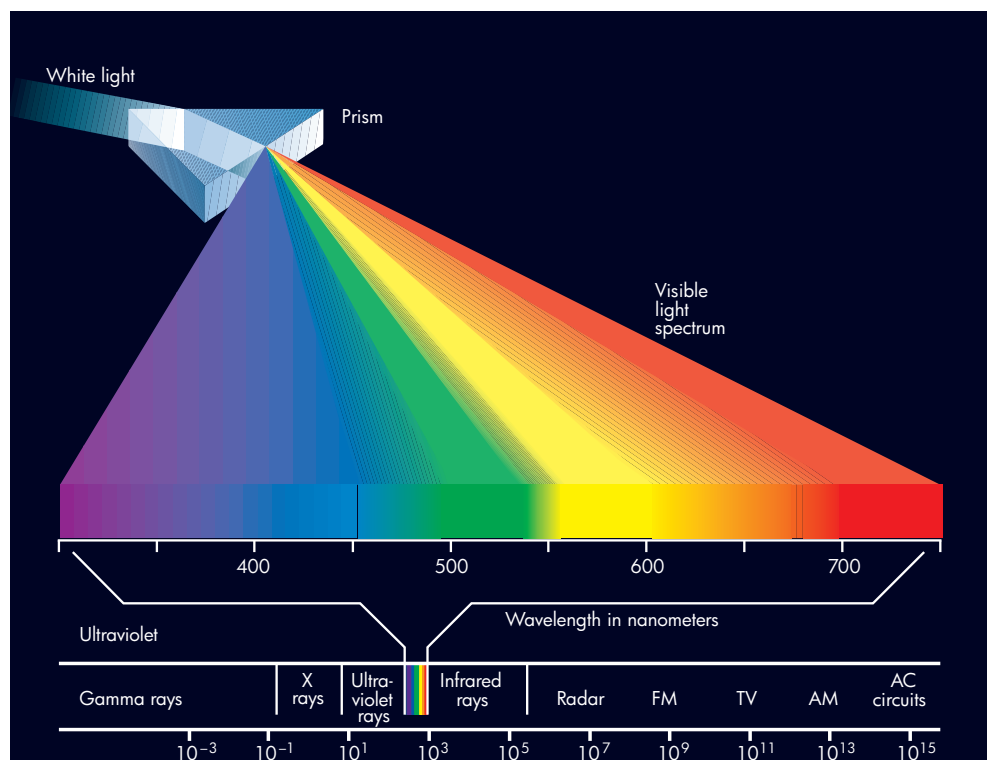


Figure 4.1 ■ The Visible Spectrum By passing a source of white light, such as sunlight, through a prism, we break it down into the colors of the visible spectrum. The visible spectrum is just a narrow segment of the electromagnetic spectrum. The electromagnetic spectrum also includes radio waves, microwaves, X-rays, cosmic rays, and many others. Different forms of electromagnetic energy have wavelengths that vary from a few trillionths of a meter to thousands of miles. Visible light varies in wavelength from about 400 to 700 *billionths* of a meter. (1 meter = 39.37 inches.)

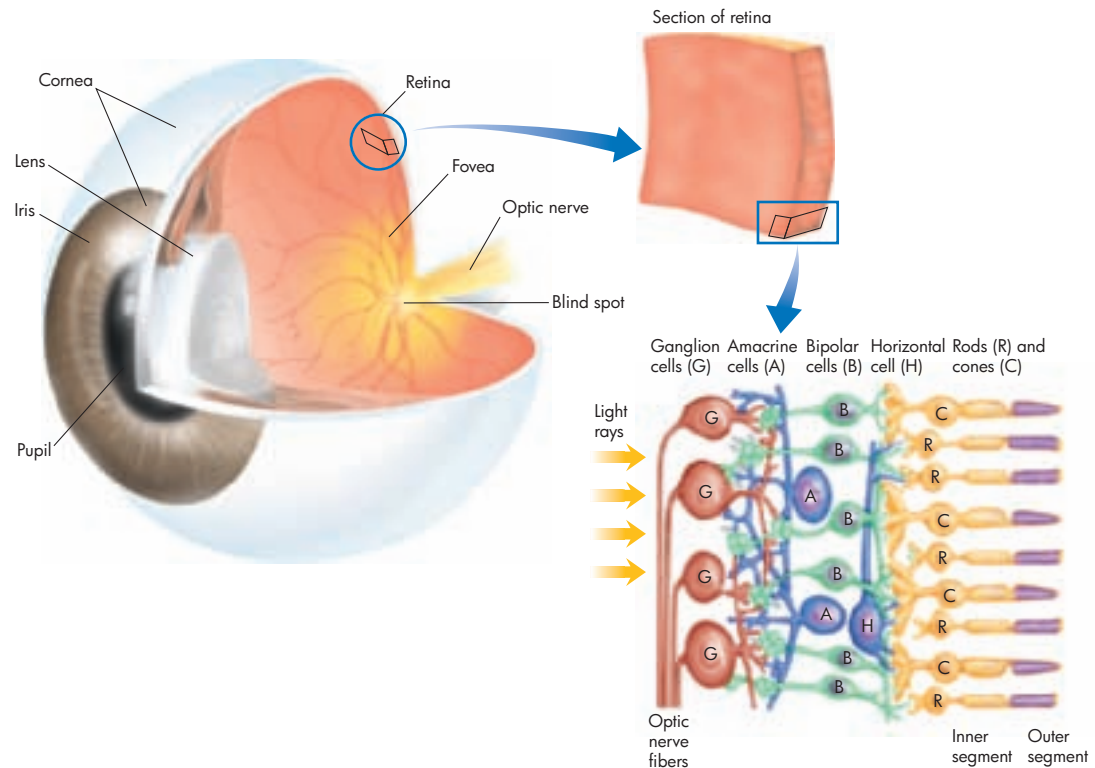


Figure 4.2 ■ The Human Eye In both the eye and a camera, light enters through a narrow opening and is projected onto a sensitive surface. In the eye, the photosensitive surface is called the retina, and information concerning the changing images on the retina is transmitted to the brain. The retina contains photoreceptors called rods and cones. Rods and cones transmit sensory input back through the bipolar neurons to the ganglion neurons. The axons of the ganglion neurons form the optic nerve, which transmits sensory stimulation through the brain to the visual cortex of the occipital lobe.

The Eye: The Better to See You With

Consider that magnificent invention called the camera, which records visual experiences. In traditional cameras, light enters an opening and is focused onto a sensitive surface, or film. Chemicals on film create a lasting impression of the image that entered the camera.

Question 8: How does the eye work? The eye—our living camera—is no less remarkable. Look at its major parts, as shown in Figure 4.2 ■. As with a film or TV camera, light enters through a narrow opening and is projected onto a sensitive surface. Light first passes through the transparent **cornea**, which covers the front of the eye’s surface. (The “white” of the eye, or *sclera*, is composed of hard protective tissue.) The amount of light that passes through the cornea is determined by the size of the opening of the muscle called the **iris**, which is the colored part of the eye. The opening in the iris is the **pupil**. The size of the pupil adjusts automatically to the amount of light present. Therefore, you do not have to purposefully open your eyes further to see better in low lighting conditions. The more intense the light, the smaller the opening. In a similar fashion, we adjust the amount of light allowed into a camera according to its brightness. Interestingly, pupil size is also sensitive to emotional response: We can literally be “wide-eyed with fear.”

Once light passes through the iris, it encounters the **lens**. The lens adjusts or accommodates to the image by changing its thickness. Changes in thickness permit a clear image of the object to be projected onto the retina. These changes focus the light according to the distance of the object from the viewer. If you hold a finger at arm’s length and slowly bring it toward your nose, you will feel tension in the eye as the thickness of the lens accommodates to keep the retinal image in focus. When people squint to bring an object into focus, they are adjusting the thickness of the lens. In contrast, the lens in a camera does not accommodate to the distance of objects. Instead, to focus the light that is projected onto the film, the camera lens is moved farther from the film or closer to it, as in a zoom lens.

The **retina** is like the film or image surface of the camera. However, the retina consists of cells called **photoreceptors** that are sensitive to light (photosensitive). There are two types of photoreceptors: *rods* and *cones*. The retina (see Figure 4.2) contains several layers of

Cornea Transparent tissue forming the outer surface of the eyeball.

Iris A muscular membrane whose dilation regulates the amount of light that enters the eye.

Pupil The apparently black opening in the center of the iris through which light enters the eye.

Lens A transparent body behind the iris that focuses an image on the retina.

Retina The area of the inner surface of the eye that contains rods and cones.

Photoreceptors Cells that respond to light.

cells: the rods and cones, **bipolar cells**, and **ganglion cells**. All of these cells are neurons. The rods and cones respond to light with chemical changes that create neural impulses that are picked up by the bipolar cells. These then activate the ganglion cells. The axons of the million or so ganglion cells in our retina converge to form the **optic nerve**. The optic nerve conducts sensory input to the brain, where it is relayed to the visual area of the occipital lobe.

As if this were not enough, the eye has additional neurons to enhance this process. Amacrine cells and horizontal cells make sideways connections at a level near the rods and cones and at another level near the ganglion cells. As a result, single bipolar cells can pick up signals from many rods and cones, and in turn, a single ganglion cell is able to funnel information from multiple bipolar cells. In fact, rods and cones outnumber ganglion cells by more than 100 to 1.

RODS AND CONES

Rods and **cones** are the photoreceptors in the retina (see Figure 4.3 ■). About 125 million rods and 6.4 million cones are distributed across the retina. The cones are most densely packed in a small spot at the center of the retina called the **fovea** (see Figure 4.2). Visual acuity (sharpness and detail) is greatest at this spot. The fovea is composed almost exclusively of cones. Rods are densest just outside the fovea and thin out toward the periphery of the retina.

Rods allow us to see in black and white. Cones provide color vision. In low lighting, it is possible to photograph a clearer image with black-and-white film than with color film. Similarly, rods are more sensitive to dim light than cones. Therefore, as the illumination grows dim, as during the evening and nighttime hours, objects appear to lose their color well before their outlines fade completely from view.

In contrast to the visual acuity of the fovea is the **blind spot**, which is insensitive to visual stimulation. It is the part of the retina where the axons of the ganglion cells converge to form the optic nerve (see Figures 4.2 and 4.4 ■).

Visual acuity (sharpness of vision) is connected with the shape of the eye. People who have to be unusually close to an object to discriminate its details are *nearsighted*. People who see distant objects unusually clearly but have difficulty focusing on nearby objects are *farsighted*. Nearsightedness can result when the eyeball is elongated so that the images of distant objects are focused in front of the retina. When the eyeball is too short, the images of nearby objects are focused behind the retina, causing farsightedness. Eyeglasses or contact lenses can be used to help nearsighted people focus distant objects on their retinas. Laser surgery can correct vision by actually changing the shape of the eye. Farsighted people usually see well enough without eyeglasses until they reach their middle years, when they may need glasses for reading.

Bipolar cells Neurons that conduct neural impulses from rods and cones to ganglion cells.

Ganglion cells Neurons whose axons form the optic nerve.

Optic nerve The nerve that transmits sensory information from the eye to the brain.

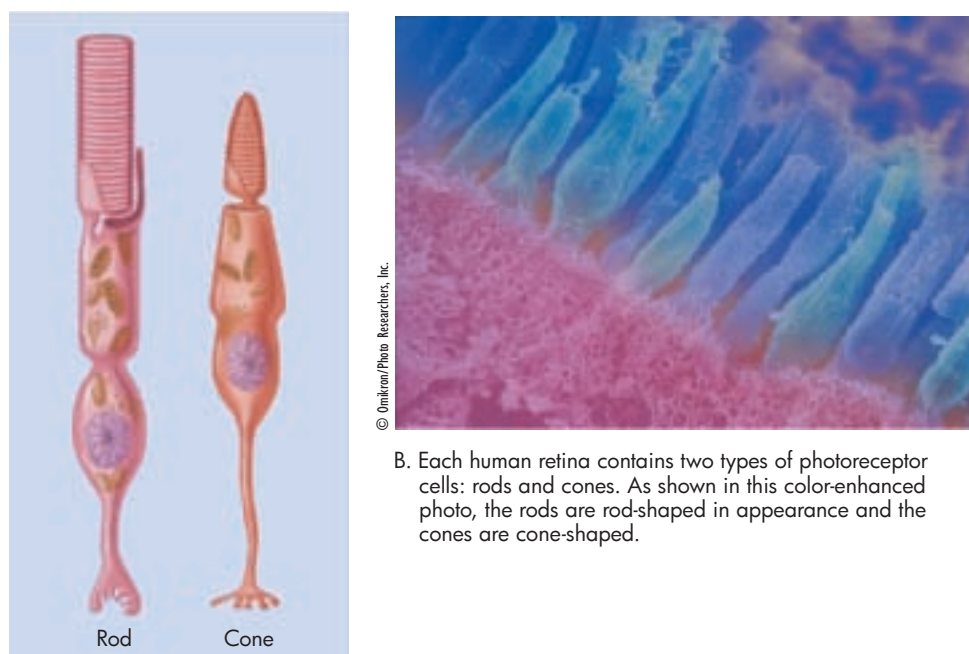
Rods Rod-shaped photoreceptors that are sensitive only to the intensity of light.

Cones Cone-shaped photoreceptors that transmit sensations of color.

Fovea An area near the center of the retina that is dense with cones and where vision is consequently most acute.

Blind spot The area of the retina where axons from ganglion cells meet to form the optic nerve.

Visual acuity Sharpness of vision.



B. Each human retina contains two types of photoreceptor cells: rods and cones. As shown in this color-enhanced photo, the rods are rod-shaped in appearance and the cones are cone-shaped.

Figure 4.3 ■ Rods and Cones You have about 125 million rods and 6.4 million cones distributed across the retina of each eye. Only cones provide sensations of color. The fovea of the eye is almost exclusively populated by cones, which are then distributed more sparsely as you work toward the periphery of the retina.

Figure 4.4 ■ The Blind Spot To try a “disappearing act,” close your left eye, hold the book close to your face, and look at the boy with your right eye. Slowly move the book away until the pie disappears. The pie disappears because it is being projected onto the blind spot of your retina, the point at which the axons of ganglion neurons collect to form the optic nerve. Note that when the pie disappears, your brain “fills in” the missing checkerboard pattern, which is one reason that you’re not usually aware that you have blind spots.



*I found I could say things with
color and shapes that I couldn't
say any other way—things
I had no words for.*

GEORGIA O'KEEFFE

Beginning in the late 30s to the mid-40s, the lenses start to grow brittle, making it more difficult to accommodate to, or focus on, objects. This condition is called **presbyopia**, from the Greek words for “old man” and “eyes,” a slight misnomer because presbyopia occurs by middle adulthood, not late adulthood. Presbyopia makes it difficult to perceive nearby visual stimuli. People who had normal visual acuity in their youth often require corrective lenses to read in middle adulthood and beyond.

LIGHT ADAPTATION

When we walk out onto a dark street, we may at first not be able to see people, trees, and cars clearly, but as time goes on, we are better able to discriminate the features of people and objects. The process of adjusting to lower lighting conditions is called **dark adaptation**.

Figure 4.5 ■ shows the amount of light needed for detection as a function of the amount of time spent in the dark. The cones and rods adapt at different rates. The cones, which permit perception of color, reach their maximum adaptation to darkness in about 10 minutes. The rods, which allow perception of light and dark only, are more sensitive to dim light and continue to adapt to darkness for up to about 45 minutes.

Adaptation to brighter lighting conditions takes place much more rapidly. When you emerge from the theater into the brilliance of the afternoon, you may at first be painfully surprised by the featureless blaze around you. The visual experience is not unlike turning the brightness of the TV set to its maximum setting, at which the edges of objects seem to dissolve into light. Within a minute or so of entering the street, however, the brightness of the scene dims, and objects regain their edges.

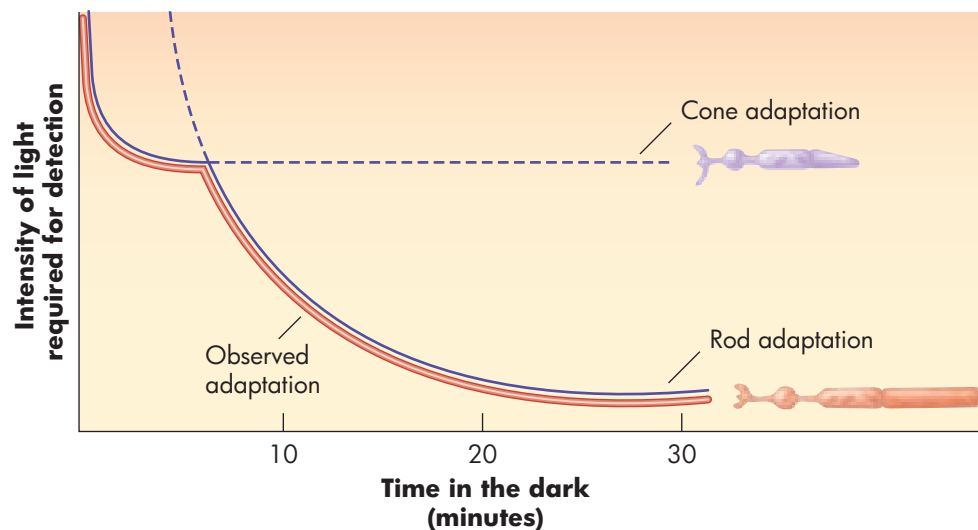
Presbyopia A condition characterized by brittleness of the lens.

Dark adaptation The process of adjusting to conditions of lower lighting by increasing the sensitivity of rods and cones.

Color Vision: Creating an Inner World of Color

For most of us, the world is a place of brilliant colors—the blue-greens of the ocean, the red-oranges of the setting sun, the deepened greens of June, the glories of the purple

Figure 4.5 ■ Dark Adaptation This illustration shows the amount of light necessary for detection as a function of the amount of time spent in the dark. Cones and rods adapt at different rates. Cones, which permit perception of color, reach maximum dark adaptation in about 10 minutes. Rods, which permit perception of dark and light only, are more sensitive than cones. Rods continue to adapt for up to about 45 minutes.



rhododendron and red hibiscus. Color is an emotional and aesthetic part of our everyday lives. In this section, we explore some of the dimensions of color and then examine theories about how we manage to convert different wavelengths of light into perceptions of color. **Question 9: What are some perceptual dimensions of color?** These include *hue*, *value*, and *saturation*.

The wavelength of light determines its color, or *hue*. The *value* of a color is its degree of lightness or darkness. The *saturation* refers to how intense a color appears to us. A fire-engine red will appear more saturated than a pale pinkish red.

Colors can also have psychological associations within various cultural settings. For example, in the United States, a bride may be dressed in white as a sign of purity. In traditional India, the guests would be shocked because white is the color for funerals. Here we mourn in black.

WARM AND COOL COLORS

If we bend the colors of the spectrum into a circle, we create a color wheel, as shown in Figure 4.6. Psychologically, the colors on the green-blue side of the color wheel are considered cool in temperature. Those colors on the yellow-orange-red side are considered warm. Perhaps greens and blues suggest the coolness of the ocean and the sky, whereas things that are burning tend to be red or orange. A room decorated in green or blue may seem more appealing on a hot July day than a room decorated in red or orange.

COMPLEMENTARY COLORS

The colors across from one another on the color wheel are labeled **complementary**. Red–green and blue–yellow are the major complementary pairs. If we mix complementary colors together, they dissolve into gray. **Truth or Fiction Revisited:** It is true, therefore, that when we mix blue and yellow light, we obtain green light.

“But wait!” you say. “Blue and yellow cannot be complementary because by mixing pigments of blue and yellow we create green, not gray.” True enough, but we have been talking about mixing *lights*, not *pigments*. Light is the source of all color. Pigments reflect and absorb different wavelengths of light selectively. The mixture of lights is an *additive* process. The mixture of pigments is *subtractive*. Figure 4.7 shows mixtures of lights and pigments of various colors.

Pigments gain their colors by absorbing light from certain segments of the spectrum and reflecting the rest. For example, we see most plant life as green because the pigment in chlorophyll absorbs most of the red, blue, and violet wavelengths of light. The remaining green is reflected. A red pigment absorbs most of the spectrum but reflects red. White pigments reflect all colors equally. Black pigments reflect very little light.

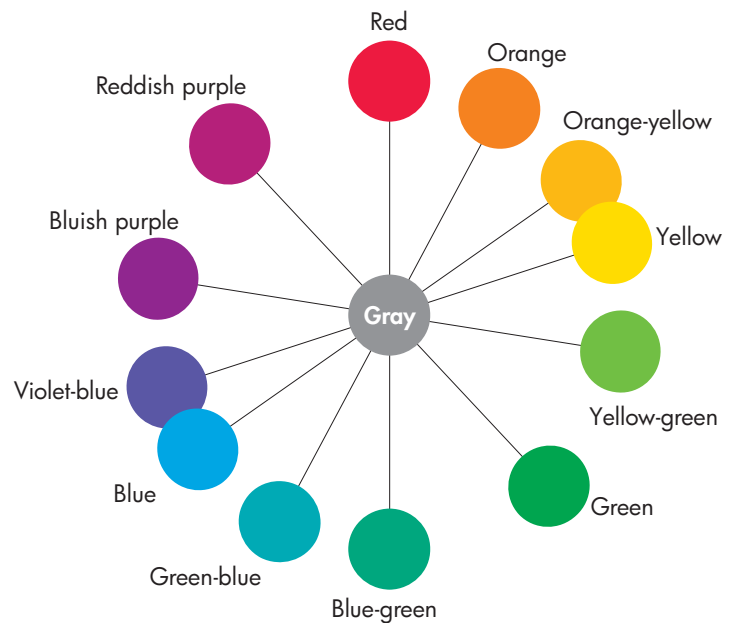


Figure 4.6 ■ The Color Wheel A color wheel can be formed by bending the colors of the spectrum into a circle and placing complementary colors across from one another. (A few colors between violet and red are not found in the spectrum and must be added to complete the circle.) When lights of complementary colors such as yellow and violet-blue are mixed, they dissolve into neutral gray. The afterimage of a color is its complement.

Complementary Descriptive of colors of the spectrum that when combined produce white or nearly white light.

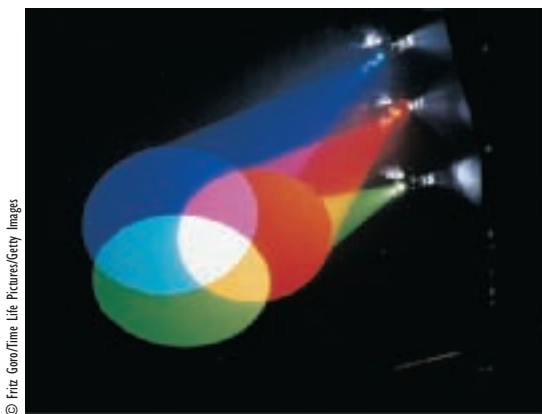


Figure 4.7 ■ Additive and Subtractive Color Mixtures Produced by Lights and Pigments Thomas Young discovered that white light and all the colors of the spectrum could be produced by adding combinations of lights of red, green, and violet-blue and varying their intensities (see Part A). Part B shows subtractive color mixtures, which are formed by mixing pigments, not light.

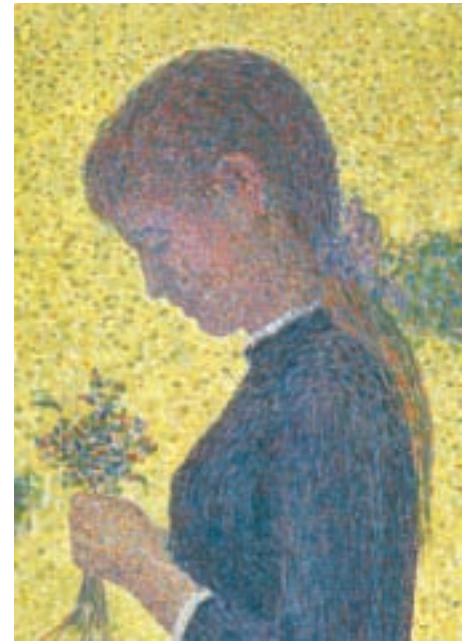


Figure 4.8 ■ Sunday Afternoon on the Island of La Grande Jatte French painter Georges Seurat molded his figures and forms from dabs of color. Instead of mixing pigments, he placed points of pure color next to one another. When the viewer is close to the canvas (see the detail), the points of color are apparent. But from a distance, they create the impression of color mixtures.

In *Sunday Afternoon on the Island of La Grande Jatte* (see Figure 4.8 ■), French painter Georges Seurat molded his figures and forms from dabs of color. Instead of mixing his pigments, he placed points of pure color next to one another. When the painting is viewed from very close (see the detail), the sensations are of pure color. But from a distance, the juxtaposition of pure colors creates the impression of mixtures of color.

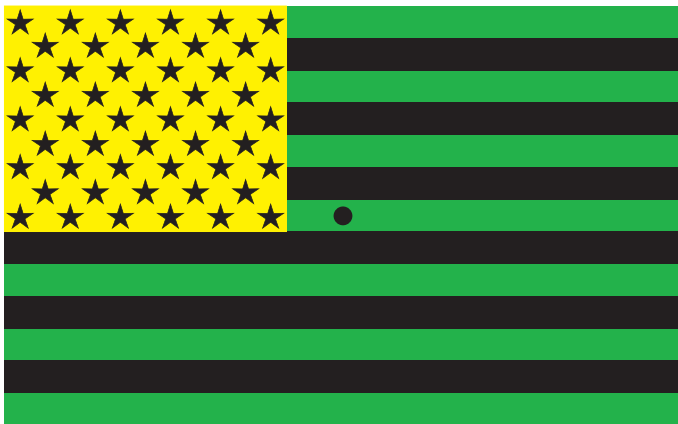


Figure 4.9 ■ Three Cheers for the ... Green, Black, and Yellow? Don't be concerned. We can readily restore Old Glory to its familiar hues. Place a sheet of white paper beneath the book, and stare at the black dot in the center of the flag for at least 30 seconds. Then remove the book. The afterimage on the paper beneath will look familiar.

Afterimage The lingering visual impression made by a stimulus that has been removed.

AFTERIMAGES

Before reading on, why don't you try a mini-experiment? Look at the strangely colored American flag in Figure 4.9 ■ for at least half a minute. Try not to blink as you are doing so. Then look at a sheet of white or gray paper. What has happened to the flag? If your color vision is working properly, and if you looked at the miscolored flag long enough, you should see a flag composed of the familiar red, white, and blue. The flag you perceive on the white sheet of paper is an **afterimage** of the first. (If you didn't look at the green, black, and yellow flag long enough the first time, try it again.) In afterimages, persistent sensations of color are followed by perception of the complementary color when the first color is removed. The same holds true for black and white. Staring at one will create an afterimage of the other. The phenomenon of afterimages has contributed to one of the theories of color vision, as we will see.

Theories of Color Vision: How Colorful?

Adults with normal color vision can discriminate many thousands of colors across the visible spectrum. Different colors have different wavelengths. Although we can vary the physical wavelengths of light in a continuous manner from shorter to longer, many changes in color are discontinuous. For example, our perception of a color shifts suddenly from blue to green even though the change in wavelength may be smaller than that between two blues.

Question 10: How do we perceive color? Our ability to perceive color depends on the eye's transmission of different messages to the brain when lights with different wavelengths stimulate the cones in the retina.

Controversy in Psychology WHAT HAPPENS IN THE EYE AND IN THE BRAIN WHEN LIGHTS WITH DIFFERENT WAVELENGTHS STIMULATE THE RETINA? HOW MANY KINDS OF COLOR RECEPTORS ARE THERE?

In this section, we explore this controversy by discussing two theories of color vision: the *trichromatic theory* and the *opponent-process theory*.

Trichromatic theory is based on an experiment conducted by British scientist Thomas Young in the early 1800s. As in Figure 4.7, Young projected three lights of different colors onto a screen so that they partly overlapped. He found that he could create any color from the visible spectrum simply by varying the intensities of the lights. When all three lights fell on the same spot, they created white light, or the appearance of no color at all. The three lights manipulated by Young were red, green, and blue-violet.

German physiologist Hermann von Helmholtz saw in Young's discovery an explanation of color vision. Helmholtz suggested that the retina in the eye must have three different types of color photoreceptors or cones. Some cones must be sensitive to red light, some to green, and some to blue. We see other colors when two different types of color receptors are stimulated. The perception of yellow, for example, would result from the simultaneous stimulation of receptors for red and green. The trichromatic theory is also known as the Young–Helmholtz theory.

In 1870, another German physiologist, Ewald Hering, proposed the

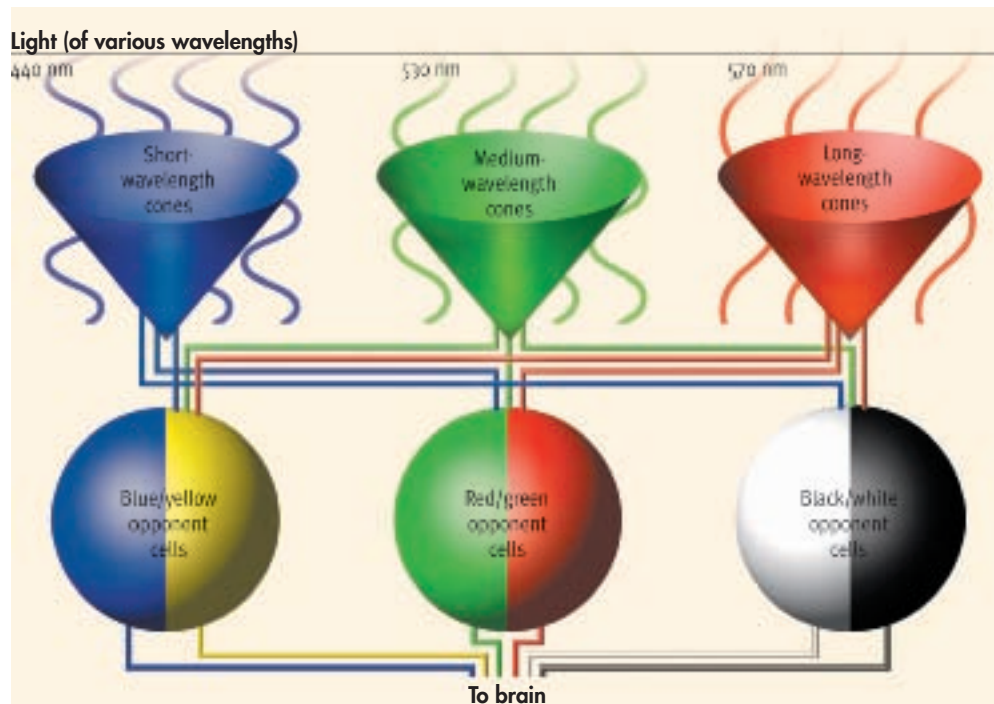
opponent-process theory of color vision: There are three types of color receptors; however, they are not sensitive just to the simple hues of red, green, and blue as Helmholtz claimed. Hering suggested instead that afterimages (such as that of the American flag shown in Figure 4.9) are made possible by three types of color receptors: red–green, blue–yellow, and a type that perceives differences in brightness (see Figure 4.10 ■). According to Hering, because a red–green cone could not transmit messages for red and green at the same time, if you stare at the green, black, and yellow flag for 30 seconds, that would disturb the balance of neural activity. The afterimage of red, white, and blue would represent the eye's attempt to reestablish a balance.

Research suggests that each theory of color vision is partially correct; in fact, this might simply be a two-stage process in which the cones are as Helmholtz says, and the transmission signals to the brain are as Hering proposes. For example, research shows that some cones are sensitive to blue, some to green, and some to red (Pang et al., 2010). But studies of the bipolar and ganglion neurons suggest that messages from cones are transmitted to the brain and relayed by the thalamus in an opponent-process fashion (Yin et al., 2009). Some

opponent-process cells that transmit messages to the visual centers in the brain are excited (“turned on”) by green light but inhibited (“turned off”) by red light. (They fire when you look at the green needles of a fir tree.) Others can be excited by red light but are inhibited by green light. (They fire when you are looking at the red ornaments on the fir tree during the holiday season.) A second set of opponent-process cells responds in an opposite manner to blue and yellow. A third set responds in an opposite manner to light and dark.

A neural rebound effect apparently helps explain the occurrence of afterimages. That is, a green-sensitive ganglion that had been excited by green light for half a minute or so might switch briefly to inhibitory activity when the light is shut off. The effect would be to perceive red even though no red light is present. Imagine looking at a green fir tree with red ornaments for a minute or so during the holidays and then turning your gaze to a white brick fireplace nearby. You might just see an image of a red tree with green ornaments!

These theoretical updates allow for the afterimage effects with the green, black, and yellow flag and are also consistent with Young's experiments in mixing lights of different colors.

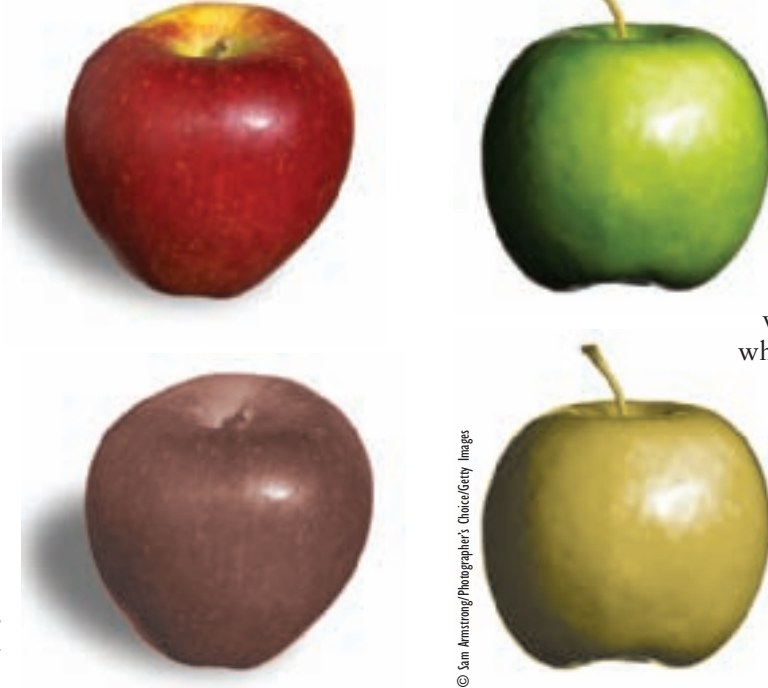


Trichromatic theory The theory that color vision is made possible by three types of cones, some of which respond to red light, some to green, and some to blue. (From the Greek roots *treis*, meaning “three,” and *chroma*, meaning “color.”)

Opponent-process theory The theory that color vision is made possible by three types of cones, some of which respond to red or green light, some to blue or yellow, and some only to the intensity of light.

Figure 4.10 ■ The Perception of Color Perception of color actually requires elements of both trichromatic and opponent-process theory. Cones in the retina are sensitive to either blue, green, or red. Color mixtures (such as yellow) require the simultaneous firing of groups of cones (in this case, green and red). But higher levels of visual processing occur in opponent-process fashion, explaining the occurrence of afterimages.

Color-Blindness



If you can discriminate among the colors of the visible spectrum, you have normal color vision and are labeled a **trichromat**. This means that you are sensitive to red–green, blue–yellow, and light–dark. **Question 11: What is color-blindness, and why are some people color-blind?** People who are totally color-blind, called **monochromats**, are sensitive only to lightness and darkness. Total color-blindness is rare. Fully color-blind individuals see the world as trichromats would on a black-and-white TV set or in a black-and-white movie.

Partial color-blindness is a sex-linked trait that mostly affects males. Partially color-blind people are called **dichromats**. They can discriminate only between two colors—red and green or blue and yellow—and the colors that are derived from mixing these colors. A dichromat might put on one red sock and one green sock but would not mix red and blue socks. Monochromats might put on socks of any color. They would not notice a difference as long as the socks' colors did not differ in intensity—that is, brightness.

Red Braeburn and Green Granny Smith Apples as Seen by Trichromats (Top Row) and by Dichromats Who Have Difficulty Distinguishing Red from Green (Bottom Row) How might dichromatism impair driving?

Learning Connections • VISION: LETTING THE SUN SHINE IN

ACTIVE REVIEW (6) Visible light is part of a spectrum of _____ energy. (7) The color of visible light is determined by its _____. (8) Light enters the eye through the _____. (9) The muscle called the _____ determines the amount of light that is let in. (10) The _____ accommodates to an image by changing thickness and focusing light onto the retina. (11) The retina is made up of photoreceptors called _____ and _____. (12) The axons of ganglion cells make up the _____ nerve, which conducts visual information to the brain. (13) Rods transmit sensations of light and dark, and cones permit perception of _____.

REFLECT AND RELATE Try a mini-experiment. Take a watch with a second hand and enter a walk-in closet that allows just the merest sliver of light to pass under the door. Close the door. How long does it take until you can see the objects in the closet?

CRITICAL THINKING What is the evidence for the different theories of color vision?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

VISUAL PERCEPTION: HOW PERCEPTIVE?

Trichromat A person with normal color vision.

Monochromat A person who is sensitive to black and white only and hence color-blind.

Dichromat A person who is sensitive to black–white and either red–green or blue–yellow and hence partially color-blind.

What do you see in Figure 4.11 ■? Do you see meaningless splotches of ink or a rider on horseback? If you perceive a horse and rider, it is not just because of the visual sensations provided by the drawing. Each of the blobs is meaningless in and of itself, and the pattern is vague. Despite the lack of clarity, however, you may still perceive a horse and rider.

Visual perception is the process by which we organize or make sense of the sensory impressions caused by the light that strikes our eyes. Visual perception involves our knowledge, expectations, and motivations. As noted earlier, whereas sensation may be thought of as a mechanical or passive process (that is, light stimulating the rods and cones of our retina), perception is an active process through which we interpret the

world around us. **Question 12: How do we organize bits of visual information into meaningful wholes?** The answer has something to do with your general knowledge and your desire to fit incoming bits and pieces of information into familiar patterns.

In the case of the horse and rider, your integration of disconnected pieces of information into a meaningful whole also reflects what Gestalt psychologists (see Chapter 1) refer to as the principle of **closure**, or the tendency to perceive a complete or whole figure even when there are gaps in the sensory input. Put another way, in perception, the whole can be very much more than the mere sum of the parts. A collection of parts can be meaningless. It is their configuration that matters.

Perceptual Organization: Getting It Together

Early in the 20th century, Gestalt psychologists noted certain consistencies in the way we integrate bits and pieces of sensory stimulation into meaningful wholes. They attempted to identify the rules that govern these processes. Max Wertheimer, in particular, discovered many such rules. As a group, these rules are referred to as the laws of **perceptual organization**. We examine several of them, beginning with those concerning figure-ground perception. Then we consider top-down and bottom-up processing.

FIGURE-GROUND PERCEPTION

If you look out your window, you may see people, buildings, cars, and streets, or perhaps grass, trees, birds, and clouds. All these objects tend to be perceived as figures against grounds, or backgrounds. Individual cars seen against the background of the street are easier to pick out than cars piled on top of one another in a junkyard. Birds seen against the sky are more likely to be perceived than birds seen “in the bush.”

When figure-ground relationships are **ambiguous**, or capable of being interpreted in various ways, our perceptions tend to be unstable, shifting back and forth (Bull et al., 2003). As an example, look for a while at Figure 4.12 ■. How many people, objects, and animals can you find? If your eye is drawn back and forth so that sometimes you



Figure 4.11 ■ Closure Meaningless splashes of ink, or a horse and rider? This figure illustrates the Gestalt principle of closure.

Closure The tendency to perceive a broken figure as being complete or whole.

Perceptual organization The tendency to integrate perceptual elements into meaningful patterns.

Ambiguous Having two or more possible meanings.



Figure 4.12 ■ Figure and Ground How many animals and demons can you find in this Escher print? Do we have white figures on a black background or black figures on a white background? Figure-ground perception is the tendency to perceive geometric forms against a background.

Figure 4.13 ■ The Rubin Vase This is a favorite drawing used by psychologists to demonstrate figure–ground perception. Part A is ambiguous, with neither the vase nor the profiles clearly the figure or the ground. In part B, the vase is the figure; in part C, the profiles are.

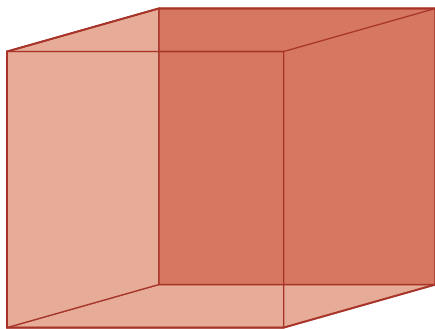
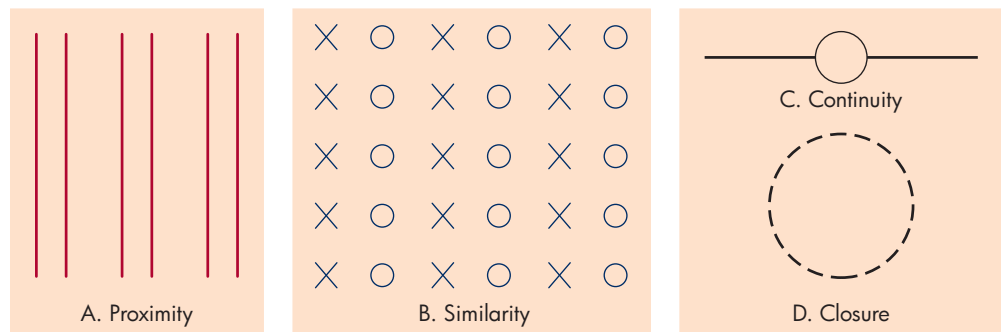


Figure 4.14 ■ The Necker Cube Ambiguity in the drawing of the cube makes perceptual shifts possible. Therefore, the darker tinted surface can become either the front or back of the cube.

Proximity Nearness. The perceptual tendency to group together objects that are near one another.

Figure 4.15 ■ Some Gestalt Laws of Perceptual Organization These drawings illustrate the Gestalt laws of proximity, similarity, continuity, and closure.



are perceiving light figures on a dark background and at other time dark figures on a light background, you are experiencing figure–ground reversals. In other words, a shift is occurring in your perception of what is figure and what is ground. The artist was able to have some fun with us because of our tendency to try to isolate geometric patterns or figures from a background. However, in this case, the background is as meaningful and detailed as the figure. Therefore, our perceptions shift back and forth.

Figure 4.13 ■ shows a Rubin vase, one of psychologists’ favorite illustrations of figure–ground relationships. The figure–ground relationship in part A of the figure is ambiguous. There are no cues that suggest which area must be the figure. For this reason, our perception may shift from seeing the vase to seeing two profiles. There is no such problem in part B. Because it seems that a white vase has been brought forward against a colored ground, we are more likely to perceive the vase than the profiles. In part C, we are more likely to perceive the profiles than the vase because the profiles are whole and the vase is broken against the background. Of course, if we wish to, we can still perceive the vase in part C because experience has shown us where it is. Why not have some fun with friends by covering up parts B and C and asking them what they see? (They’ll catch on quickly if they can see all three drawings at once.)

The Necker cube (see Figure 4.14 ■) is another ambiguous drawing that can lead to perceptual shifts. Hold this page at arm’s length and stare at the center of the figure for 30 seconds or so. Try to allow your eye muscles to relax. (The feeling is of your eyes “glazing over.”) After a while, you will notice a dramatic shift in your perception of the box. What was once a front edge is now a back edge, and vice versa. The perceptual shift is made possible by the fact that the outline of the drawing permits two interpretations.

OTHER GESTALT RULES FOR ORGANIZATION

In addition to the law of closure, Gestalt psychologists have noted that our perceptions are guided by rules or laws of *proximity*, *similarity*, *continuity*, and *common fate*.

Let’s try a mini-experiment. Without reading further, describe part A of Figure 4.15 ■. Did you say it consists of six lines or of three groups of two parallel lines? If you said three sets of lines, you were influenced by the **proximity**, or nearness, of some of the lines. There is no other reason for perceiving them in pairs or subgroups: All of the lines are parallel and of equal length.

Now describe part B of the figure. Did you perceive the figure as a 6 3 6 grid, or as three columns of x's and three columns of o's? According to the law of **similarity**, we perceive similar objects as belonging together. For this reason, you may have been more likely to describe part B in terms of columns than in terms of rows or a grid.

What about part C? Is it a circle with two lines stemming from it, or is it a (broken) line that goes through a circle? If you saw it as a single (broken) line, you were probably organizing your perceptions according to the rule of **continuity**. That is, we perceive a series of points or a broken line as having unity.

According to the law of **common fate**, elements seen moving together are perceived as belonging together. A group of people running in the same direction appears unified in purpose. Birds that flock together seem to be of a feather. (Did I get that right?) Part D of Figure 4.15 provides another example of the law of closure. The arcs tend to be perceived as a circle (or circle with gaps) rather than as just a series of arcs.

TOP-DOWN VERSUS BOTTOM-UP PROCESSING

Imagine that you are trying to put together a thousand-piece jigsaw puzzle—a task I usually avoid. Now imagine that you are trying to accomplish it after someone has walked off with the box showing the picture formed by the completed puzzle.

When you have the box—when you know what the “big picture” or pattern looks like—cognitive psychologists refer to the task of assembling the pieces as **top-down processing**. The “top” of the visual system refers to the image of the pattern in the brain, and the top-down strategy for putting the puzzle together implies that you use the larger pattern to guide subordinate perceptual motor tasks such as hunting for particular pieces. Without knowledge of the pattern (without the box), the assembly process is referred to as **bottom-up processing**. You begin with bits and pieces of information and become aware of the pattern formed only after you have worked at it for a while (Wilson & Farah, 2003).

Top-down and bottom-up processing can be applied to many cognitive matters, even politics. If you consider yourself a liberal or a conservative, you can “fill in” your attitude toward many specific issues by applying the liberal or conservative position. That is top-down processing. But many people do not label themselves liberal or conservative. They look at issues and form positions on an issue-by-issue basis. Eventually, they may discover an overall pattern that places them more or less in the liberal or conservative camp. That is bottom-up processing.

Perception of Motion: Life on the Move

Moving objects—people, animals, cars, or boulders plummeting down a hillside—are vital sources of sensory information. Moving objects even capture the attention of newborn infants. **Question 13: How do we perceive movement?** To understand how we perceive movement, recall what it is like to be on a train that has begun to pull out of the station while the train on the adjacent track remains stationary. If your own train does not lurch as it accelerates, you might think at first that the other train is moving. Or you might not be certain whether your train is moving forward or the other train is moving backward.

The visual perception of movement is based on change of position relative to other objects. To early scientists, whose only tool for visual observation was the naked eye, it seemed logical that the sun circled the Earth. You have to be able to imagine the movement of the Earth around the sun as seen from a theoretical point in outer space; you cannot observe it directly.

How, then, do you determine which train is moving when your train is pulling out of the station (or the other train is pulling in)? One way is to look for objects that you know are stable, such as platform columns, houses, signs, or trees. If you are stationary in relation to them, your train is not moving. Observing people walking on the station platform may not provide the answer, however, because they are also changing their position relative to stationary objects. You might also try to sense the motion of the train in your body. You know from experience how to do these things quite well, although it may be difficult to phrase explanations for them.



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Putting It All Together Is it easier to complete a jigsaw puzzle when you have a picture of the completed cover on the box or when you only have the pieces? Why?

Similarity The perceptual tendency to group together objects that are similar in appearance.

Continuity The tendency to perceive a series of points or lines as having unity.

Common fate The tendency to perceive elements that move together as belonging together.

Top-down processing The use of contextual information or knowledge of a pattern to organize parts of the pattern.

Bottom-up processing The organization of the parts of a pattern to recognize, or form an image of, the pattern they compose.

Illusions Sensations that give rise to misperceptions.

Autokinetic effect The tendency to perceive a stationary point of light in a dark room as moving.

Stroboscopic motion A visual illusion in which the perception of motion is generated by a series of stationary images that are presented in rapid succession.

Phi phenomenon The perception of movement as a result of sequential presentation of visual stimuli.

Monocular cues Stimuli suggestive of depth that can be perceived with only one eye.

Perspective A monocular cue for depth based on the convergence (coming together) of parallel lines as they recede into the distance.

Interposition A monocular cue for depth based on the fact that a nearby object obscures a more distant object behind it.

Shadowing A monocular cue for depth based on the fact that opaque objects block light and produce shadows.

Texture gradient A monocular cue for depth based on the perception that closer objects appear to have rougher (more detailed) surfaces.

Stroboscopic Motion In a motion picture, viewing a series of stationary images at the rate of about 16 to 22 frames per second provides an illusion of movement termed stroboscopic motion. The actual movement that is occurring is the rapid switching of stationary images.

We have been considering the perception of real movement. Psychologists have also studied several types of apparent movement, or **illusions** of movement. These include the *autokinetic effect*, *stroboscopic motion*, and the *phi phenomenon*.

THE AUTOKINETIC EFFECT

If you were to sit quietly in a dark room and stare at a point of light projected onto the far wall, after a while it might appear that the light had begun to move, even if it actually remained quite still. The tendency to perceive a stationary point of light as moving in a dark room is called the **autokinetic effect**.

Over the years, psychologists have conducted interesting experiments in which they have asked people, for example, what the light is “spelling out.” The light has spelled out nothing, of course, and the words perceived by subjects reflect their own cognitive processes, not external sensations.

STROBOSCOPIC MOTION

Stroboscopic motion makes motion pictures possible. In **stroboscopic motion**, the illusion of movement is provided by the presentation of a rapid progression of images of stationary objects.

So-called motion pictures do not really consist of images that move. Rather, the audience is shown 16 to 22 pictures, or *frames*, per second. Each frame differs slightly from the preceding one. Showing the frames in rapid succession provides the illusion of movement. At the rate of at least 16 frames per second, the “motion” in a film seems smooth and natural. With fewer than 16 or so frames per second, the movement looks jumpy and unnatural. That is why slow motion is achieved by filming perhaps 100 or more frames per second. When they are played back at about 22 frames per second, the movement seems slowed down yet still smooth and natural.

THE PHI PHENOMENON

Have you seen news headlines spelled out in lights that rapidly wrap around a building? Have you seen an electronic scoreboard in a baseball or football stadium? When the home team scores, some scoreboards suggest explosions of fireworks. What actually happens is that a row of lights is switched on and then off. As the first row is switched off, a second row is switched on, and so on for dozens, perhaps hundreds, of rows. When the switching occurs rapidly, the **phi phenomenon** occurs: The on-off process is perceived as movement.

Like stroboscopic motion, the phi phenomenon is an example of apparent motion. Both appear to occur because of the law of continuity. We tend to perceive a series of points as having unity, so each series of lights (points) is perceived as a moving line.

Depth Perception: How Far Is Far?

Think of the problems you might have if you could not judge depth or distance. You might bump into other people, believing them to be farther away. An outfielder might not be able to judge whether to run toward the infield or the fence to catch a fly ball. You might give your front bumper a workout in stop-and-go traffic. **Question 14: How do we perceive depth?** It happens that *monocular* and *binocular cues* both help us perceive the depth of objects—that is, their distance from us.



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MONOCULAR CUES

Now that you have considered how difficult it would be to navigate through life without depth perception, ponder the problems of the artist who attempts to portray three-dimensional objects on a two-dimensional surface. Artists use a type of **monocular cue**—pictorial cues—to create an illusion of depth. These are cues that can be perceived by one eye (*mono-* means “one”). They include perspective, relative size, clearness, interposition, shadows, and texture gradient, and they cause certain objects to appear more distant from the viewer than others.

Distant objects stimulate smaller areas on the retina than nearby ones. The amount of sensory input from them is smaller, even though they may be the same size. The distances between far-off objects also appear smaller than equivalent distances between nearby objects. For this reason, the phenomenon known as **perspective** occurs. That is, we tend to perceive parallel lines as coming closer together, or converging, as they recede from us. However, as we will see when we discuss *size constancy*, experience teaches us that distant objects that look small are larger when they are close. In this way, their relative size also becomes a cue to their distance.

The engraving in Figure 4.16 ■ represents an impossible scene in which the artist uses principles of perspective to fool the viewer. Artists normally use *relative size*—the fact that distant objects look smaller than nearby objects of the same size—to suggest depth in their works. The paradoxes in *Frontispiece to Kerby* are made possible because more distant objects are *not* necessarily depicted as smaller than nearby objects. Thus, what at first seems to be background suddenly becomes foreground, and vice versa.

The *clearness* of an object also suggests its distance. Experience teaches us that we sense more details of nearby objects. For this reason, artists can suggest that objects are closer to the viewer by depicting them in greater detail. Note that the “distant” hill in the Hogarth engraving (see Figure 4.16) is given less detail than the nearby plants at the bottom of the picture. Our perceptions are mocked when a man “on” the distant hill in the background is shown conversing with a woman leaning out a window in the middle ground.

We also learn that nearby objects can block our view of more distant objects. Overlapping, or **interposition**, is the placing of one object in front of another. Experience teaches us that partly covered objects are farther away than the objects that obscure them (see Figure 4.17) ■. In the Hogarth engraving, which looks closer: the row of trees in the background or the moon sign hanging from the building (or is it buildings?) to the right? How does the artist use interposition to confuse the viewer?

Additional information about depth is provided by **shadowing** and is based on the fact that opaque objects block light and produce shadows. Shadows and highlights give us information about an object’s three-dimensional shape and its relationship to the source of light. For example, the left part of Figure 4.18 ■ is perceived as a two-dimensional circle, but the right part tends to be perceived as a three-dimensional sphere because of the highlight on its surface and the shadow underneath. In the “sphere,” the highlighted central area is perceived as closest to us, with the surface receding to the edges.

Another monocular cue is **texture gradient**. (A gradient is a progressive change.) Closer objects are perceived as having rougher textures. In the Hogarth engraving (see Figure 4.16), the building just behind the large fisherman’s head has a rougher texture and therefore seems to be closer than the building with the window from which the woman is leaning. And how can the moon sign be hanging from both buildings?

Motion cues also indicate depth. If you have ever driven in the country, you have probably noticed that distant objects such as mountains and stars appear to move along with you. Objects at an intermediate distance seem to be stationary, but nearby objects such as roadside markers, rocks, and trees seem to go by quite rapidly. The tendency of objects to seem to move backward or forward as a function of their



Figure 4.16 ■ What Is Wrong with This Picture? How does English artist William Hogarth use monocular cues for depth perception to deceive the viewer?



Figure 4.17 ■ The Effects of Interposition The four circles are all the same size. Which circles seem closer? The complete circles or the circles with chunks bitten out of them?



Figure 4.18 ■ Shadowing as a Cue for Depth Shadowing makes the circle on the right look three-dimensional.

Relative size leads us to perceive the bicycles and people that are larger as being closer to us.

Perspective leads us to perceive the parallel lines on the sidewalk as coming closer together, or converging, as they recede from us.



© Richard Douglas Rose

Clearness leads us to perceive the trees and signs and people with greater detail as being closer to us.

Texture gradient leads us to perceive the tree trunks and handlebars with rougher (more detailed) textures as being closer.

Shadowing leads us to perceive the shadows and highlights in the seats of the bicycles as giving them depth (and curved surfaces) although the picture we are viewing is two-dimensional.

Overlapping leads us to perceive the bicycles that block our view of parts of other bicycles as being closer to us.

Motion parallax A monocular cue for depth based on the perception that nearby objects appear to move more rapidly in relation to our own motion.

Binocular cues Stimuli suggestive of depth that involve simultaneous perception by both eyes.

Retinal disparity A binocular cue for depth based on the difference in the image cast by an object on the retinas of the eyes as the object moves closer or farther away.

Convergence A binocular cue for depth based on the inward movement of the eyes as they attempt to focus on an object that is drawing nearer.

Size constancy The tendency to perceive an object as being the same size even as the size of its retinal image changes according to the object's distance.

Color constancy The tendency to perceive an object as being the same color even though lighting conditions change its appearance.

distance is known as **motion parallax**. We learn that objects that seem to move with us are farther away.

BINOCULAR CUES

Binocular cues involve both eyes and help us perceive depth. Two binocular cues are *retinal disparity* and *convergence*.

Try an experiment. Hold your right index finger at arm's length. Now hold your left index finger about a foot closer but in a direct line. If you keep your eyes relaxed as you do so, you will see first one finger, then the other. An image of each finger will be projected onto the retina of each eye, and each image will be slightly different because the finger will be seen from different angles. The difference between the projected images is referred to as **retinal disparity**. In the case of the closer finger, the "two fingers" look farther apart. Closer objects have greater retinal disparity.

If we try to maintain a single image of the closer finger, our eyes must turn inward, or converge on it, making us cross-eyed. **Convergence** causes feelings of tension in the eye muscles. The binocular cues of retinal disparity and convergence are strongest when objects are close.

Why are psychologists concerned about depth perception? On a fundamental level, sources of food and danger lie beyond, near or far. Evolutionary psychologists would note that organisms that have sophisticated systems for perceiving distance are more likely to survive into adulthood and reproduce, thus making these systems a stable element in their species. In the following section, you will see that our methods of perception also help us keep the world a stable place, even though the shapes and colors and other properties of objects are perpetually shifting.

Perceptual Constancies: Keeping the World a Stable Place

The world is a constantly shifting display of visual sensations. Think how confusing it would be if you believed that a door was a trapezoid and not a rectangle because it is ajar. Or what if we perceived a doorway to be a different doorway when seen from 6 feet away compared to 4 feet? As we neared it, we might think it was larger than the door we were seeking and become lost. Or consider the problems of the pet owner who recognizes his dog from the side but not from above because its shape is different when seen from above. Fortunately, these problems tend not to occur—at least with familiar objects—because perceptual constancies enable us to recognize objects even when their apparent shape or size differs. **Question 15: What are perceptual constancies?** For example, why do we perceive a door to be a rectangle even when it is partly open?

SIZE CONSTANCY

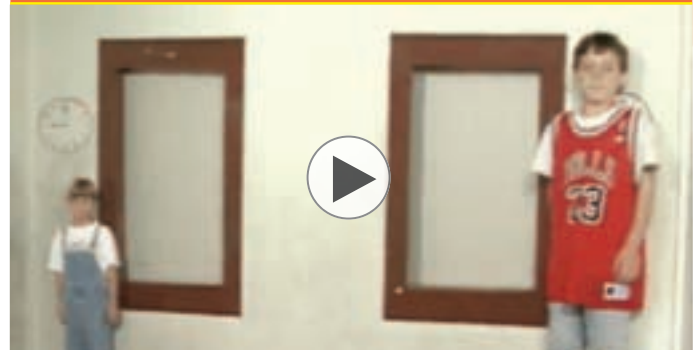
There are a number of perceptual constancies, including **size constancy**. We may say that people “look like ants” when viewed from the top of a tall building, but because of size constancy, we know they remain full-sized people even if the details of their forms are lost in the distance. We can thus say that we perceive people to be the same size even when viewed from different distances. Likewise, the image of a dog seen from 20 feet away occupies about the same amount of space on your retina as an inch-long insect crawling on your hand. Yet you do not perceive the dog to be as small as the insect. Through your visual experiences, you have acquired size constancy—that is, the tendency to perceive an object as the same size even though the size of its image on your retina varies as a function of its distance. Experience teaches us about perspective—that the same object seen at a distance appears to be smaller than when it is nearby (see Figure 4.19) ■.

A cross-cultural case study suggests that a person from another culture might indeed perceive people and cars to be insects from the vantage point of an airplane. It also emphasizes the role of experience in the development of size constancy. Anthropologist Colin Turnbull (1961) found that an African Pygmy, Kenge, thought that buffalo perceived across an open field were some form of insect. Turnbull had to drive Kenge down to where the animals were grazing to convince him that they were not insects. During the drive, as the buffalo gradually grew in size, Kenge muttered to himself and moved closer to Turnbull in fear. Even after Kenge saw that these animals were, indeed, familiar buffalo, he still wondered how they could grow large so quickly. Kenge, you see, lived in a thick forest and normally did not view large animals from great distances. For this reason, he had not developed size constancy for distant objects. However, Kenge had no difficulty displaying size constancy with objects placed at various distances in his home.

COLOR CONSTANCY

Color constancy is the tendency to perceive objects as retaining their color even though lighting conditions may alter their appearance. Your bright yellow car may edge toward gray as the hours wend their way through twilight. But when you finally locate the car in the parking lot, you may still think of it as yellow. You expect to find a yellow car and still judge it to be “yellower” than the (twilight-faded) red and green cars on either side of it.

Video Connections—The Ames Room



© Credit: Line To Come

The Ames Room shown here creates an illusion because (a) the room looks cubic when viewed with one eye but it is actually trapezoidal and (b) people or objects seem to grow or decrease in size when they move from one corner to the other. View the video to understand how the Ames Room works.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.



© Emanuel Hoque/Getty Images

Figure 4.19 ■ Size Constancy Although this woman’s hand looks as though it is larger than her head, we recognize that this is an illusion created by the fact that her hand is closer to us than her head.

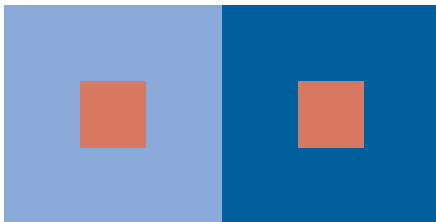


Figure 4.20 ■ Brightness Constancy
The orange squares within the blue squares are the same hue, yet the orange within the dark blue square is perceived as brighter. Why?

BRIGHTNESS CONSTANCY

Brightness constancy is similar to color constancy. Consider Figure 4.20 ■. The orange squares within the blue squares are equally bright, yet the one within the dark blue square is perceived as brighter. Why? Again, consider the role of experience. If it were nighttime, we would expect orange to fade to gray. The fact that the orange within the dark square stimulates the eye with equal intensity suggests that it must be much brighter than the orange within the lighter square.

SHAPE CONSTANCY

Shape constancy is the tendency to perceive objects as maintaining their shape, even if we look at them from different angles so that the shape of their image on the retina changes dramatically. You perceive the top of a coffee cup or a glass to be a circle even though it is a circle only when seen from above. When seen from an angle, it is an ellipse. When the cup or glass is seen on edge, its retinal image is the same as that of a straight line. So why do you still describe the rim of the cup or glass as a circle? Perhaps for two reasons: First, experience has taught you that the cup will look circular when seen from above. Second, you may have labeled the cup as circular or round. Experience and labels help make the world a stable place. Can you imagine the chaos that would prevail if we described objects as they appear as they stimulate our sensory organs with each changing moment?



Figure 4.21 ■ Shape Constancy When closed, the door is a rectangle. When open, the retinal image is trapezoidal. But because of shape constancy, we still perceive it as rectangular.

Let's return to the door that "changes shape" when it is ajar. The door is a rectangle only when viewed straight on (Figure 4.21) ■. When we move to the side or open it, the left or right edge comes closer and appears larger, changing the retinal image to a trapezoid. Yet we continue to think of doors as rectangles.

Visual Illusions: Is Seeing Believing?

The principles of perceptual organization make it possible for our eyes to play tricks on us. Psychologists, like magicians, enjoy pulling a rabbit out of a hat now and then. Let me demonstrate how the perceptual constancies trick the eye through *visual illusions*.

The Hering–Helmholtz and Müller–Lyer illusions (see Figure 4.22 ■, parts A and B) are named after the people who devised them. In the Hering–Helmholtz illusion, the horizontal lines are straight and parallel. However, the radiating lines cause them to appear to be bent outward near the center. The two lines in the Müller–Lyer illusion are the same length, but the line on the left, with its reversed arrowheads, looks longer.

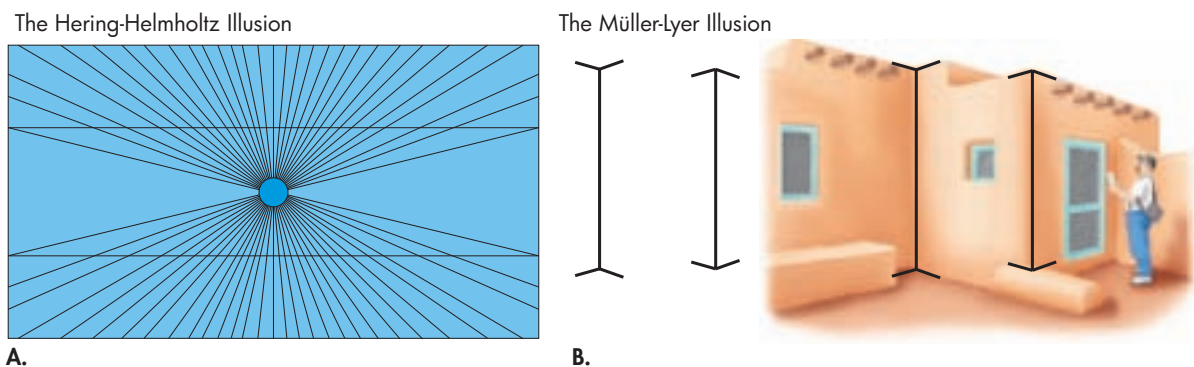


Figure 4.22 ■ The Hering–Helmholtz and Müller–Lyer Illusions In the Hering–Helmholtz illusion, are the horizontal lines straight or curved? In the Müller–Lyer illusion, are the vertical lines equal in length?

Let's try to explain these illusions. Because of our experience and lifelong use of perceptual cues, we tend to perceive the Hering–Helmholtz drawing as three-dimensional. Because of our tendency to perceive bits of sensory information as figures against grounds, we perceive the blue area in the center as a circle in front of a series of radiating lines, all of which lie in front of a blue ground. Next, because of our experience with perspective, we perceive the radiating lines as parallel. We perceive the two horizontal lines as intersecting the “receding” lines, and we know that they would have to appear bent out at the center if they were to be equidistant at all points from the center of the circle.

Experience probably compels us to perceive the vertical lines in the Müller–Lyer illusion as the corners of a building (see Figure 4.22, part B). We interpret the length of the lines based on our experience with corners of buildings.

Figure 4.23 ■ represents the Ponzo illusion. In this illusion, the two monsters are the same length. However, do you perceive the top monster as bigger? The rule of size constancy may give us some insight into this illusion as well. Perhaps the converging lines again strike us as being lines receding into the distance. The rule of size constancy tells us that if two objects appear to be the same size and one is farther away, the object that looks farther away must be larger. So we perceive the top monster as larger.



© Ponzo illusion illustration from *Mind Sights* by Roger N. Shepard, © 1990 by Roger N. Shepard. Reprinted by permission of Henry Holt and Company, LLC

Figure 4.23 ■ A Monstrous Illusion The two monsters in this drawing are exactly the same height and width. Yet the top one appears to be much larger. Can you use the principle of size constancy to explain why?

Learning Connections • VISUAL PERCEPTION: HOW PERCEPTIVE?

ACTIVE REVIEW (14) Perceptual organization concerns the grouping of bits of sensory stimulation into a meaningful _____. (15) Gestalt rules of perceptual organization refer to _____–ground relationships, proximity, similarity, continuity, common fate, and closure. (16) When we are putting puzzle pieces together, a picture of the result enables us to engage in _____ processing; otherwise, we must solve the puzzle by bottom-up processing. (17) We perceive movement by sensing motion across the _____ of the eye and change of position in relation to other objects. (18) _____ motion, used in films, is an illusion of motion caused by the rapid presentation of a series of still images.

REFLECT AND RELATE Have you had the experience of being in a train and not knowing whether your train or the one on the next track was moving? How do you explain your confusion? How did you figure out which one was really moving?

CRITICAL THINKING How do creators of visual illusions use laws of perception to trick the eye? How do research findings concerning visual perception demonstrate the difference between sensation and perception?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

HEARING: MAKING SENSE OF SOUND

Consider the advertising slogan for the classic science fiction film *Alien*: “In space, no one can hear you scream.” It’s true. Space is an almost perfect vacuum. Hearing requires a medium through which sound can travel, such as air or water. **Question 16: What is sound?**

Sound, or **auditory** stimulation, travels through the air like waves. If you could see sound waves, they would look something like the ripples in a pond when you toss in

Brightness constancy The tendency to perceive an object as being just as bright even though lighting conditions change its intensity.

Shape constancy The tendency to perceive an object as being the same shape although the retinal image varies in shape as it rotates.

Auditory Having to do with hearing.

A CLOSER LOOK • REAL LIFE

HOW DID THE ANIMALS KNOW THE TSUNAMI WAS COMING?

The tsunami of 2005 hit the southern coast of south central Asia—in countries from Indonesia to Sri Lanka to India—killing as many as one quarter of a million people. People were caught off guard, but not the animals.

Along the western coast of Thailand, elephants giving rides to tourists began to trumpet agitatedly hours before the tsunami, just about when the earthquake that fractured the ocean floor sent



© Paul Saunders/Getty Images

Do Elephants Sense What Humans Can't? Research indicates that elephants can sense vibrations in the ground over vast distances. This might be one way they can detect an earthquake or a tsunami before a human becomes aware of it. Other animals use other senses to detect tsunamis, earthquakes, and other impending disasters.

the big waves rushing toward the shore. An hour before the waves slammed into the area, the elephants began wailing. Just before the waves struck, they trooped off to higher ground. Earthquakes cause vibrations on land and in the water, and storms make electromagnetic changes in the air. Elephants are particularly sensitive to ground vibrations and probably sensed, in their feet and trunks, the earthquake that caused the tsunami.

Some dogs refused to go outdoors. Others sought higher ground. A survivor in Thailand said, “Dogs are smarter than all of us. . . . [They] started running away up to the hilltops long before we even realized what was coming” (Oldenburg, 2005).

Flamingos usually breed in low-lying areas at this time of year, but on the day of the tsunami, they abandoned their sanctuary on the coast of India and headed into safer forests before the waves hit shore (Oldenburg, 2005).

Yala National Park in Sri Lanka was hit hard by the waves, but officials were surprised that hundreds of elephants, tigers, leopards, deer, wild boar, water buffalo, monkeys, and reptiles had escaped the tsunami unharmed.

Do animals have a “sixth sense” for detecting earthquakes, hurricanes, volcanic eruptions, and tsunamis before the earth starts shaking? Some birds, dogs, tigers, and elephants can detect sound waves whose frequencies are too low for humans to hear (“infrasound”). Dogs’ superior sense of smell might detect subtle chemical changes in the air. Other animals are apparently super-sensitive to temperature, touch, or vibration, which gives them advance warning. Many animals can apparently detect subtle or abrupt changes in the environment. Some animals apparently have acute senses of smell and hearing that warn them of something coming toward them before people sense anything (Mott, 2005).

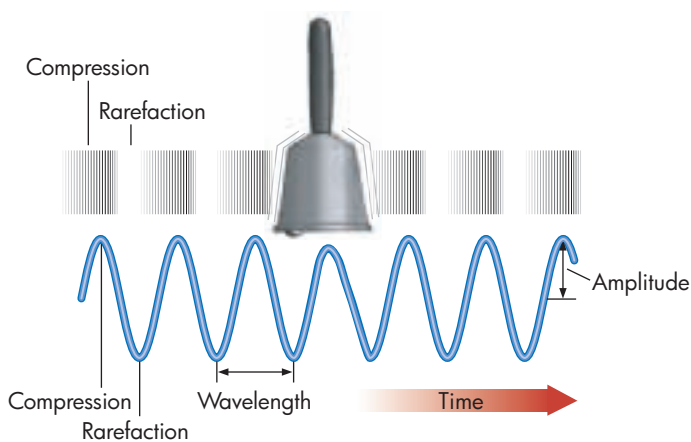


Figure 4.24 ■ Creation of Sound Waves The ringing of a bell compresses and expands (rarefies) air molecules, sending forth vibrations called sound waves that stimulate the sense of hearing.

Hertz (Hz) A unit expressing the frequency of sound waves. One hertz equals one cycle per second.

a pebble. You hear the splash even if you can't see the sound of it. The sound of the splash is caused by changes in air pressure. The air is alternately compressed and expanded like the movements of an accordion. If you were listening under water, you would also hear the splash because of changes in the pressure of the water. In either case, the changes in pressure are vibrations that approach your ears in waves. These vibrations—sound waves—can also be created by a ringing bell (see Figure 4.24 ■), your vocal cords, guitar strings, or the slam of a book thrown down on a desk. A single cycle of compression and expansion is one wave of sound. Sound waves can occur many (many!) times in 1 second. The human ear is sensitive to sound waves with frequencies of 20 to 20,000 cycles per second.

Pitch and Loudness

Pitch and loudness are two psychological dimensions of sound. The pitch of a sound is determined by its frequency, or the number of cycles per second as expressed in the unit **hertz (Hz)**. One cycle per second is 1 Hz. The greater the number of cycles per second (Hz), the higher the pitch of the sound (see Figure 4.25 ■).

The pitch of women's voices is usually higher than that of men's voices because women's vocal cords are usually shorter and therefore vibrate at a greater frequency. Also, the strings of a violin are shorter than those of a viola or bass viol. Pitch detectors in the brain allow us to tell differences in pitch.

The loudness of a sound roughly corresponds to the height, or amplitude, of sound waves. Figure 4.25 shows records of sound waves that vary in frequency and amplitude. Frequency and amplitude are independent. That is, both high- and low-pitched sounds can be either high or low in loudness. The loudness of a sound is expressed in **decibels (dB)**. Zero dB is equivalent to the threshold of hearing—the lowest sound that the typical person can hear. How loud is that? It’s about as loud as the ticking of a watch 20 feet away in a very quiet room.

The decibel equivalents of many familiar sounds are shown in Figure 4.26 ■. Twenty-five dB is equivalent in loudness to a whisper at 5 feet. Thirty dB is roughly the limit of loudness at which your librarian would like to keep your college library. You may suffer hearing damage if you are exposed to sounds of 85 to 90 dB for very long periods. This is why (careful) carpenters wear ear covers while they are hammering away, and why people risk permanent damage to their hearing when they attend loud rock concerts, which reach levels above 140 dB. (Bring earplugs.)

Now let’s turn our attention to the human ear—the marvelous instrument that senses all these different “vibes.”

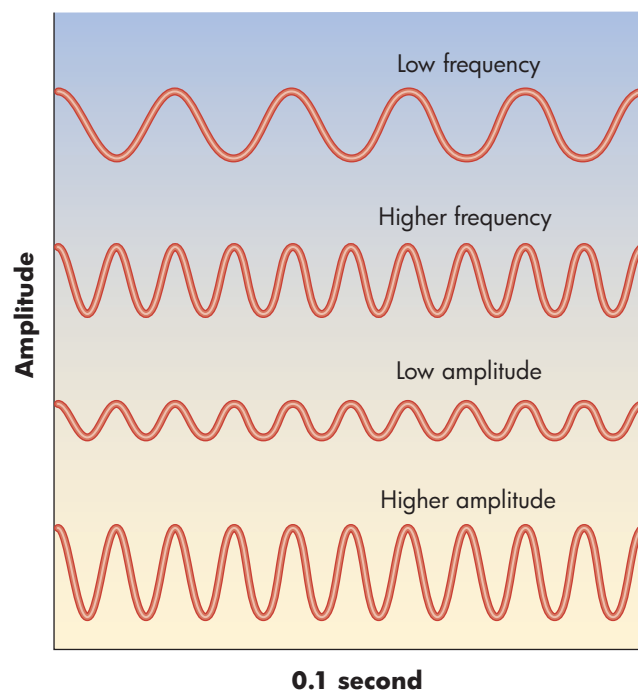


Figure 4.25 ■ Sound Waves of Various Frequencies and Amplitudes Which sounds have the highest pitch? Which are loudest?

The Ear: The Better to Hear You With

The human ear is good for lots of things—including catching dust, combing your hair around, and hanging jewelry from. It is also well suited to sensing sounds. **Question 17: How does the ear work?** The ear is shaped and structured to capture sound waves, vibrate in sympathy with them, and transmit them to centers in the brain. In this way, you not only hear something, but you can also figure out what it is. The ear has three parts: the outer ear, middle ear, and inner ear (see Figure 4.27 ■).

The outer ear is shaped to funnel sound waves to the **eardrum**, a thin membrane that vibrates in response to sound waves and thereby transmits them to the middle and inner ears. The middle ear contains the eardrum and three small bones—the *hammer*, the *anvil*, and the *stirrup*—which also transmit sound by vibrating. These bones were given their names (actually the Latin *malleus*, *incus*, and *stapes* [pronounced STAY-peas], which translate as hammer, anvil, and stirrup) because of their shapes. The middle ear functions as an amplifier, increasing the pressure of the air entering the ear.

The stirrup is attached to another vibrating membrane, the *oval window*. This oval window works in conjunction with the round window, which balances the pressure in the inner ear. The round window pushes outward when the oval window pushes in and is pulled inward when the oval window vibrates outward.

The oval window transmits vibrations into the inner ear, the bony snail-shell-shaped tube called the **cochlea** (from the Greek word for “snail”). The cochlea contains two longitudinal membranes that divide it into three fluid-filled chambers. One of the membranes that lies coiled within the cochlea is called the **basilar membrane**. Vibrations in the fluids within the chambers of the inner ear press against the basilar membrane.

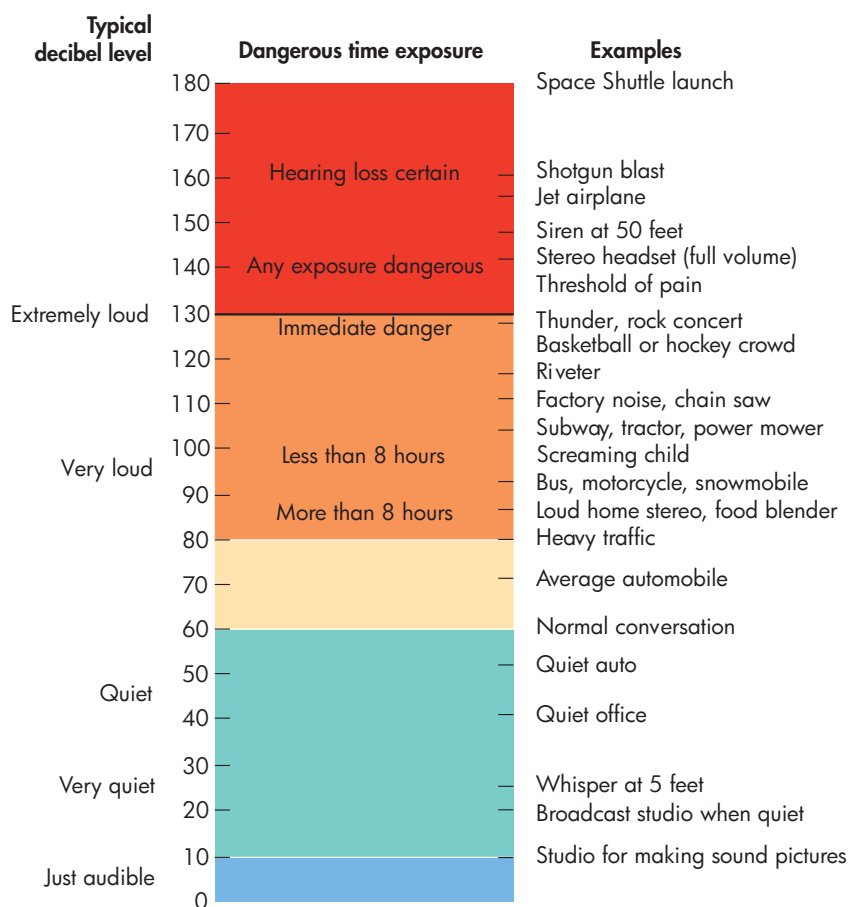


Figure 4.26 ■ Decibel Ratings of Familiar Sounds Zero dB is the threshold of hearing. You may suffer hearing loss if you incur prolonged exposure to sounds of 85 to 90 dB.

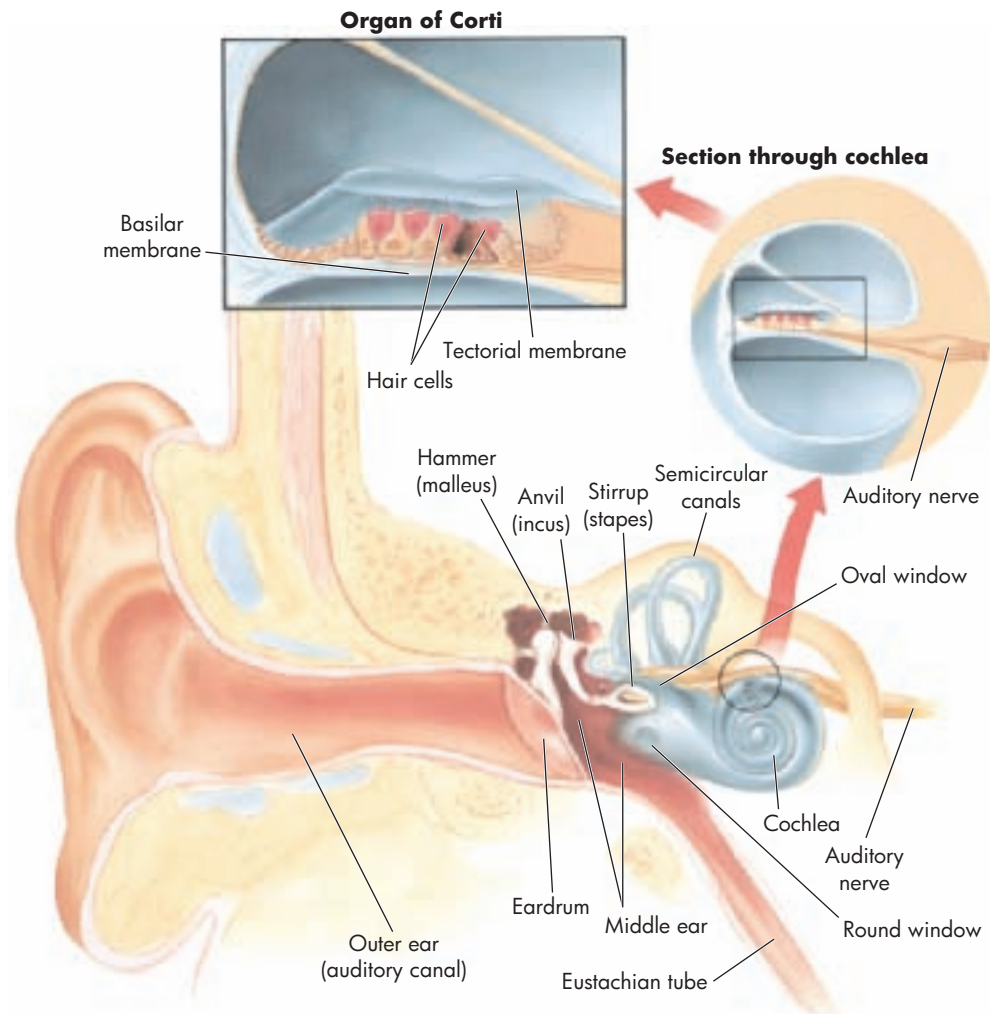


Figure 4.27 ■ The Human Ear The outer ear funnels sound to the eardrum. Inside the eardrum, vibrations of the hammer, anvil, and stirrup transmit sound to the inner ear. Vibrations in the cochlea transmit the sound to the auditory nerve by way of the basilar membrane and the organ of Corti.

The **organ of Corti**, sometimes referred to as the “command post” of hearing, is attached to the basilar membrane. Some 16,000 receptor cells—called *hair cells* because they project like hair from the organ of Corti—are found in each ear (Hwang et al., 2010). Hair cells “dance” in response to the vibrations of the basilar membrane. Their up-and-down movements generate neural impulses, which are transmitted to the brain via the **auditory nerve**. Auditory input is then projected onto the hearing areas of the temporal lobes of the cerebral cortex.

Decibel (dB) A unit expressing the loudness of a sound.

Eardrum A thin membrane that vibrates in response to sound waves, transmitting the waves to the middle and inner ears.

Cochlea The inner ear; the bony tube that contains the basilar membrane and the organ of Corti.

Basilar membrane A membrane that lies coiled within the cochlea.

Organ of Corti The receptor for hearing that lies on the basilar membrane in the cochlea.

Auditory nerve The axon bundle that transmits neural impulses from the organ of Corti to the brain.

Locating Sounds: Up, Down, and Around

How do you balance the loudness of a stereo set? You sit between the speakers and adjust the volume until the sound seems to be equally loud in each ear. If the sound to the right is louder, the musical instruments are perceived as being to the right rather than in front. **Question 18: How do we locate sounds?** There is a resemblance between balancing a stereo set and locating sounds. A sound that is louder in the right ear is perceived as coming from the right. A sound coming from the right also reaches the right ear first. Both loudness and the sequence in which the sounds reach the ears provide directional cues.

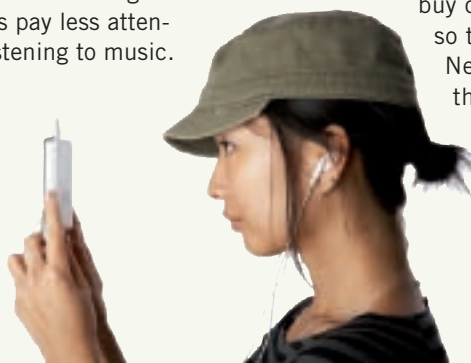
But it may not be easy to locate a sound coming from directly in front or in back of you or overhead. Such sounds are equally distant from each ear and equally loud. So what do we do? Simple—usually, we turn our head slightly to determine in which ear the sound increases. If you turn your head a few degrees to the right and the loudness increases in your left ear, the sound must be coming from in front of you. Of course, we also use vision and general knowledge in locating the source of sounds. If you hear the roar of jet engines, most of the time you can bet that the airplane is overhead.

A CLOSER LOOK • REAL LIFE

IPODS ON CAMPUS: THE SOUNDS OF OBLIVION?

iPods are extremely popular on campus. Two of three university students have them, and most of the rest have another kind of personal listening device (Danhauer, 2009). Because iPods and similar devices store so much music and are capable of producing outputs at 130 dB and higher, health professionals and parents, among others, are concerned that listeners are placing themselves at risk for hearing loss. To combat the possibility of such loss, Fligor and Cox (2004) recommend the “60–60 rule”—that people should listen at no more than 60% of full volume for no more than 60 minutes per day. Other health professionals are not so strict and recommend listening levels of no more than 70% of full volume for 4 to 5 hours per day. However, most standard earphones do not block out ambient noise, so many listeners increase the volume when they encounter background noise (78%) or are exercising (61%). But there are other dangers. One is so-called iPod oblivion, in which listeners pay less attention to their environments when they are listening to music. Two pedestrian deaths in New York within 4 months were attributed to iPod oblivion (Kuntzman, 2007).

Jeffrey Danhauer (2009) undertook a survey with 607 students drawn from universities across the United States to determine experiences with, and attitudes toward, the use of iPods. The great majority (86%) were 18–21 years old, and 60% were female.



© Ocean Photography/Neer

Two of three respondents reported using an iPod, and the largest number of students said they did so 1–2 hours per day. Their reasons for using an iPod included listening to music (95%), avoiding bothering other people with their music (77%), relaxing (75%), fighting boredom (74%), isolating themselves from the people around them (55%), and helping them concentrate on things such as schoolwork (46%).

The great majority (87%) reported that using an iPod at high volume could cause hearing loss, yet 52% said they had no hearing problems (12% thought they did have hearing loss attributable to noise, and another 6% thought they had hearing loss due to iPod use). Five of six students said they did not know that Apple has a software download that enables listeners to protect their hearing by setting their maximum loudness. Only one respondent in six said he or she would not use such software. However, more than half (55%) also would buy custom earpieces that filter background noise so that their iPod could be used at a lower volume. Nearly two respondents in five (38%) endorsed the 60–60 rule (another 42% might do so). If they had to choose, most students would lower the volume rather than curtail listening time.

iPod: Big MP3 Player on Campus Two of three university students use iPods. Do they cause hearing loss? What can students do to lessen the risk of damage to hearing?

Perception of Loudness and Pitch

Sounds are heard because they cause vibration in parts of the ear, and information about these vibrations is transmitted to the brain. **Question 19: How do we perceive loudness and pitch?** The loudness and pitch of sounds appear to be related to the number of receptor neurons on the organ of Corti that fire and how often they fire. Psychologists generally agree that sounds are perceived as louder when more of these sensory neurons fire.

Deafness: Navigating a World of Silence

More than 1 in 10 Americans has a hearing impairment, and 1 in 100 cannot hear at all (Erixon et al., 2009). Deaf people are deprived of a key source of information about the world around them. In recent years, however, society has made greater efforts to bring them into the mainstream of sensory experience. People are usually on hand to convert political and other speeches into hand signs (such as those of American Sign Language) for hearing-impaired members of the audience. Many TV shows are closed captioned so they can be understood by people with hearing problems. Also, as mentioned earlier, advocates for deaf people have emphasized the positive aspects of dwelling in a world of silence. **Question 20: What kinds of deafness are there?** What can we do about them?

The two major types of deafness are *conductive deafness* and *sensorineural deafness*. **Conductive deafness** stems from damage to the structures of the middle ear—either to the eardrum or to the three bones that conduct (and amplify) sound waves from the outer ear to the inner ear (Daud et al., 2010; Erixon et al., 2009). This is the hearing impairment often found among older people. People with conductive deafness often profit from hearing aids, which provide the amplification that the middle ear does not. Surgical treatment can be successful as well.

— ■ —
*The empty vessel makes
the loudest sound.*

WILLIAM SHAKESPEARE

*Music is the movement of
sound to reach the soul for the
education of its virtue.*

PLATO
— ■ —

Conductive deafness The forms of deafness in which there is loss of conduction of sound through the middle ear.

Controversy in Psychology HOW DO WE EXPLAIN PITCH PERCEPTION? WHAT HAPPENS WHEN THE BASILAR MEMBRANE RUNS OUT OF PLACES TO VIBRATE? WHAT HAPPENS WHEN IT CANNOT VIBRATE FAST ENOUGH?

It takes two processes to explain perception of color: *trichromatic theory* and *opponent-process theory*. Similarly, it takes at least two processes to explain pitch perception—that is, perception of sound waves with frequencies that vary from 20 to 20,000 cycles per second: *place theory* and *frequency theory*.

Hermann von Helmholtz helped develop the place theory of pitch discrimination as well as the Young–Helmholtz (trichromatic) theory of color vision. **Place theory** holds that the pitch of a sound is sensed according to the place along the basilar membrane that vibrates in response to it. In classic research with guinea pigs and cadavers that led to the award of a Nobel Prize, Georg von Békésy (1957) found evidence for place theory. He determined that receptors at different sites along the membrane fire in response to

tones of differing frequencies. Receptor neurons appear to be lined up along the basilar membrane like piano keys. The higher the pitch of a sound, the closer the responsive neurons lie to the oval window (Erixon et al., 2009). However, place theory appears to apply only to pitches that are at least as high as 4,000 Hz. But what about lower pitches? That’s where frequency theory comes in.

Frequency theory notes that for us to perceive these lower pitches, we need the stimulation of neural impulses that match the frequency of the sound waves. That is, in response to low pitches—pitches of about 20 to 1,000 cycles per second—hair cells on the basilar membrane fire at the same frequencies as the sound waves. However, neurons cannot fire more than 1,000 times per second. Therefore, frequency theory

can account only for perception of pitches between 20 and 1,000 cycles per second. In actuality, frequency theory appears to account only for pitch perception between 20 and a few hundred cycles per second.

I noted that it takes *at least two processes* to explain how people perceive pitch. The *volley principle* is the third, and it accounts for pitch discrimination between a few hundred and 4,000 cycles per second (Ebeling, 2008; Machery & Carlyon, 2010). In response to sound waves of these frequencies, groups of neurons take turns firing in the way that one row of soldiers used to fire rifles while another row knelt to reload. Alternating firing—that is, volleying—appears to transmit sensory information about pitches in the intermediate range.

Place theory The theory that the pitch of a sound is determined by the section of the basilar membrane that vibrates in response to the sound.

Frequency theory The theory that the pitch of a sound is reflected in the frequency of the neural impulses that are generated in response to the sound.

Sensorineural deafness The forms of deafness that result from damage to hair cells or the auditory nerve.

Sensorineural deafness usually stems from damage to the structures of the inner ear, most often the loss of hair cells, which normally do not regenerate. Sensorineural deafness can also stem from damage to the auditory nerve caused by factors such as disease or acoustic trauma (prolonged exposure to very loud sounds). In sensorineural deafness, people tend to be more sensitive to some pitches than to others. In the hearing impairment called Hunter’s notch, the loss is limited to particular frequencies—in this case, the frequencies of the sound waves generated by a gun firing. Prolonged exposure to 85 dB can cause hearing loss. As noted earlier, people who attend rock concerts, where sounds may reach 140 dB, risk permanently damaging their ears, as do workers who run pneumatic drills or drive noisy vehicles. The ringing sensation that often follows exposure to loud sounds probably means that hair cells in the inner ear have been damaged. If you find yourself suddenly exposed to loud sounds, remember that your fingertips serve as good emergency ear protectors.

Cochlear implants, or “artificial ears,” contain microphones that sense sounds and electronic equipment that transmits sounds past damaged hair cells to stimulate the auditory nerve directly. Such implants have helped many people with sensorineural deafness (Tait et al., 2010). However, they cannot assume the functions of damaged auditory nerves.

Learning Connections • HEARING: MAKING SENSE OF SOUND

ACTIVE REVIEW (19) Sound waves alternatively _____ and expand molecules of a medium like air. (20) The human ear can hear sounds varying in frequency from 20 to _____ cycles per second (Hz). (21) The frequency of sound waves determines their _____. (22) Loudness is measured in _____ (dB). (23) The middle ear contains three bones—the hammer, _____, and stirrup. (24) The cochlea contains fluids that vibrate against the _____ membrane. (25) The “command post” of hearing—called the _____—is attached to the basilar membrane. (26) Sound waves travel from the organ of Corti to the brain by the _____ nerve.

REFLECT AND RELATE Do you know anyone with hearing problems? What is the source of the impairment? How does the person cope with the impairment?

CRITICAL THINKING Are you familiar with the violin, viola, cello, and bass fiddle? How do their sounds differ? How can you use the information in this section to explain the differences?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

THE CHEMICAL SENSES: SMELL AND TASTE

Smell and taste are the chemical senses. In the cases of vision and hearing, physical energy strikes our sensory receptors. With smell and taste, we sample molecules of the substances being sensed.

Smell: Sampling Molecules in the Air

People are underprivileged when it comes to the sense of smell. Dogs, for instance, devote about seven times as much of the cerebral cortex as we do to the sense of smell. Male dogs sniff to determine where the boundaries of other dogs' territories leave off and whether female dogs are sexually receptive. Dogs have been selectively bred to enhance their sense of smell. Some now earn a living by sniffing out explosive devices or illegal drugs in suitcases.

Smell also has an important role in human behavior. It makes a crucial contribution to the **flavor** of foods, for example. If you did not have a sense of smell, an onion and an apple might taste the same to you! People's sense of smell may be deficient when we compare them to those of a dog, but we can detect the odor of 1-millionth of a milligram of vanilla in a liter of air.

Question 21: How does the sense of smell work? Smell is the sense that detects odors. An *odor* is a sample of the substance being sensed. Odors are detected by sites on receptor neurons in the **olfactory** membrane high in each nostril. Receptor neurons fire when a few molecules of the substance in gaseous form come into contact with them. Their firing transmits information about odors to the brain via the **olfactory nerve**. That is how the substance is smelled.

It is unclear how many basic kinds of odors there are. In any event, olfactory receptors may respond to more than one kind of odor. Mixtures of smell sensations also help produce the broad range of odors that we can perceive.

The sense of smell adapts rapidly to odors such that you lose awareness of them, even obnoxious ones. This might be fortunate if you are in a locker room or an outhouse. It might not be so fortunate if you are exposed to paint fumes or secondhand smoke because you may lose awareness of them while danger remains. Also, one odor can mask another, which is how air fresheners work.

In many species, odors trigger instinctive responses. An experiment by one research group reveals how sex recognition in various species of lizards relies either on color or odor (López et al., 2002). The group aimed to determine whether color or odor or a combination of the two stimulated aggressive responses or sexual advances from males of the Spanish lizard, *P. hispanicus*. They experimentally manipulated the color and odor of male lizards, creating groups with all combinations of color and odor of males and females. They found that males reacted significantly more aggressively to intruders with male odors regardless of their color, whereas intruders with female odors were courted regardless of their actual sex and coloring.

Taste: Yes, You've Got Taste

Your cocker spaniel may jump at the chance to finish off your bowl of sherbet, but your Siamese cat may turn up her nose at the opportunity. Why? Dogs can perceive the taste quality of sweetness, as can pigs, but cats cannot. But when it comes to the sense of taste, the lowly catfish may well be the champ. Think of them as "swimming tongues." They can detect food through murky water and across long distances because their bodies are studded with nearly 150,000 taste buds (Rodrigues-Galdino et al., 2009). **Truth or Fiction Revisited:** It is true that the bodies of catfish are covered with taste buds.

Taste is an extremely important sense because animals, including humans, use the sense of taste in acquiring nutrients and avoiding poisons. A food may look good from a distance. It may trigger fond memories. It may even smell good, but if it tastes bad, we are likely not to swallow it.

Smell is a potent wizard that transports you across thousands of miles and all the years you have lived.

HELEN KELLER



© AP Photo/John Reynolds

An Acute Sense of Smell Compared with humans, dogs devote much more of their cerebral cortex to the sense of smell. Dogs have been trained to sniff out drugs, explosives, and in this case, human beings.

Flavor A complex quality of food and other substances that is based on their odor, texture, and temperature as well as their taste.

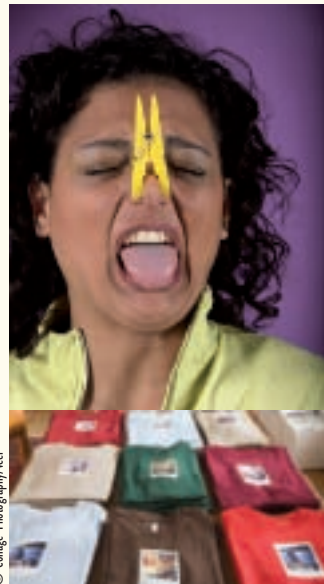
Olfactory Having to do with the sense of smell.

Olfactory nerve The nerve that transmits information concerning odors from olfactory receptors to the brain.

A CLOSER LOOK • RESEARCH

ADVANCES IN SCIENCE? THE CASE OF THE AROMATIC T-SHIRTS

Readers may be familiar with perfume and cologne as aids to sexual attraction, but how about body odor? Body odor? Yes, body odor.



© Collage Photography/Keer

A group of researchers (Jacob et al., 2002) had a sample of men wear T-shirts for 2 days. Throughout that period, they kept their aromas “pure” by avoiding deodorants, spicy foods (no garlic, please), pets, and sex. They then placed the T-shirts in boxes where they could not be seen but could clearly be smelled. Women in the study then made a sacrifice for science which may have been much greater than the men’s. They were asked to smell each of the boxes and choose the one they would be most willing to live with—that is, the one they would choose “if they had to smell it all the time.”

Now, the women were kept blind (but not nasally blocked) as to the purpose of the study and also blind to the fact that they were smelling “ripe” T-shirts. By and large, the women rated the odors as mildly pleasant. The women had no difficulty telling the “boxes” apart and easily selected a favorite.

The T-shirt study apparently has something to do with evolution and genes. The shirts selected as favorites had been worn by men who were similar in genetic makeup to the women’s fathers. The genes that seem to do the trick are called M.H.C. genes, and they produce proteins that identify cells within one’s body as “self,” not foreign. Cells that obtain the stamp of approval are not attacked by the body’s immune system. But why the father? Here the researchers become speculative. Perhaps by finding odors that are suggestive of genetic similarity to the father, but not the mother, women are enticed to mate with men who are similar but not overly similar to themselves.

This is not to suggest that the major factor in mate selection is, well, nasal inspiration. Visual appearance, educational background, sharing of interests, and socioeconomic status may have more to do with it (Foster, 2008). But possibly, the nose also knows something about what it takes for a woman to live with a man year after year.

Question 22: How does the sense of taste work? As in the case of smell, taste involves sampling molecules of a substance. Taste is sensed through **taste cells**—receptor neurons located on **taste buds**. You have about 10,000 taste buds, most of which are located near the edges and back of your tongue. Taste buds tend to specialize a bit. Some, for example, are more responsive to sweetness, whereas others react to several tastes. Other taste receptors are found in the roof, sides, and back of the mouth and in the throat. Some taste buds are even found in the stomach, although we only perceive tastes in the mouth and top of the throat. Buds deep in the mouth are evolutionarily adaptive because they can warn of poisonous food as it is about to be swallowed (Brand, 2000).

Researchers generally agree on at least four primary taste qualities: sweet, sour, salty, and bitter. There also appears to be a fifth basic taste, which is termed *umami* in Japanese and means “meaty” or “savory” (Rolls, 2009). Others believe that there may be still more basic tastes (Schiffman, 2000; Yamamoto et al., 2009). Regardless of how many basic tastes there are, the flavor of a food involves its taste but is more complex. Although apples and onions are similar in taste, their flavors differ greatly. After all, you wouldn’t chomp into a nice cold onion on a warm day, would you? The flavor of a food depends on its odor, texture, and temperature as well as on its taste. If it were not for odor, heated tenderized shoe leather might pass for steak.

Just as some people see better than others, some people have a better ability to taste than do others—but their superiority may be limited to one or more basic tastes. Those of us with low sensitivity for the sweet taste may require twice the sugar to sweeten our food as others who are more sensitive to sweetness. Those of us who claim to enjoy very bitter foods may actually be taste-blind to them. Sensitivities to different tastes apparently have a genetic component (Bartoshuk, 2000; Snyder & Bartoshuk, 2009).

By eating hot foods and scraping your tongue with forks and rough pieces of food, you regularly kill off many taste cells. But you need not be alarmed at this inadvertent oral aggression. Taste cells are the rabbits of the sense receptors. They reproduce rapidly enough to completely renew themselves about once a week.



© Kathy Ferguson-Johnson/PhotoDisc, Inc.

Sensational? The flavors of foods are determined not only by their taste but also by their odor, texture, and temperature.

LearningConnections • THE CHEMICAL SENSES: SMELL AND TASTE

ACTIVE REVIEW (27) A(n) _____ is a sample of molecules of the substance being smelled. (28) Odors are detected by the _____ membrane in each nostril. (29) There are four primary taste qualities: sweet, sour, salty, and _____. (30) The receptor neurons for taste are called _____ cells, which are located in taste buds on the tongue.

REFLECT AND RELATE Has food ever seemed to lose its flavor when you had a cold or an allergy attack? Why

did it happen? Have you had the experience of growing accustomed to a noxious odor so that you have lost awareness of it?

CRITICAL THINKING Critical thinkers pay close attention to definitions. What is the difference between the *taste* of a food and its *flavor*?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Although older people often complain that their food has little or no “taste,” they are more likely to experience a decline in the sense of smell. Because the flavor of a food represents both its tastes and its odors or aromas, older people experience loss in the *flavor* of their food. Therefore, older people often spice their food heavily to enhance its flavor.

THE SKIN SENSES (YES, IT DOES)

The skin is much more than a protective coating for your body. As you may know from lying on the sand beneath a broiling sun, and perhaps from touching the person lying next to you, the skin also discriminates among many kinds of sensations. **Truth or Fiction Revisited:** It is true that the skin is a sensory organ as well as a protective coating for the body. **Question 23: What are the skin senses, and how do they work?** The skin senses include touch, pressure, warmth, cold, and pain. We have distinct sensory receptors for pressure, temperature, and pain, but some nerve endings may receive more than one type of sensory input. Here, let's focus on touch and pressure, temperature, and pain.

Touch and Pressure: Making Contact

Sensory receptors embedded in the skin fire when the surface of the skin is touched. There may be several kinds of receptors for touch—some that respond to constant pressure and others that respond to intermittent pressure, as in tapping the skin. *Active touching* means continually moving your hand along the surface of an object so that you continue to receive sensory input from the object. You may have noticed that if you are trying to get the feel of a fabric or the texture of a friend's hair, you must move your hand over it. Otherwise, the sensations quickly fade. If you pass your hand over the fabric or hair and then hold it still, again the sensations of touching will fade. Active touching receives information concerning not only touch per se but also pressure, temperature, and feedback from the muscles involved in movements of our hands.

You can assess the sensitivity of your sense of touch by trying a mini-experiment suggested by Cynthia O'Dell and Mark Hoyert (2002): Set out a series of cookie-cutter outlines, close your eyes, and see how many you can identify from your sense of touch alone.

Different parts of the body are more sensitive to touch and pressure than others. If you take another look at Figure 3.13 on page 89, you'll see that the parts of the body that “cover” more than their fair share of somatosensory cortex are most sensitive to touch. These parts include the hands, face, and some other regions of the body. Psychophysicists use methods such as the **two-point threshold** to assess sensitivity to pressure. This method determines the smallest distance by which two rods touching the skin must be separated before the (blindfolded) individual reports that there are two rods rather than one. With this method, psychophysicists have found that our fingertips, lips, noses, and cheeks are more sensitive than our shoulders, thighs, and calves. That is, the rods can be closer together but perceived as distinct when they touch the lips more than when they touch the

*Once I knew only darkness
and stillness. . . . My life was
without past or future, . . . but
a little word from the fingers
of another fell into my hand
that clutched at emptiness,
and my heart leaped to the
rapture of living.*

HELEN KELLER

*At the touch of a lover,
everyone becomes a poet.*

PLATO

Taste cells Receptor cells that are sensitive to taste.

Taste buds The sensory organs for taste. They contain taste cells and are located on the tongue.

Two-point threshold The least distance by which two rods touching the skin must be separated before the person will report that there are two rods, not one, on 50% of occasions.

shoulders. Why the difference in sensitivity? First, nerve endings are more densely packed in the fingertips and face than in other locations. Second, more sensory cortex is devoted to the perception of sensations in the fingertips and face (see Figure 3.14 once again).

The sense of pressure, like the sense of touch, undergoes rapid adaptation. For example, you may have undertaken several minutes of strategic movements to wind up with your hand on the arm or leg of your date, only to discover that adaptation to this delightful source of pressure reduces the sensation.

Temperature: Sometimes Everything Is Relative

The receptors for temperature are neurons located just beneath the skin. When skin temperature increases, the receptors for warmth fire. Decreases in skin temperature cause receptors for cold to fire.

Sensations of temperature are relative. When we are at normal body temperature, we might perceive another person's skin as warm. When we are feverish, though, the other person's skin might seem cool. We also adapt to differences in temperature. When we walk out of an air-conditioned house into the July sun, we feel intense heat at first. Then the sensations of heat tend to fade (although we may still be uncomfortable because of high humidity). Similarly, when we first enter a swimming pool, the water may seem cool or cold because it is below our body temperature. Yet after a few moments, an 80°F pool may seem quite warm. In fact, we may chide a newcomer for not diving right in.

Pain

For most people, pain is a frequent visitor. Headaches, backaches, toothaches—these are only a few of the types of pain that most of us encounter from time to time. According to a national Gallup survey of 2,002 adults in the United States (Arthritis Foundation, 2000), 89% experience pain at least once a month. More than half (55%) of people aged 65 and older say they experience pain daily. Sad to say, people aged 65 and above are most likely to attribute pain to getting older (88%), with a sense that they can do nothing about disabilities such as arthritis. By contrast, people aged 18 to 34 are more likely to attribute pain to tension or stress (73%), to overwork (64%), or to their lifestyle (51%). When we assume that there is nothing we can do about pain, we are less likely to try. Yet 43% of Americans say that pain curtails their activities, and 50% say that pain puts them in a bad mood. There are also a number of gender differences in the experiencing of, and response to, pain, as shown in Table 4.1 ■. What is pain? What can we do about it?

— ■ —
*After great pain, a formal
feeling comes.
The Nerves sit ceremonious,
like tombs.*

EMILY DICKINSON

— ■ —

Table 4.1 ■ Gender Differences in Experiencing and Responding to Pain

Percent Who Report ...	Women	Men
Experiencing daily pain	46	37
Feeling they have a great deal of control over their pain	39	48
Feeling that tension and stress are their leading causes of pain	72	56
Going to see the doctor about pain only when other people urge them to do it	27	38
Balancing the demands of work and family life to be the key cause of their pain	35	24
Frequent headaches	17	8
Frequent backaches	24	19
Arthritis	20	15
Sore feet	25	17

Why do you think women are more likely than men to experience pain? What is the gender difference in willingness to see the doctor about pain? How would you explain the gender difference in willingness to see the doctor?

Source of data: Arthritis Foundation (2000, April 6). Pain in America: Highlights from a Gallup survey. <http://www.arthritis.org>

Pain results from the stimulation of neurons in the skin called *nociceptors*. Evolutionary psychologists would point out that pain is adaptive, if unpleasant, because it motivates us to do something about it. For some of us, however, chronic pain—pain that lasts once injuries or illnesses have cleared—saps our vitality and interferes with the pleasures of everyday life (Fenton, 2010; Gatchel & Kishino, 2010).

We can sense pain throughout most of the body, but pain is usually sharpest where nerve endings are densely packed, as in the fingers and face. Pain can also be felt deep within the body, as in the cases of abdominal pain and back pain. Even though headaches may seem to originate deep inside the head, there are no nerve endings for pain in the brain. In fact, brain surgery can be done with a local anesthetic that prevents the patient from feeling the drilling of a small hole through the skull.

Pain usually originates at the point of contact, as when you bang a knee (see Figure 4.28 ■). But its reverberations throughout the nervous system are extensive. The pain message to the brain is initiated by the release of chemicals, including prostaglandins, bradykinin, and a chemical called *P* (yes, *P* stands for “pain”). Prostaglandins facilitate transmission of the pain message to the brain and heighten circulation to the injured area, causing the redness and swelling that we call inflammation. Inflammation serves the biological function of attracting infection-fighting blood cells to the affected area to protect it against invading germs. Pain-relieving drugs such as aspirin and ibuprofen work by inhibiting the production of prostaglandins.

The pain message is relayed from the spinal cord to the thalamus and then projected to the cerebral cortex, making us aware of the location and intensity of the damage. Ronald Melzack and Joel Katz (2006) speak of a “neuromatrix” that includes these chemical reactions but involves other aspects of physiology and psychology in our reaction to pain. For example, visual and other sensory inputs tell us what is happening and influence the cognitive interpretation of the situation. Our emotional response affects the degree of pain, and so do the ways we respond to stress. For example, if the pain derives from an object we fear, perhaps a knife or needle, we may experience more pain. If we perceive that there is nothing we can do to change the situation, perception of pain may increase. If we have self-confidence and a history of successful responding to stress, the perception of pain may diminish.

One of the more intriguing topics within the study of pain is that of phantom limb pain.

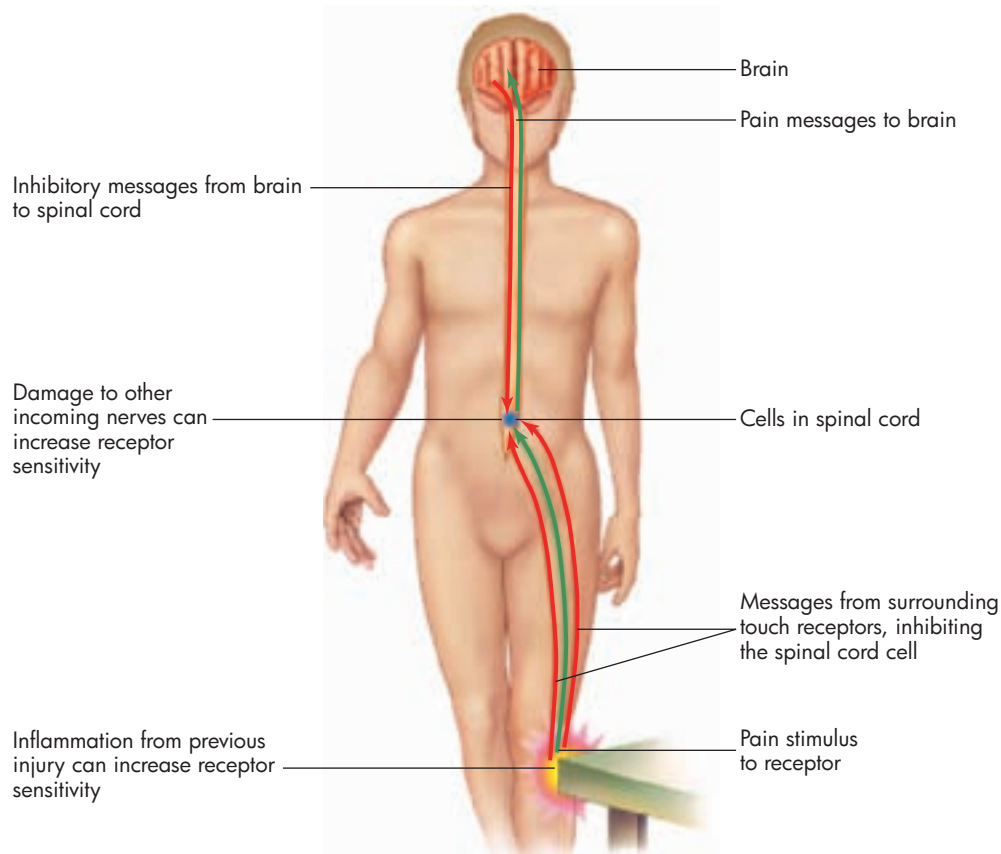


Figure 4.28 ■ Perception of Pain Pain originates at the point of contact, and the pain message to the brain is initiated by the release of prostaglandins, bradykinin, and substance P.

PHANTOM LIMB PAIN

[I was] suddenly aware of a sharp cramp in my left leg. I tried to get at it . . . with my single arm, but, finding myself too weak, hailed an attendant. “Just rub my left calf, . . . if you please.” “Calf? . . . You ain’t got none, pardner. It’s took off.”

The above is a true story from the U.S. Civil War as reported by Melzack (2006). The soldier had been wounded in battle. An arm had been amputated, with his knowledge, but he had also lost both legs, with no recollection of the operation. Yet he experienced pain “in” the amputated limbs.

Truth or Fiction Revisited: Many people experience pain in limbs that have been amputated. The fact that many people experience pain in limbs that are no longer there is one of the more fascinating phenomena of psychology. The majority of combat veterans with amputated limbs report feeling pain in such missing, or “phantom,” limbs (Kooijman et al., 2000; Nampiamparmpil, 2008). The limb may be gone, but the pain is real enough. It sometimes involves activation of nerves in the stump of the missing limb, but local anesthesia does not always eliminate the pain. The pain appears to result from activation of parts of the brain in which the pain was represented. Research shows that many people who experience phantom limb pain show neural activity in the motor and somatosensory cortex that is consistent with the pain (Melzack & Katz, 2006).

We consider what to do about pain in the Life Connections section at the end of the chapter.

LearningConnections • THE SKIN SENSES (YES, IT DOES)

ACTIVE REVIEW (31) The _____ threshold method allows psychophysicists to assess sensitivity to pressure by determining the distance by which two rods touching the skin must be separated before a person will report that there are two rods, not one. (32) Our lips are (more or less?) sensitive to touch than our shoulders.

REFLECT AND RELATE Have you ever entered a swimming pool and felt cold even though the water temperature was in the 70s? How can you explain the experience?

CRITICAL THINKING Does it seem strange to think of the skin as a sensory organ? If it does, be my guest and check out the discussion of “functional fixedness” in Chapter 8.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.



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Kinesthesia These acrobats receive information about the position and movement of parts of their bodies through the sense of kinesthesia. Information is fed to the brain from sensory organs in the joints, tendons, and muscles.

KINESTHESIS AND THE VESTIBULAR SENSE

Try this mini-experiment. Close your eyes and then touch your nose with your finger. If you weren’t right on target, I’m sure you came close. But how? You didn’t see your hand moving, and you didn’t hear your arm swishing through the air. Humans and many other animals have senses that alert them to their movements and body position without relying on vision, including *kinesthesia* and the *vestibular sense*.

Kinesthesia: How Moving?

Question 24: What is kinesthesia? *Kinesthesia* is the sense that informs you about the position and motion of parts of the body. The term is derived from the ancient Greek words for “motion” (*kinesis*) and “perception” (*aisthesis*). In kinesthesia, sensory information is fed back to the brain from sensory organs in the joints, tendons, and muscles. You were able to bring your finger to your nose easily by employing your kinesthetic sense. When you make a muscle in your arm, the sensations of tightness and hardness are also provided by kinesthesia.

Imagine going for a walk without kinesthesia. You would have to watch the forward motion of each leg to be certain you had raised it high enough to clear the curb. And if you had tried the nose-to-finger brief experiment without the kinesthetic sense,

you would have had no sensory feedback until you felt the pressure of your finger against your nose (or cheek or eye or forehead), and you probably would have missed dozens of times.

Are you in the mood for another experiment? Close your eyes again. Then “make a muscle” in your right arm. Could you sense the muscle without looking at it or feeling it with your left hand? Of course you could. Kinesthesia also provides information about muscle contractions.

The Vestibular Sense: How Upright?

Truth or Fiction Revisited: It is true that you have a sense that keeps you an upright person. It is your **vestibular sense**, which provides your brain with information as to whether you are upright (physically, not morally). **Question 25: How does the vestibular sense work?** Sensory organs located in the **semicircular canals** and elsewhere in the ears monitor your body’s motion and position in relation to gravity. They tell you whether you are falling and provide cues to whether your body is changing speed, such as when you are in an accelerating airplane or automobile. It is thus the vestibular sense that keeps us physically upright. Now, you may recall episodes when you have been spun around blindfolded at a party or in the spinning Teacups amusement park ride. Afterward, it might have been difficult for you to locate yourself in space (if you remained blindfolded) or to retain your balance. The reason is that the fluid in the semicircular canals was tossed about so fiercely that you lost your ability to monitor or control your position in relation to gravity.

The Concept Review on the next page summarizes key points about the senses.

LearningConnections • KINESTHESIS AND THE VESTIBULAR SENSE

ACTIVE REVIEW (33) Kinesthesia is the sensing of bodily _____ and movement. (34) Kinesthesia relies on sensory organs in the joints, tendons, and _____. (35) The vestibular sense informs us whether we are in a(n) _____ position or changing speeds. (36) The vestibular sense is housed mainly in the _____ of the ears.

REFLECT AND RELATE Can you walk upright with your eyes closed? How do you do it?

CRITICAL THINKING Why are some people “natural athletes”? Might there be genetic factors related to kinesthesia and the vestibular sense that contribute to their abilities?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

EXTRASENSORY PERCEPTION: IS THERE PERCEPTION WITHOUT SENSATION?

Extrasensory perception (ESP)—also referred to as parapsychological or psi phenomena—refers to the perception of objects or events through means other than sensory organs. Although the research evidence comes down hard against perception in the absence of sensation, 60% of the American public believes that some people have psychic powers or ESP (National Science Foundation, 2002). Therefore, we need to examine the type of research scientists conduct to determine whether there is any validity to it.

As suggested by the root “para,” meaning alongside, *parapsychological* (psi) means standing alongside psychology, not actually a part of psychology. Psychological communication occurs verbally or by means of body language. Psi communication refers to the transfer of information through an irregular or unusual process—not through the usual senses.








Let’s note that many psychologists do not believe that ESP is an appropriate area for scientific inquiry. Scientists study natural events, but ESP smacks of the supernatural, even the occult. Extrasensory perception also has the flavor of a nightclub act in which a blindfolded “clairvoyant” calls out the contents of an audience member’s pocketbook. Other psychologists, however, believe that there is nothing wrong with investigating ESP.

Kinesthesia The sense that informs us about the positions and motion of parts of our bodies.

Vestibular sense The sense of equilibrium that informs us about our bodies’ positions relative to gravity.

Semicircular canals Structures of the inner ear that monitor body movement and position.

CONCEPT REVIEW THE SENSES

Sense	What We Sense	Receptor Organs	Nature of Sensory Receptors
Vision	Visible light (part of the spectrum of electromagnetic energy; different colors have different wavelengths)	Eyes 	Photoreceptors in the retinas (rods, which are sensitive to the intensity of light, and cones, which are sensitive to color)
Hearing	Changes in air pressure (or in another medium, such as water) that result from vibrations called sound waves	Ears 	Hair cells in the organ of Corti, which is attached to a membrane (the basilar membrane) within the inner ear (the cochlea)
Smell	Molecules of the substance	Nose 	Receptor neurons in the olfactory membrane high in each nostril
Taste	Molecules of the substance	Tongue 	Taste cells located on taste buds on the tongue
Touch, pressure	Pushing or pulling of the surface of the body	Skin 	Nerve endings in the skin, some of which are located around the hair follicles
Kinesthesia	Muscle contractions	Sensory organs in joints, tendons, and muscles 	Receptor cells in joints, tendons, and muscles
Vestibular sense	Movement and position in relation to gravity	Sensory organs in the ears (e.g., in the semicircular canals) 	Receptor cells in the ears



Go to Psychology CourseMate at www.cengagebrain.com to access an interactive version of this Concept Review designed to help you test yourself on the topics presented here.

The issue for them is not whether ESP is sensationalistic but whether its existence can be demonstrated in the laboratory. **Question 26: Is there really such a thing as extrasensory perception (ESP)?**

Perhaps the best known of the ESP researchers was Joseph Banks Rhine of Duke University. Although he received his doctorate in botany, Rhine studied ESP for several decades beginning in the late 1920s (Viulli, 2008). In a typical experiment in clairvoyance, Rhine would use a pack of 25 Zener cards, which contained five sets of the cards shown in Figure 4.29 ■. Pigeons pecking randomly to indicate which one was about to be turned up would be “correct” 20% of the time. Rhine found that some people guessed correctly significantly more often than the 20% chance rate. He concluded that these individuals might have some degree of ESP.

A more current method for studying telepathy (direct communication between minds, without use of sensory perception) is the *ganzfeld procedure* (Howard et al., 2009). In this method, one person acts as a “sender” and the other as a “receiver.” The sender views randomly selected visual stimuli such as photographs or videotapes, while the receiver, who is in another room and whose eyes are covered and ears are blocked, tries to mentally tune in to the sender. After a session, the receiver is shown four visual stimuli and asked to select the one transmitted by the sender. A person guessing which stimulus was “transmitted” would be correct 25% of the time (one time in four) by chance alone. An analysis of 28 experiments using the *ganzfeld procedure*, however, found that receivers correctly identified the visual stimulus 38% of the time (Honorton, 1985), a percentage unlikely to be due to chance. A series of 11 more studies with the *ganzfeld procedure* obtained similar results (Bem & Honorton, 1994; Honorton et al., 1990).

Overall, however, there are many reasons for skepticism of ESP. First is the *file-drawer problem* (Howard et al., 2009). Buyers of supermarket magazines tend to forget “psychics” predictions when they fail to come true (that is, they have “filed” them away). Similarly, ESP researchers are less likely to report research results that show failure. Therefore, we would expect unusual findings (for example, a subject with a high success rate at psi-communication tasks over a period of several days) to appear in the research literature. In other words, if you flip a coin indefinitely, eventually you will flip 10 heads in a row. The odds against this are high, but if you report your eventual success and do not report the weeks of failure, you give the impression that you have unique coin-flipping ability. (You may even fool yourself.)

Then, too, it has not been easy to replicate experiments in ESP (Howard et al., 2009). People who have “demonstrated” ESP with one researcher have failed to do so with another researcher or have refused to participate in other studies. Also, the findings in one study are usually noticeably absent in follow-ups or under careful analysis. For example, Julie Milton and Richard Wiseman (1999) reviewed the research reported by Bem and Honorton (1994). They weighed the results of 30 *ganzfeld* ESP studies from seven laboratories. They found no evidence—zero—that subjects in these studies scored above chance levels on the ESP task.

From all of these studies, *not one person has emerged who can reliably show ESP from one occasion to another and from one researcher to another.* **Truth or Fiction Revisited:** There is no adequate scientific evidence that people can read other people’s minds. Research has not identified one single indisputable telepath or clairvoyant. In sum, most psychologists do not grant ESP research much credibility. They prefer to study perception that involves sensation. After all, what is life without sensation?



Figure 4.29 ■ Zener Cards Joseph Banks Rhine used these Zener cards in research on clairvoyance. Participants are asked to predict which card will be turned up.

LearningConnections • EXTRASENSORY PERCEPTION: IS THERE PERCEPTION WITHOUT SENSATION?

ACTIVE REVIEW (37) _____ refers to perception of objects or events through means other than sensory organs. (38) The *ganzfeld procedure* is currently used to study _____. (39) One reason for skepticism about ESP is the _____ problem; that is, researchers are less likely to report research results that show failure.

REFLECT AND RELATE Does anyone you know believe that some people are “psychics”? What kind of evidence is

required to support the existence of ESP? Why do you think many readers of this textbook will continue to believe in ESP despite the lack of scientific evidence?

CRITICAL THINKING Should psychologists conduct research into ESP? Why or why not?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections PAIN, PAIN, GO AWAY—DON'T COME AGAIN ANOTHER DAY

The most common methods of pain relief are pills—aspirin, acetaminophen, ibuprofen, and so on. But these medicines have side effects, especially when they are used over prolonged periods. Psychologists, like medical doctors, are concerned about the control of pain. In this Life Connections feature, we first discuss the gate theory of pain. Then we look at the ancient Chinese technique of acupuncture, which is still widely practiced today. Finally, we survey psychological methods for reducing pain.

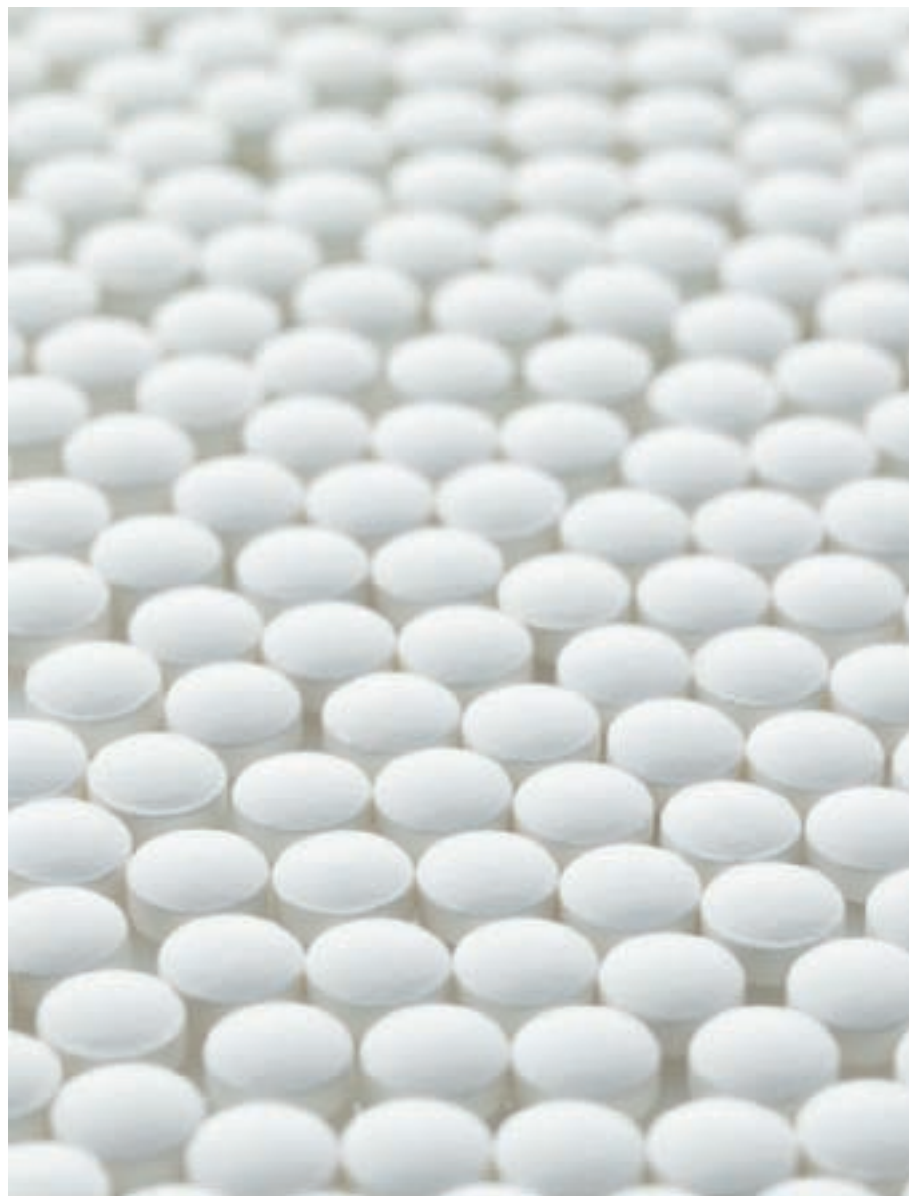
Gate Theory

Simple remedies like rubbing a banged knee frequently help relieve pain. Why? One possible answer lies in the *gate theory* of pain originated by researchers including Ronald Melzack and Patrick Wall. From this perspective, the nervous system can process only a limited amount of stimulation at a time. Rubbing the knee transmits sensations to the brain that, in a sense, compete for the attention of neurons. Many nerves are thus prevented from transmitting pain messages to the brain. The mechanism is analogous to shutting down a “gate” in the spinal cord. It is like a switchboard being flooded with calls. The flooding prevents any of the calls from getting through.

Acupuncture

Thousands of years ago, the Chinese began mapping the body to learn where pins might be placed to deaden pain. Acupuncture has remained largely unknown in the West. But the practice got some wider attention in the 1970s when *New York Times* columnist James Reston wrote about his appendectomy in China. He reported no discomfort although acupuncture was his primary anesthetic. More recently, TV journalist Bill Moyers’s report (1993) on current usage of acupuncture in China received much attention.

Traditional acupuncturists believe that the practice balances the body’s flow of energy, but research has shown that it stimulates nerves that reach the hypothalamus and may result in the release



© Fancy Photography/istock

Treating Pain Pills are the most common method of treating pain. However, psychologists have devised many methods for coping with chronic pain.

of endorphins and cortisol (Spelts & Gaynor, 2010). Endorphins are naturally occurring chemical messengers that are similar to the narcotic morphine in their chemical structure and effects. The drug *naloxone* blocks both the painkilling effects of morphine and of acupuncture. Therefore, the analgesic effects of acupuncture may be due to the morphinelike endorphins. Cortisol is a stress hormone.

Transcutaneous electrical nerve stimulation (TENS) is a noninvasive alternative to acupuncture (Binder &

Baron, 2010). In TENS, electrodes are applied to the skin, often at acupuncture points, and electrical currents are passed through the body from point to point. In a typical study of TENS, electrodes were placed at acupuncture points commonly used to help pregnant women deliver their babies with less discomfort (Chao et al., 2007). The women in the study reported experiencing less discomfort during delivery than a control group and indicated willingness to repeat the procedure.

Psychological Methods for Coping with Pain

Coping with that age-old enemy—pain—has traditionally been a medical issue. The primary treatment has been chemical, as in the use of pain-killing drugs. However, psychology has dramatically expanded our arsenal of weapons for fighting pain.

Accurate Information

One irony of pain management is that giving people accurate and thorough information about their condition often helps them manage pain (Turner & Turk, 2008). Most people in pain try *not* to think about why things hurt during the early phases of an illness. Physicians, too, often neglect the human aspects of relating to their patients. That is, they focus on diagnosing and treating the causes of pain, but they often fail to discuss with patients the meaning of the pain and what the patient can expect.

Yet when uncomfortable treatment methods are used, such as cardiac catheterization or chemotherapy for cancer, knowledge of the details of the treatment, including how long it will last and how much pain there will be, can help people cope with the pain (Jaaniste et al., 2007). Knowledge of medical procedures reduces stress by helping people maintain control over their situation. Some people, on the other hand, do not want information about painful medical procedures. Their attitude is, “Do what you have to do and get it over with.” It may be most helpful to match the amount of information provided with the amount desired.

Distraction and Fantasy: The X-Box Approach to Coping with Pain?

Diverting attention from pain helps many people cope with it (Jaaniste et al., 2007). Psychologists frequently recommend that people use distraction or fantasy as ways of coping with pain. For example, imagine that you’ve injured your leg and you’re waiting to see the doctor in an emergency room. You can distract yourself by focusing on details of your environment. You can count ceiling tiles or the hairs on the back of a finger.



© Ocean Photography/Net

The Video-Game Approach to Coping with Pain? Psychologists find that distraction and fantasy help individuals manage pain. Yes, it may hurt, but that doesn’t mean we must focus all of our attention on it.

You can describe (or criticize) the clothes of medical personnel or passersby. Playing video games also distracts people from the pain and discomfort of medical procedures (Dahlquist et al., 2009; Hoffman et al., 2008). For example, child cancer patients can become wrapped up in video games while they receive injections of nausea-producing chemicals. Other distraction methods that help children deal with pain include combing one’s hair and blowing on a noisemaker.

Hypnosis

In 1842, London physician W. S. Ward amputated a man’s leg after using a rather strange anesthetic: hypnosis. According to reports, the man experienced no discomfort. Several years later, operations were being performed routinely under hypnosis at his infirmary. Today, hypnosis is often used to reduce chronic pain (Jensen, 2009; Jensen & Patterson, 2006) and as an anesthetic in dentistry, childbirth, and even in some forms of surgery (Montgomery et al., 2000).

In using hypnosis to manage pain, the hypnotist usually instructs the person that he or she feels nothing or that the pain is distant and slight. Hypnosis can also aid in the use of distraction and fantasy. For example, the hypnotist can instruct the person to imagine that he or she is relaxing on a warm, exotic seashore. We will learn more about hypnosis in Chapter 5.

Relaxation Training

When we are in pain, we often tense up. Tensing muscles is uncomfortable in itself, arouses the sympathetic nervous system, and focuses our attention on the pain. Relaxation counteracts these self-defeating behavior patterns. Some psychological methods of relaxation focus on relaxing muscle groups. Some involve breathing exercises. Others use relaxing imagery: The imagery distracts the person and deepens feelings of relaxation. Relaxation training may be as effective as most medications for migraine headaches and for chronic pain in the lower back and jaw (Gatchel & Kishino, 2010).

Coping with Irrational Beliefs

Irrational beliefs can heighten pain (Gatchel & Kishino, 2010). For example, telling oneself that the pain is unbearable and that it will never cease increases discomfort. Some people seem to feel obligated to focus on things that distress them. They may be unwilling to allow themselves to be distracted from pain and discomfort. Thus, cognitive methods aimed at changing irrational beliefs hold some promise (Dummett, 2010).

Other Methods

Pain is a source of stress, and psychologists have uncovered many factors that seem to moderate the effects of stress. One is a sense of commitment. For example, if we are undergoing a painful medical procedure to diagnose or treat an illness, it might help if we recall that we *chose* to participate rather than see ourselves as helpless victims. Thus, we are in control of the situation, and a sense of control enhances the ability to cope with pain (Turk & Okifuji, 2002).

Supportive social networks help as well. The benefits of having friends visit us—or visiting friends who are unwell—are as consistent with psychological findings as they are with folklore.

And don’t forget gate theory. When you feel pain in a toe, squeeze all your toes. When you feel pain in your calf, rub your thighs. People around you may wonder what you’re doing, but you’re entitled to try to “flood the switchboard” so that some pain messages don’t get through.

Sensation and Perception: Your Tickets of Admission to the World Outside

1. What are sensation and perception?

Sensation is a mechanical process that involves the stimulation of sensory receptors (neurons) and the transmission of sensory information to the central nervous system. Perception is not mechanical. Perception is the active organization of sensations into a representation of the outside world, and it reflects learning and expectations.

2. How do we know when something is there?

We know something is there when the intensity of the stimulus, such as a light, exceeds the absolute threshold for that stimulus. The absolute threshold is the lowest intensity at which the stimulus can be detected. We know that something has changed when the change in intensity exceeds the difference threshold. The difference threshold is the minimum difference in intensity that can be discriminated. Difference thresholds are expressed in Weber’s constants.

3: Would ads that show an appealing image or a command—such as “Buy!”—for only a fraction of a second influence us?

They might do so. Subliminal stimulation has been shown to have modest effects on behavior, especially when people are motivated in the direction of an ad or command.

4. What is signal-detection theory?

Signal-detection theory explains the ways that stimulus characteristics and psychological factors—for example, motivation, familiarity with a stimulus, and attention—interact to influence whether a stimulus will be detected.

5. What are feature detectors?

Feature detectors are neurons that fire in response to specific features of sensed stimuli. For example, detectors in the visual cortex fire in response to particular features of visual input, such as lines sensed at various angles or specific colors.

6. How do our sensory systems adapt to a changing environment?

We become more sensitive to stimuli of low magnitude and less sensitive to stimuli that remain the same (such as the background noises outside the window). Growing more sensitive to stimulation is termed sensitization, or positive adaptation. Growing less sensitive to continuous stimulation is called desensitization, or negative adaptation.

Vision: Letting the Sun Shine In

7. Just what is light?

Visible light is the part of the range of electromagnetic energy that triggers visual sensations. Light is made up of

waves of energy; the color violet has the shortest wavelength, and red has the longest. White sunlight can be broken down into the colors of the rainbow by means of a prism.

8. How does the eye work?

The eye senses and transmits visual stimulation to the occipital lobe of the cerebral cortex. After light passes through the cornea, the size of the pupil determines the amount that can pass through the lens. The lens focuses light onto the retina, which is composed of photoreceptors (neurons) called rods and cones. Cones permit perception of color. Rods transmit sensations of light and dark only. Light is transmitted from the retina to the brain via the optic nerve, which is made up of the axons of retinal ganglion cells. Visual acuity is connected with the shape of the eye and age. As we age, the lenses grow brittle, making it difficult to focus; the condition is called presbyopia. Rods are more sensitive than cones to lowered lighting and continue to adapt to darkness once cones have reached their peak adaptation.

9. What are some perceptual dimensions of color?

These include hue, value, and saturation. The wavelength of light determines its hue. Yellow-orange-red colors are considered warm. Greens and blues are considered cool. Colors across from one another on the color wheel are complementary. In afterimages, persistent sensations of color are followed by perception of the complementary color when the first color is removed.

10. How do we perceive color?

There are two theories as to how we perceive color. According to the trichromatic theory, there are three types of cones—some sensitive to red, others to green, and still others to blue-violet. The opponent-process theory proposes three types of color receptors: red–green, blue–yellow, and light–dark. Opponent-process theory is supported by the appearance of afterimages. These two theories may actually reflect a two-step process.

11. What is color-blindness, and why are some people color-blind?

People with normal color vision are called trichromats. Monochromats see no color, and dichromats are blind to some parts of the spectrum. Partial color blindness is a sex-linked trait that impairs the working of cones sensitive to red–green.

Visual Perception: How Perceptive?

12. How do we organize bits of visual information into meaningful wholes?

Perceptual organization involves recognizing patterns and processing information about relationships between parts and the whole. Gestalt rules of perceptual organization involve figure–ground relationships, proximity, similarity,

continuity, common fate, and closure. Perception of a whole followed by perception of parts is termed top-down processing. Perception of the parts that leads to perception of a whole is termed bottom-up processing.

13. How do we perceive movement?

We visually perceive movement when the light reflected by moving objects moves across the retina and also when objects shift in relation to one another. Distant objects appear to move more slowly than nearby objects, and objects in the middle ground may give the illusion of moving backward. Stroboscopic motion, responsible for the illusion of motion pictures, occurs through the presentation of a rapid progression of images of stationary objects (frames).

14. How do we perceive depth?

Depth perception involves monocular and binocular cues. Monocular cues include pictorial cues, such as perspective, clearness, interposition, shadows, and texture gradient, and motion cues, such as motion parallax. Binocular cues include retinal disparity and convergence.

15. What are perceptual constancies?

Perceptual constancies are acquired through experience and make the world a stable place. For example, we learn to assume that objects retain their size, shape, brightness, and color despite their distance from us, their position, or changes in lighting conditions.

Hearing: Making Sense of Sound

16. What is sound?

To be transmitted, sound waves require a medium such as air or water. Sound waves alternatively compress and expand molecules of the medium, creating vibrations. The human ear can hear sounds varying in frequency from 20 to 20,000 cycles per second (Hz). The greater the frequency, the higher the sound's pitch. The loudness of a sound roughly corresponds to the amplitude of sound waves measured in decibels (dB). We can experience hearing loss if we are exposed to protracted sounds of 85 to 90 dB or more.

17. How does the ear work?

The ear captures sound waves, vibrates in sympathy with them, and transmits auditory information to the brain. The outer ear funnels sound waves to the eardrum, which vibrates in sympathy with them and transmits the auditory information through the bones of the middle ear to the cochlea of the inner ear. The basilar membrane of the cochlea transmits those stimuli to the organ of Corti. From there, sound travels to the brain via the auditory nerve.

18. How do we locate sounds?

We locate sounds by determining in which ear they are louder. We may turn our heads to pin down that information.

19. How do we perceive loudness and pitch?

Sounds are perceived as louder when more sensory neurons fire. The place theory of pitch perception holds that the pitch of a sound is sensed according to the place along the basilar membrane that vibrates in response to it; it accounts for sounds whose frequencies exceed 4,000 Hz. Frequency theory states that pitch perception depends on the stimulation of neural impulses that match the frequency of the sound waves and accounts for frequencies of 20 to 1,000 Hz. The volley principle accounts for pitch discrimination between a few hundred and 4,000 cycles per second.

20. What kinds of deafness are there?

Conductive deafness—common among older people—is caused by damage to the middle ear and is often ameliorated by hearing aids, which amplify sounds. Sensorineural deafness is usually caused by damage to neurons in the inner ear and can sometimes be corrected by cochlear implants.

The Chemical Senses: Smell and Taste

21. How does the sense of smell work?

The sense of smell is chemical. It samples molecules of substances called odors through the olfactory membrane in each nostril. Smell makes a key contribution to the flavor of foods.

22. How does the sense of taste work?

There are four primary taste qualities: sweet, sour, salty, and bitter. Flavor involves the odor, texture, and temperature of food, as well as its taste. Taste is sensed through taste cells, which are located in taste buds on the tongue.

The Skin Senses (Yes, It Does)

23. What are the skin senses, and how do they work?

The skin senses include touch, pressure, warmth, cold, and pain. Touches and pressure are sensed by receptors located around the roots of hair cells below the surface of the skin. We have separate receptors for warmth and cold beneath the skin. Pain generally results from the firing of nociceptors and the transmission of pain messages to the brain.

Kinesthesia and the Vestibular Sense

24. What is kinesthesia?

Kinesthesia is the sensation of body position and movement. It relies on sensory organs in the joints, tendons, and muscles.

25. How does the vestibular sense work?

The vestibular sense is mostly housed in the semicircular canals of the ears and tells us whether we are in an upright position.

Extrasensory Perception: Is There Perception Without Sensation?

26. Is there really such a thing as extrasensory perception (ESP)?

ESP, or psi communication, refers to the perception of objects or events through means other than sensory organs. Many psychologists do not believe that ESP is an appropriate area for scientific inquiry. The ganzfeld procedure

studies telepathy by having one person (the sender) try to mentally transmit visual information to a receiver in another room. Because of the file-drawer problem and lack of replication of positive results, there is no reliable evidence for the existence of ESP.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of this feature.

KEY TERMS

- Absolute threshold (p. 108)
- Afterimage (p. 118)
- Ambiguous (p. 121)
- Auditory (p. 129)
- Auditory nerve (p. 132)
- Autokinetic effect (p. 124)
- Avatar (p. 107)
- Basilar membrane (p. 131)
- Binocular cues (p. 126)
- Bipolar cells (p. 115)
- Blind spot (p. 115)
- Bottom-up processing (p. 123)
- Brightness constancy (p. 128)
- Closure (p. 121)
- Cochlea (p. 131)
- Color constancy (p. 127)
- Common fate (p. 123)
- Complementary (p. 117)
- Conductive deafness (p. 133)
- Cones (p. 115)
- Convergence (p. 126)
- Continuity (p. 123)
- Cornea (p. 114)
- Dark adaptation (p. 116)
- Decibel (dB) (p. 131)
- Desensitization (p. 112)
- Dichromat (p. 120)
- Difference threshold (p. 110)
- Eardrum (p. 131)
- Feature detectors (p. 112)
- Flavor (p. 135)
- Fovea (p. 115)
- Frequency theory (p. 134)
- Ganglion cells (p. 115)
- Hertz (Hz) (p. 130)
- Hue (p. 113)
- Illusions (p. 124)
- Interposition (p. 125)
- Iris (p. 114)
- Just noticeable difference (jnd) (p. 110)
- Kinesthesia (p. 140)
- Lens (p. 114)
- Monochromat (p. 120)
- Monocular cues (p. 125)
- Motion parallax (p. 126)
- Olfactory (p. 135)
- Olfactory nerve (p. 135)
- Opponent-process theory (p. 119)
- Optic nerve (p. 115)
- Organ of Corti (p. 132)
- Perception (p. 108)
- Perceptual organization (p. 121)
- Perspective (p. 125)
- Phi phenomenon (p. 124)
- Photoreceptors (p. 114)
- Pitch (p. 109)
- Place theory (p. 134)
- Presbyopia (p. 116)
- Proximity (p. 122)
- Psychophysicist (p. 108)
- Pupil (p. 114)
- Retina (p. 114)
- Retinal disparity (p. 126)
- Rods (p. 115)
- Semicircular canals (p. 141)
- Sensation (p. 108)
- Sensitization (p. 112)
- Sensorineural deafness (p. 134)
- Sensory adaptation (p. 112)
- Shadowing (p. 125)
- Shape constancy (p. 128)
- Signal-detection theory (p. 111)
- Similarity (p. 123)
- Size constancy (p. 127)
- Stroboscopic motion (p. 124)
- Subliminal stimulation (p. 110)
- Taste buds (p. 136)
- Taste cells (p. 136)
- Texture gradient (p. 125)
- Top-down processing (p. 123)
- Trichromat (p. 120)
- Trichromatic theory (p. 119)
- Two-point threshold (p. 137)
- Vestibular sense (p. 141)
- Visible light (p. 113)
- Visual acuity (p. 115)
- Weber's constant (p. 110)

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5

Consciousness



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MAJOR TOPICS

The Many Meanings of
Consciousness
Sleep and Dreams: Other
Worlds Within?
Altering Consciousness
Through Hypnosis,
Meditation, and Biofeedback
Altering Consciousness
Through Drugs

FEATURES

A Closer Look—Diversity: Dreams across Cultures: From Forests to Rain Showers to “The Dreaming”
A Closer Look—Real Life: Myths about Getting to Sleep That Can Keep You Up at Night
In Profile: Franz Anton Mesmer
Controversy in Psychology: How Do Psychologists Explain Hypnosis?
Self-Assessment: Do You Have a Problem with Alcohol?
Controversy in Psychology: Is a Drink a Day Good for You?
A Closer Look—Real Life: Dependence on Cocaine? Denial at Work
Controversy in Psychology: Is Marijuana Harmful? Should It Be Available as a Medicine?
Concept Review: Psychoactive Drugs and Their Effects
Life Connections: Getting to Sleep—and Elsewhere—Without Drugs
Self-Assessment: Sleep Quiz: Are You Getting Your Z's?

TRUTH OR FICTION?

- T F** We act out our forbidden fantasies in our dreams.
- T F** Many people have insomnia because they try too hard to fall asleep at night.
- T F** It is dangerous to awaken a sleepwalker.
- T F** You can be hypnotized against your will.
- T F** The effects of hypnotism are due to a special trance state.
- T F** You can teach a rat to raise or lower its heart rate.
- T F** Substance abuse is on the rise in high schools.
- T F** A drink a day is good for you.
- T F** Heroin was once used as a cure for addiction to morphine.
- T F** Many health professionals calm down hyperactive children by giving them a stimulant.
- T F** Coca-Cola once “added life” to its signature drink through the use of a powerful—but now illegal—stimulant.
- T F** The number of people who die from smoking-related causes is greater than the number lost to motor vehicle accidents, abuse of alcohol and all other drugs, suicide, homicide, and AIDS *combined*.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

When you talk to yourself, who talks and who listens?

This is the sort of question posed by philosophers and scientists who study consciousness. Although it might seem that psychologists, who study the brain and mental processes, are best equipped to look into consciousness, psychologists for many years banished the topic of consciousness from their field. In 1904, for example, William James wrote an article with the intriguing title “Does Consciousness Exist?” James did not think consciousness was a proper area of study for psychologists because scientific methods could not directly observe or measure another person’s consciousness.

John Watson, the “father of modern behaviorism,” agreed. Watson insisted that only observable, measurable behavior is the province of psychology: “The time seems to have come when psychology must discard all references to consciousness” (1913, p. 163). When Watson became the president of the American Psychological Association in 1914, his view was further cemented in the minds of many psychologists.

But the past few decades have seen a cognitive revolution, and thousands of psychologists now believe we cannot capture the richness of human experience without referring to consciousness (Sternberg, 2009). We are flooded with studies of consciousness by psychologists, biologists, neuroscientists, physicists, even computer scientists. Yet we still cannot directly observe the consciousness of another person, and so we rely on self-reports of consciousness as we observe events such as neural activity in the brain.

THE MANY MEANINGS OF CONSCIOUSNESS

Let’s begin this most intriguing area of psychology by posing this question: **Question 1: What is consciousness?**

Consciousness as Awareness

One meaning of **consciousness** is *sensory awareness* of the environment. The sense of vision enables us to see, or be *conscious* of, the sun gleaming on the snow. Yet sometimes we are not aware of sensory stimulation. We may be unaware, or unconscious, of sensory stimulation when we do not pay attention to it. The world is a buzz with signals, yet you are conscious of, or focusing on, only the words on this page (I hope).

Consciousness A concept with many meanings, including sensory awareness of the world outside, direct inner awareness of one’s thoughts and feelings, personal unity, and the waking state.

Therefore, another aspect of consciousness is **selective attention**. Selective attention means focusing one's consciousness on a particular stimulus. To keep your car on the road, you must pay more attention to driving conditions than to your hunger pangs.

Adaptation to our environment involves learning which stimuli must be attended to and which ones can be safely ignored. Selective attention makes our senses keener (Kerlin et al., 2010; McLachlan & Wilson, 2010). This is why we can pick out the speech of a single person across a room at a cocktail party—a phenomenon suitably termed the *cocktail-party effect*.

Although we can decide where and when we will focus our attention, various kinds of stimuli also tend to capture attention. Among them are these:

- Sudden changes, as when a cool breeze enters a sweltering room or we receive a particularly high or low grade on an exam.
- Novel stimuli, as when a dog enters the classroom or a person shows up with an unusual hairdo.
- Intense stimuli, such as bright colors, loud noises, sharp pain, or extremely attractive people.
- Repetitive stimuli, as when the same TV commercial is played a dozen times throughout the course of a football game.

Consciousness comes in many flavors. Anyone who has taught an introductory psychology class, or attended one at eight o'clock Friday morning, has seen them all. There may be a couple of party-hearty frat boys in the back row, dozing after a long night spent celebrating the upcoming weekend. These two are not conscious. Up a couple of rows is the scammer checking out [someone] across the aisle and wondering if he can get a date. He is conscious, but not of you; nor are the three girls down the way who are passing notes to each other and suppressing their merriment. Another has a tape recorder going and is finishing up a paper for another class, and he will be conscious of you later. The front row kids are sippin' their coffee, taking notes furiously and occasionally nodding in agreement; at least they are conscious of you.

MICHAEL S. GAZZANIGA, 2008,
P. 277

How do advertisers use these facts to get “into” our consciousness and our pocket-books? Think of some TV commercials that captured your attention. What kinds of stimuli put them front and center in your awareness?

Yet another meaning of consciousness is **direct inner awareness**. Close your eyes and imagine spilling a can of bright red paint across a black tabletop. Watch it spread across the black, shiny surface and then drip onto the floor. Although this image may be vivid, you did not “see” it literally. Neither your eyes nor any other sensory organs were involved. You were *conscious* of the image through direct inner awareness.

We are conscious of—or have direct inner awareness of—our own thoughts, emotions, and memories. However, we may not be able to measure direct inner awareness scientifically. Nevertheless, many psychologists argue, “It is detectable to anyone that has it” (J. L. Miller, 1992, p. 180).

Selective attention The focus of one's consciousness on a particular stimulus.

Direct inner awareness Knowledge of one's own thoughts, feelings, and memories without the use of sensory organs.



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Selective Attention Selective attention makes our senses keener.

Conscious, Preconscious, Unconscious, and Nonconscious

Sigmund Freud, the founder of psychoanalysis, differentiated between the thoughts and feelings we are conscious, or aware, of and those that are preconscious and unconscious. **Preconscious** material is not currently in awareness but is readily available. For example, if you answer the following questions, you will summon up preconscious information: What did you eat for dinner yesterday? About what time did you wake up this morning? What is your phone number? You can make these preconscious bits of information conscious by directing your inner awareness, or attention, to them.

According to Freud, still other mental events are **unconscious**. This means that they are unavailable to awareness under most circumstances. Freud believed that some painful memories and sexual and aggressive impulses are unacceptable to us, so we *automatically* (unconsciously) eject them from our awareness. In other words, we *repress* them. **Repression** of these memories and impulses allows us to avoid feelings of anxiety, guilt, or shame.

People can also *choose* to stop thinking about unacceptable ideas or distractions. When we consciously eject unwanted mental events from awareness, we are engaging in

suppression. We may, for example, suppress thoughts of an upcoming party when we need to study for a test. We may also try to suppress thoughts of a test while we are at the party!

Some bodily processes, such as the firings of neurons, are **nonconscious**. They cannot be experienced through sensory awareness or direct inner awareness. The growing of hair and the carrying of oxygen in the blood are nonconscious. We can see that our hair has grown, but we have no sense receptors that give us sensations of growing. We can feel the need to breathe but do not directly experience the exchange of carbon dioxide and oxygen.

Let's now journey all the way back to the most conscious aspect of our being—our sense of self.

Consciousness as Personal Unity: The Sense of Self

As we develop, we differentiate ourselves from what is not us. We develop a sense of being persons, individuals. There is a totality to our impressions, thoughts, and feelings that makes up our conscious existence—our continuing sense of self in a changing world. In this usage of the word, consciousness *is* self.

Consciousness as the Waking State

The word *conscious* also refers to the waking state as opposed, for example, to sleep. From this perspective, sleep, meditation, the hypnotic “trance,” and the distorted perceptions that can accompany the use of consciousness-altering drugs are considered *altered states of consciousness*.

In the remainder of this chapter, we explore various types of altered states of consciousness. They include sleep and dreams; hypnosis, meditation, and biofeedback; and finally, the effects of psychoactive drugs.

Preconscious In psychodynamic theory, descriptive of material that is not in awareness but can be brought into awareness by focusing one's attention.

Unconscious In psychodynamic theory, descriptive of ideas and feelings that are not available to awareness.

Repression In psychodynamic theory, the automatic (unconscious) ejection of anxiety-evoking ideas, impulses, or images from awareness.

Suppression The deliberate, or conscious, placing of certain ideas, impulses, or images out of awareness.

Nonconscious Descriptive of bodily processes, such as growing hair, of which we cannot become conscious. We may “recognize” that our hair is growing but cannot directly experience the biological process.

LearningConnections • THE MANY MEANINGS OF CONSCIOUSNESS

ACTIVE REVIEW (1) John B. Watson argued that only observable _____ should be studied by psychologists. (2) *Consciousness* has several meanings, including sensory awareness, the selective aspect of attention, direct inner _____, personal unity, and the waking state. (3) _____ differentiated among ideas that are conscious, preconscious, and unconscious.

REFLECT AND RELATE Are you conscious, or aware, of yourself and the world around you? How do you know?

CRITICAL THINKING Why do behaviorists object to studying consciousness? Why do cognitive psychologists pursue the study of consciousness?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

SLEEP AND DREAMS: OTHER WORLDS WITHIN?

Sleep is a fascinating topic. After all, we spend about one third of our adult lives asleep. Sleep experts recommend that adults get 8 hours of sleep a night, but according to the National Sleep Foundation (2009), adults in the United States typically get about 6.8 hours of sleep. About one third get 6 hours or less of sleep a night during the workweek. One third admit that lack of sleep impairs their ability to function during the day, and nearly one in five admits to falling asleep at the wheel.

Yes, we spend one third of our lives in sleep—or would if we could. As you can see in Figure 5.1 ■, however, some animals get much more sleep than we do, and some obtain much less. Why? It might have something to do with evolutionary forces. Animals that are most at risk of being hunted by predators tend to sleep less—an adaptive response to the realities of life, and death.

Biological and Circadian Rhythms

We and other animals are subject to rhythms, and they are related to the rotation and revolutions of the planet. Many birds (and people who can afford it!) migrate south

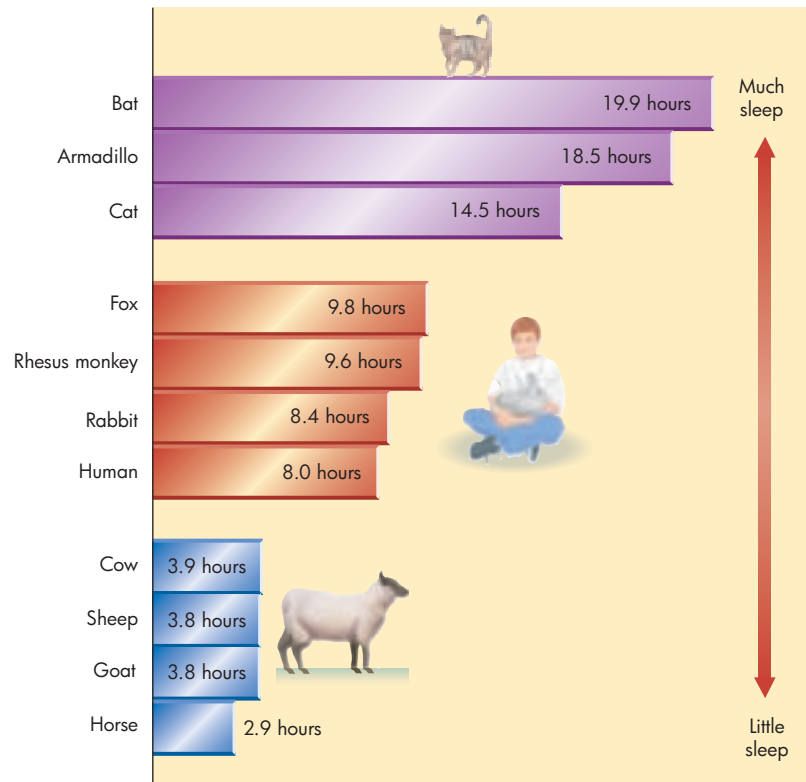


Figure 5.1 ■ Sleep Time for Mammals
Different mammals require different amounts of sleep. Reasons remain uncertain, but evolution apparently plays a role: Animals more prone to being attacked by predators sleep less.

in the fall and north in the winter. A number of animals hibernate for the winter and emerge when buds again are about to blossom.

Our alternating periods of wakefulness and sleep provide an example of an internally generated **circadian rhythm**. **Question 2: What is a circadian rhythm?** A circadian rhythm is a cycle that is connected with the 24-hour period of Earth's rotation. A cycle of wakefulness and sleep is normally 24 hours long. However, when

people are removed from cues that signal day or night, a cycle tends to extend to about 25 hours, and people sleep nearly 10 of them (National Sleep Foundation, 2000b). Why? We do not know. And within our periods of sleep, we typically undergo a number of 90-minute cycles during which we run through five stages of sleep.

Some of us function optimally in the morning, and others in the afternoon. Some of us are “night owls,” who are at our best when most of our neighbors are sleeping soundly.

Your circadian rhythm can become disturbed when there is a mismatch between your sleep-schedule demands and your internal sleep-wake cycle. A disruption in sleep patterns can lead to trouble falling asleep—insomnia—or to getting too much sleep—*hypersomnia*. Jet lag is one kind of assault on your circadian rhythm. Frequent changes of time zones or frequent changes of work shifts (as encountered, for example, by nursing personnel)

can induce more persistent or recurrent problems in your circadian rhythm. Treatment often includes gradual adjustments in your sleep schedule to allow your circadian system to become aligned with changes in your sleep-wake schedule.

Why do we sleep? Why do we dream? What are daydreams? Let's explore the nature of sleep, dreams, and sleep disorders.

The Stages of Sleep: How Do We Sleep?

When we sleep, we slip from consciousness to unconsciousness. When we are conscious, our brains emit waves characterized by certain *frequencies* (numbers of waves per second) and *amplitudes* (heights—an index of strength). Brain waves are rough indicators of the activity of large numbers of neurons. The strength or energy of brain waves is expressed in volts (an electrical unit). Likewise, when we sleep, our brains emit waves that differ from those emitted



© Ocean Photography/Alamy

A Night Owl Some of us—night owls—function best while our neighbors are sleeping soundly. For most of us, however, the traditional 9 to 5 is just fine.

Circadian rhythm Referring to cycles that are connected with the 24-hour period of the Earth's rotation. (From the Latin *circa*, meaning “about,” and *dia*, meaning “day.”)

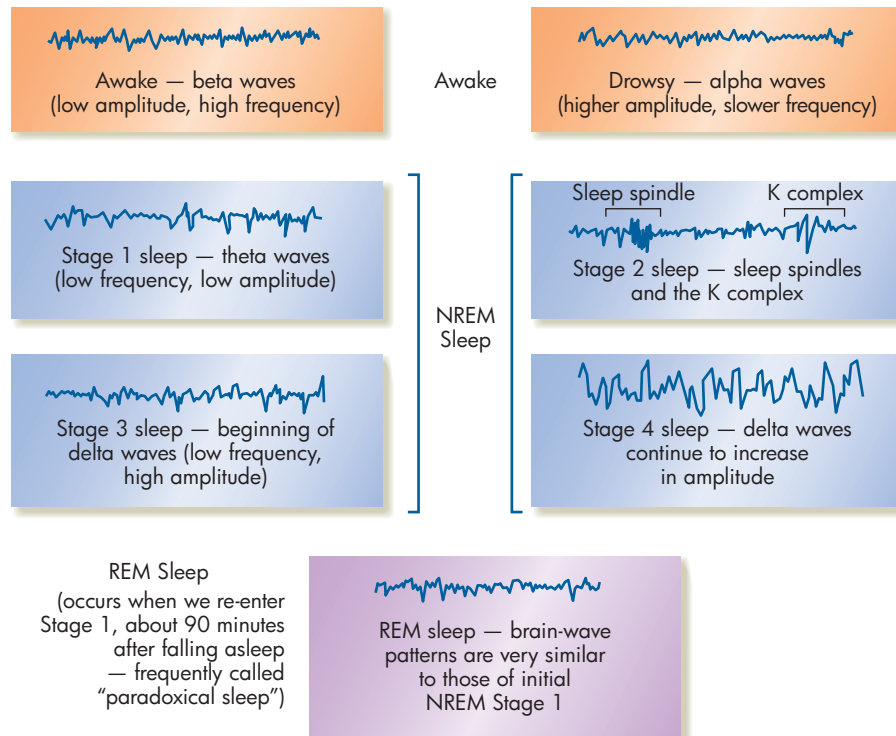


Figure 5.2 ■ The Stages of Sleep

This figure illustrates typical EEG patterns for the stages of sleep. During REM sleep, EEG patterns resemble those of the waking state. For this reason, REM sleep is often termed paradoxical sleep. As sleep progresses from stage 1 to stage 4, brain waves become slower, and their amplitude increases. Dreams, including normal nightmares, are most vivid during REM sleep. More disturbing sleep terrors tend to occur during deep stage 4 sleep.

when we are conscious. The electroencephalograph, or EEG, has helped researchers identify the different brain waves during the waking state and when we are sleeping. Figure 5.2 ■ shows EEG patterns that reflect the frequency and strength of brain waves that occur during the waking state, when we are relaxed, and when we are in the various stages of sleep. Brain waves, like other waves, are cyclical. The printouts in Figure 5.2 show what happens during a period of 15 seconds or so. **Question 3: How do we describe the stages of sleep?**

High-frequency brain waves are associated with wakefulness. When we move deeper into sleep, their frequency decreases and their amplitude (strength) increases. When we close our eyes and begin to relax before going to sleep, our brains emit many **alpha waves**. Alpha waves are low-amplitude brain waves of about 8 to 13 cycles per second.

Figure 5.2 shows five stages of sleep. The first four sleep stages are considered **non-rapid-eye-movement (NREM) sleep**. These contrast with the fifth stage, which is called **rapid-eye-movement (REM) sleep** because our eyes dart back and forth quickly beneath our closed lids.

STAGE 1

As we enter stage 1 sleep, our brain waves slow down from the alpha rhythm and enter a pattern of **theta waves**. Theta waves, with a frequency of about 6 to 8 cycles per second, are accompanied by slow, rolling eye movements. The transition from alpha waves to theta waves may be accompanied by a **hypnagogic state** during which we may experience brief dreamlike images that resemble vivid photographs. Stage 1 sleep is the lightest stage of sleep. If we are awakened from stage 1 sleep, we may deny that we were asleep or feel that we have not slept at all.

STAGES 2, 3, AND 4

After 30 to 40 minutes of stage 1 sleep, we undergo a rather steep descent into stages 2, 3, and 4 (see Figure 5.3) ■. During stage 2, brain waves are medium in amplitude with a frequency of about 4 to 7 cycles per second, but these are punctuated by *sleep spindles*—brief bursts of brain wave activity that signal the onset of REM sleep. Sleep spindles have a frequency of 12 to 16 cycles per second.

During deep sleep stages 3 and 4, our brains produce slower **delta waves**, which reach relatively great amplitude compared with other brain waves. During stage 3, the delta waves have a frequency of 1 to 3 cycles per second. Stage 4 is the deepest stage of sleep, from which it is the most difficult to be awakened. During stage 4 sleep, the delta waves slow to about 0.5 to 2 cycles per second, and their amplitude is greatest.

Alpha waves Rapid low-amplitude brain waves that have been linked to feelings of relaxation.

Non-rapid-eye-movement (NREM) sleep The first four stages of sleep.

Rapid-eye-movement (REM) sleep A stage of sleep characterized by rapid eye movements, which have been linked to dreaming.

Theta waves Slow brain waves sometimes accompanied by a hypnagogic state.

Hypnagogic state The drowsy interval between waking and sleeping characterized by brief, hallucinatory, dreamlike experiences.

Delta waves Strong, slow brain waves usually emitted during stage 3 and 4 sleep.

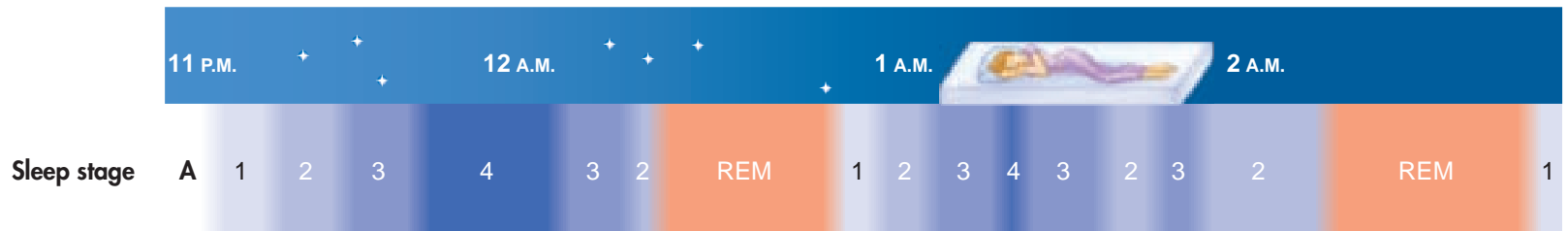


Figure 5.3 ■ Sleep Cycles This figure illustrates the alternation of REM and non-REM sleep for the typical sleeper. There are about five periods of REM sleep during an eight-hour night. Sleep is deeper earlier in the night, and REM sleep tends to become prolonged toward morning.

REM SLEEP

After perhaps half an hour of deep stage 4 sleep, we begin a relatively rapid journey back upward through the stages until we enter REM sleep (Figure 5.3). REM sleep derives its name from the *rapid eye movements*, observable beneath the closed eyelids, that characterize this stage. During REM sleep, we produce relatively rapid, low-amplitude brain waves that resemble those of light stage 1 sleep. REM sleep is also called *paradoxical sleep* because the EEG patterns observed suggest a level of arousal similar to that of the waking state (see Figure 5.3). However, it is difficult to awaken a person during REM sleep. When people are awakened during REM sleep, as is the practice in sleep research, about 80% of the time they report that they have been dreaming. (We also dream during NREM sleep but less frequently. People report dreaming only about 20% of the time when awakened during NREM sleep.)

Each night, we tend to undergo five trips through the stages of sleep (see Figure 5.3). These trips include about five periods of REM sleep. Our first journey through stage 4 sleep is usually longest. Sleep tends to become lighter as the night wears on. Our periods of REM sleep tend to become longer, and toward morning, our last period of REM sleep may last close to half an hour.

— ■ —
*The woods are lovely,
 dark, and deep,
 But I have promises to keep,
 And miles to go before I sleep,
 And miles to go before I sleep.*

ROBERT FROST

— ■ —

The Functions of Sleep: Why Do We Sleep?

Question 4: Why do we sleep? Researchers do not have all the answers as to why we sleep, but sleep seems to serve a number of purposes: It rejuvenates the body, helps us recover from stress, helps us consolidate learning and memories, and in infants, it may even promote the development of the brain.

Consider the hypothesis that sleep helps rejuvenate a tired body. Most of us have had the experience of going without sleep for a night and feeling “wrecked” or “out of it” the following day. Perhaps the next evening, we went to bed early to “catch up on our sleep.” What happens to you if you do not sleep for one night? For several nights?

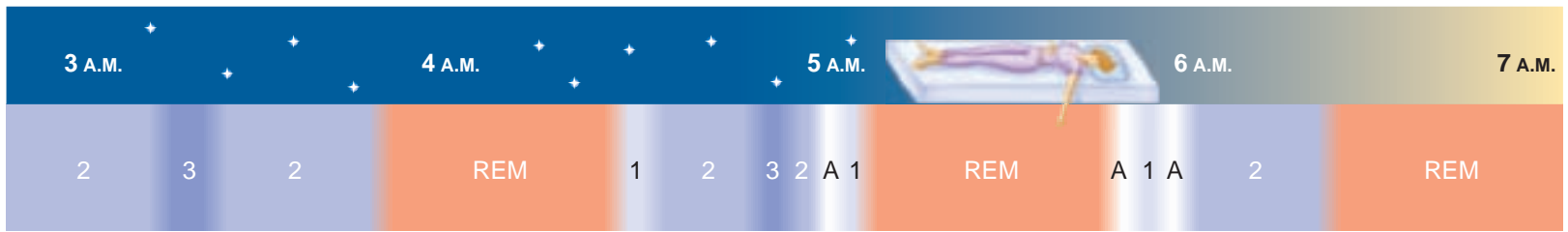
Many students can pull “all-nighters” in which they cram for a test through the night and then perform reasonably well the following day. But they tend to show deficits in psychological functions such as attention, learning, and memory, especially if they go sleepless for more than one night (Dubiel et al., 2010; Ward et al., 2009).

Sleep deprivation makes for dangerous driving (M. L. Jackson, 2009). It is estimated to be connected with 100,000 vehicular crashes and 1,500 deaths in the United States each year (S. Clark, 2009). A Swedish study of more than 10,000 traffic accidents concluded that early morning driving—particularly at 4:00 A.M.—is many times more dangerous than driving during the later morning or afternoon. The researchers controlled for the effects of alcohol consumption and darkness and attributed the greater number of accidents to sleepiness (Akerstedt et al., 2001). To combat sleep deprivation that occurs during the week, many people sleep late or nap on their days off (National Sleep Foundation, 2009).

WHY DO YOU NEED THE AMOUNT OF SLEEP YOU NEED?

The amount of sleep we need seems in part genetically determined (Cirelli, 2009). People also tend to need more sleep during periods of stress, such as a change of job, an increase in workload, or an episode of depression (Mayers et al., 2009; Rosekind et al., 2010). In fact, sleep seems to help us recover from stress.

Newborn babies may sleep 16 hours a day, and teenagers may sleep 12 hours or more (“around the clock”). It is widely believed that older people need less sleep than younger adults do, but sleep in older people is often interrupted by physical discomfort



or the need to go to the bathroom. To make up for sleep lost at night, older people will often “nod off” during the day.

SLEEP, LEARNING, AND MEMORY

REM sleep and deep sleep are both connected with the consolidation of learning and memory (Dubielo et al., 2010; C. P. Ward et al., 2009). In some studies, animals or people have been deprived of REM sleep. In fact, fetuses have periods of waking and sleeping, and REM sleep may foster the development of the brain before birth (McCarley, 1992; Uhlhaas et al., 2010). REM sleep may also help maintain neurons in adults by “exercising” them at night. Deprivation of REM sleep is accomplished by monitoring EEG records and eye movements and waking the person during REM sleep. Under these conditions, animals and people learn more slowly and forget what they have learned more rapidly. In any event, people and other animals that are deprived of REM sleep tend to show REM rebound, meaning that they spend more time in REM sleep during subsequent sleep periods. That is, they catch up. It is mostly during REM sleep that we dream. Let’s now consider dreams, a mystery about which philosophers, poets, and scientists have theorized for centuries.

Dreams: What Is the “Stuff” of Dreams?

To quote from Shakespeare’s *The Tempest*, just what is the “stuff” of dreams? What are they “made on”? **Question 5: What are dreams?** Like memories and fantasies, dreams involve imagery in the absence of external stimulation and can seem very real. In college, I often had “anxiety dreams” the night before a test. I dreamed repeatedly that I had taken the test and it was all over. (Imagine the disappointment when I awakened and realized that the test still lay before me!)



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Dreams What is “such stuff as dreams are made on”? Where do dreams come from? Why do they contain the imagery they contain? Are most dreams exciting adventures, dull recurrences of the events of the day, or plans for the following day?

Dreams are most likely to have vivid imagery during REM sleep, whereas images are vaguer and more fleeting during NREM sleep. Also, you tend to dream every time you are in REM sleep. Therefore, if you sleep for 8 hours and undergo five sleep cycles, you may have five dreams. Dreams may compress time the way a movie does by skipping over hours or days to a future time, but the actual action tends to take place in “real time.” Fifteen minutes of events fill about 15 minutes of dreaming. Furthermore, your dream theater is quite flexible. You can dream in black and white or in full color.

Some dreams are nightmares. One common nightmare is that something heavy is sitting on your chest and watching you as you breathe. Another is that you are trying to run away from a terrible threat but cannot gain your footing or coordinate your leg muscles. Nightmares, like most pleasant dreams, are generally products of REM sleep.

Question 6: Why do we dream what we dream? There are many theories as to why we dream what we dream. Some are psychological and others are more biologically oriented. The nearby A Closer Look affords insight into beliefs about dreaming that have been discovered through anthropological research.

DREAMS AS REFLECTIONS OF “THE RESIDUE OF THE DAY”

You may recall dreams involving fantastic adventures, but most dreams involve memories of the activities and problems of the day (Morewedge & Norton, 2009). If we are preoccupied with illness or death, sexual or aggressive urges, or moral dilemmas, we are likely to dream about them. The characters in our dreams are more likely to be friends and neighbors than spies, monsters, and princes—subjects that have been referred to, poetically, as “the residue of the day.”

However, traumatic events can spawn nightmares, as reported in studies of the aftermath of the terrorist attacks on the World Trade Center and Pentagon in 2001 (Roberts et al., 2009; Singareddy & Balon, 2002). People who suffer frequent nightmares are more likely than other people to also suffer from anxiety, depression, and other kinds of psychological discomfort (Roberts et al., 2009).

DREAMS AS THE EXPRESSION OF UNCONSCIOUS DESIRES

“A dream is a wish your heart makes” is a song lyric from the Disney film *Cinderella*. Freud theorized that dreams reflect unconscious wishes and urges. He argued that through dreams we can express impulses we would censor during the day. Moreover, he said that the content of dreams is symbolic of unconscious fantasized objects such as the genitals. A key part of Freud’s method of psychoanalysis involved interpretation of his clients’ dreams. **Truth or Fiction Revisited:** However, there is no evidence that we act out forbidden fantasies in our dreams.

We all dream; we do not understand our dreams, yet we act as if nothing strange goes on in our sleep minds, strange at least by comparison with the logical, purposeful doings of our minds when we are awake.

ERICH FROMM

A CLOSER LOOK • DIVERSITY

DREAMS ACROSS CULTURES: FROM FORESTS TO RAIN SHOWERS TO “THE DREAMING”

Anthropological research sheds fascinating light on the ways in which dreams relate to a culture’s way of life (Hearne, 2003). For example, animals are dreamed of extensively in hunting cultures. Oceanic peoples dream of fish. Some cultures respect dreams as coming from an honored source and containing knowledge that can help the dreamer. In some cases, dreams of the future are seen as omens.

The Pagiboti of the Democratic Republic of Congo believe that their ancestors send them dreams. Dreams signal success or failure at the hunt. A dream of meeting an animal in the forest is a good omen, suggesting a good kill on the following day.

The Malaysian natives find symbolism in their dreams. A gale means sorrow is approaching. Hail means poverty. Bathing in a rain shower means that the person will escape danger. Flies, like mosquitoes, mean that an enemy nears.

In Central American pre-Mayan and Mayan cultures, dreams and visions were valued as omens of the future. People would fast, force themselves to remain awake, and chew coca leaves (laced with cocaine) to bring on visions. Dreams that followed a first puberty fast were believed to hold keys to the person’s future. These people would occasionally sacrifice an animal and wrap it tightly around the person’s neck, half strangling him, until lack of oxygen produced a vision. Professional diviners of dreams (“listeners”) were revered because they helped steer society through natural and other disasters.

People in some ancient societies believed that the soul traveled during sleep. Dreams were given as much credence as waking experiences. When such peoples reported flying or slaying monsters, they were not lying; rather, they were reporting dreams, which they believed to be as accurate as events that occurred while they were awake.

The Australian Aborigines believed that Earth was formed and beings created during “Dreamtime”—also known as World Dawn, or The Dreaming. Here is where the spirits of the dead return. It is a place that is still believed to provide power for healers.

DREAMS AS PROTECTING SLEEP

Freud also believed that dreams “protect sleep” by providing imagery that helps keep disturbing, repressed thoughts out of awareness. The theory that dreams protect sleep has been challenged by the observation that disturbing events tend to be followed by disturbing dreams on the same theme—not by protective imagery (Hollan, 2009; Reiser, 2001). Our behavior in dreams is also generally consistent with our waking behavior. Most dreams, then, are unlikely candidates for the expression of repressed urges (even disguised). A person who leads a moral life tends to dream moral dreams.

THE ACTIVATION–SYNTHESIS MODEL OF DREAMS

There are also biological views of the “meanings” of dreams. According to the **activation–synthesis model**, acetylcholine (a neurotransmitter) and the pons (a structure in the lower part of the brain) stimulate responses that lead to dreaming (Hobson, 1999, 2003; Stuart & Conduit, 2009). One effect is *activation* of the reticular activating system (RAS), which arouses us, but not to waking. During the waking state, firing of these cells in the reticular formation is linked to movement, particularly the movements involved in walking, running, and other physical acts. During REM sleep, however, neurotransmitters generally inhibit activity, so we usually do not thrash about as we dream (Stuart & Conduit, 2009). In this way, we save ourselves (and our bed partners) some wear and tear. But the eye muscles are stimulated and thus show the rapid eye movement associated with dreaming. The RAS also stimulates neural activity in the parts of the cortex involved in memory. The cortex then *synthesizes*, or puts together, these sources of stimulation to some degree to yield the stuff of dreams. Yet research with the PET scan shows that the frontal lobes of the brain, which seem to be where we make sense of experience, are relatively inactive during sleep (Wade, 1998). Dreams are therefore more likely to be emotionally gripping than coherent in plot.

DREAMS AS HELPING US CONSOLIDATE MEMORIES

Another view of dreams is that with the brain cut off from the world outside, learning experiences and memories are replayed and consolidated during sleep, although the evidence for this hypothesis is somewhat contradictory (Siegel, 2009). This view finds support in research showing a neural “replaying” of recent waking patterns of neural activity in the hippocampus (Zhang, 2009).

There may be no absolute agreement on the origins of the functions of sleep or the content of dreams, but many—perhaps most—of us either live with or encounter sleep disorders now and then.

Sleep Disorders

Although nightmares are unpleasant, they do not qualify as sleep disorders. The term *sleep disorders* is reserved for other problems that can seriously interfere with our functioning. **Question 7: What kinds of sleep disorders are there?** Some sleep disorders, like insomnia, are all too familiar, experienced by at least half of American adults. Others, like sleep apnea (pauses in breathing), affect as many as one quarter of us (National Sleep Foundation, 2009). In this section, we discuss insomnia and less common sleep disorders: narcolepsy, sleep apnea, and the so-called *deep-sleep disorders*—sleep terrors, bed-wetting, and sleepwalking.

INSOMNIA

I grew up in a family where the question “How’d you sleep?” was a topic of genuine reflection at the breakfast table. My five sisters and I each rated the last night’s particular qualities—when we fell asleep, how often we woke, what we dreamed, if we dreamed. My father’s response influenced the family’s mood for the day: if “lousy,” the rest of us felt lousy, too. If there’s such a thing as an insomnia gene, Dad passed it on to me, along with his green eyes and Irish melancholy....

Halfway through my life, I still wander at night... Everybody has a cure to recommend [for insomnia], whether

—*Fatigue is the best pillow.*

BENJAMIN FRANKLIN

Activation–synthesis model The view that dreams reflect activation of cognitive activity by the reticular activating system and synthesis of this activity into a pattern.



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Table 5.1 ■ Gender Differences in Factors That Disrupt Sleep

Factor	Percent of women reporting factor	Percent of men reporting factor
Stress (e.g., restlessness, muscle tension): 22% of adults overall	26	20
Pain: 20% of adults overall	25	13
Children: 17% of adults overall	21	12
Partner's snoring: 16% of adults overall	22	7
Pauses in partner's breathing: 8% of adults overall	11	2

Source: Based on data reported by the National Sleep Foundation, 2000b.

it's warm milk, frisky sex, or melatonin. One friend solemnly prescribes whiffing dirty socks before turning out the lights.... Sleeping pills can force the body into unconsciousness, it's true. I've had my jags on Halcion and Xanax, Ambien and Restoril.... But the body is never really tricked. The difference between drugged and natural sleep eventually reveals itself, like the difference between an affair and true romance. It shows up in your eyes.... As with desire, [sleep] resists pursuit. Sleep must come find you.

—Hayes, 2001, pp. 3–5

According to the National Sleep Foundation (2009), more than half of American adults and about two thirds of older adults are affected by insomnia in any given year. Women complain of insomnia more often than men do (Hale et al., 2009). Table 5.1 ■ shows a number of factors that contribute to insomnia.

Truth or Fiction Revisited: It is true that many people have insomnia because they try too hard to fall asleep at night. People with insomnia tend to compound their sleep problems when they try to force themselves to fall asleep. Their concern heightens autonomic activity and muscle tension (Ong et al., 2009). You cannot force or will yourself

—
Man should forget his anger
before he lies down to sleep.

MOHANDAS GANDHI

A CLOSER LOOK • REAL LIFE

MYTHS ABOUT GETTING TO SLEEP THAT CAN KEEP YOU UP AT NIGHT

Does your knowledge of sleep help you get your z's or keep you awake at night? Check whether you believe the following myths about sleep and see.

MYTH 1: Spending more time in bed at night will give me a better chance of falling asleep.

Fact: The longer you spend in bed without sleeping, the more you will associate being awake with your bed, making it harder to fall asleep.

MYTH 2: I need at least 8 hours of sleep each night to be healthy.

Fact: Although it is important to get enough sleep, there's no "golden number" of hours of sleep that everyone must achieve to be healthy.

MYTH 3: A little nap during the day won't affect my sleep at night.

Fact: We have individual sleep time requirements, and sleep is accumulated across a 24-hour period, not just at night. Napping during the day can worsen an insomniac's problems at night.

MYTH 4: Insomnia only happens to people who are anxious or depressed.

Fact: Depression or anxiety can certainly cause insomnia, but so can medical problems, side effects of medication, stimulants, and poor hygiene.

MYTH 5: A few drinks before bed help me sleep better at night.

Fact: Although you may feel drowsy after drinking and fall asleep more easily, alcohol can disrupt sleep and make sleep less restorative.

MYTH 6: Watching TV in bed helps me to fall asleep at night.

Fact: Your mind becomes activated when you watch television. You experience audio and visual stimulation, neither of which is conducive to good sleep.

MYTH 7: If I don't get enough sleep during the week, I can always catch up on the weekends.

Fact: Although you can sleep longer hours on the weekends and feel better on those days, this doesn't prevent you from being sleep deprived during the week.

Adapted from Silberman, S. A. (2009). *The insomnia workbook: A comprehensive guide to getting the sleep you need*. Oakland, CA: New Harbinger Publications.



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Narcolepsy In an experiment on narcolepsy, the dog barks, nods its head, and then falls suddenly asleep.

to go to sleep. You can only set the stage for sleep by lying down and relaxing when you are tired. If you focus on sleep too closely, it will elude you.

You will find strategies for tackling insomnia—and winning—in this chapter’s Life Connections feature.

NARCOLEPSY

A person with **narcolepsy** falls asleep suddenly and irresistibly. Narcolepsy afflicts as many as 100,000 people in the United States and seems to run in families. The “sleep attack” may last about 15 minutes, after which the person awakens feeling refreshed. Nevertheless, these sleep episodes are dangerous and frightening. They can occur while a person is driving or working with sharp tools. They also may be accompanied by the sudden collapse of muscle groups or even of the entire body—a condition called *sleep paralysis*. In sleep paralysis, the person cannot move during the transition from the waking state to sleep, and hallucinations (such as of a person or object sitting on the chest) occur.

Although the causes are unknown, narcolepsy is thought to be a disorder of REM-sleep functioning. Stimulants and antidepressant drugs have helped many people with narcolepsy (Mamelak, 2009).

SLEEP APNEA

Sleep apnea is a dangerous sleep disorder in which the air passages are obstructed. People with sleep apnea stop breathing periodically up to several hundred times per night. Obstruction may cause the sleeper to suddenly sit up and gasp for air before falling back asleep. People with sleep apnea are stimulated nearly, but not quite, to waking by the buildup of carbon dioxide. Sleep apnea is associated with obesity and chronic loud snoring. It is more than a sleep problem. It can lead to high blood pressure, heart attacks, and strokes (Sekizuka et al., 2010).

Causes of sleep apnea include anatomical deformities that clog the air passages, such as a thick palate, and problems in the breathing centers in the brain. Sleep apnea is treated by such measures as weight loss, surgery, and continuous positive airway pressure (CPAP), which is supplied by a mask that provides air pressure that keeps the airway open during sleep.

SLEEP TERRORS

It typically begins with a loud, piercing cry or scream in the night. Even the most soundly sleeping parent will be summoned to the child’s bedroom as if shot from a cannon. The child (most cases involve children) may be sitting up, appearing frightened and showing signs of

Narcolepsy A “sleep attack” in which a person falls asleep suddenly and irresistibly.

Sleep apnea Temporary absence or cessation of breathing while asleep. (From Greek and Latin roots meaning “without” and “breathing.”)

—■—
*Some people talk in their
sleep. Lecturers talk while other
people sleep.*

ALBERT CAMUS
—■—

extreme arousal—profusely sweating with rapid heartbeat and respiration. The child may start talking incoherently or thrash about wildly but remain asleep. If the child awakens fully, he or she may not recognize the parent or may attempt to push the parent away. After a few minutes, the child falls back into a deep sleep and, upon awakening in the morning, remembers nothing of the experience. These terrifying attacks are called **sleep terrors**.

Sleep terrors, bed-wetting, and sleepwalking all occur during deep (stage 3 or 4) sleep, are more common among children, and may reflect immaturity of the nervous system (Kotagal, 2009; Nir & Tononi, 2010). Sleep terrors are similar to, but more severe than, nightmares. They usually occur during deep sleep, whereas nightmares take place during REM sleep. Sleep terrors usually occur during the first two sleep cycles of the night, whereas nightmares are more likely to occur during later sleep cycles. Although a person experiencing sleep terrors may suddenly sit up, he or she is never fully awake, returns to sleep, and may recall a vague image as of someone pressing on his or her chest. (Memories of nightmares tend to be more vivid.) Sleep terrors are often decreased by taking a minor tranquilizer at bedtime. The drug reduces the amount of time spent in stage 4 sleep.

BED-WETTING

Bed-wetting is often seen as a stigma that reflects parental harshness or the child's attempt to punish the parents, but this disorder, too, may stem from immaturity of the nervous system. In most cases, it resolves itself before adolescence, often by age 8. Behavior-therapy methods that condition children to awaken when they are about to urinate have been helpful (E. C. Jackson, 2009). The drug imipramine often helps, although the reason for its effectiveness is not fully understood. Sometimes, all that is needed is reassurance that no one is to blame for bed-wetting and that most children outgrow it.

SLEEP TALKING AND SLEEPWALKING

All five of my sisters remember me as the family sleepwalker. [My sister] Shannon recalls helping Mom fold clothes in the den late one night when I appeared. Perhaps it was the fragrant smell of laundry, like incense, that drew me. I stopped in front of the TV in my pj's, eyes open, and began yelling. It was gibberish, Shannon remembers, but the choking anger behind it was alarming. While that behavior alone is odd, the aspect of her story I find most fascinating is my mother's reaction: unfazed, "He's only sleepwalking," she murmured, as though it were as common as the evening paperboy's late delivery. I imagine her then saying calmly, "Okay, Shannon, let's start on the towels."

—Hayes, 2001, p. 99

Sleep terrors Frightening dreamlike experiences that occur during the deepest stage of NREM sleep. Nightmares, in contrast, occur during REM sleep.

Perhaps half of all children occasionally talk in their sleep. Surveys suggest that some 7% to 15% walk in their sleep (Cotton & Richdale, 2010; S. Li et al., 2009). Only about 2% of a random sample of nearly 5,000 people aged 15 to 100 did so (Ohayon et al., 1999). Sleepwalkers may roam about almost nightly while their parents fret

LearningConnections • SLEEP AND DREAMS: OTHER WORLDS WITHIN?

ACTIVE REVIEW (4) EEG research shows that different stages of sleep are characterized by different _____ waves. (5) Because EEG patterns during REM sleep resemble those of the waking state, REM sleep is also called _____ sleep. (6) During a typical 8-hour night, we undergo about _____ trips through the different stages of sleep. (7) Dreams are most vivid during (REM or NREM?) sleep. (8) According to the _____-synthesis model, dreams reflect neural activity. (9) Sleep terrors, bed-wetting, and sleepwalking all occur during _____ sleep.

REFLECT AND RELATE How much sleep do you need? (How do you know?) Did you ever pull an all-nighter? What

were the effects? The next time you pull an all-nighter, why not keep a diary of your feelings the following day? This could help you the next time you are faced with the decision of whether to stay awake and study or get some sleep.

CRITICAL THINKING What do you dream about? Has anyone tried to interpret your dreams? Is the interpretation consistent with any of the theories of dreams discussed in the chapter? Why are many modern psychologists critical of Freud's theory of dreams?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

about the accidents that could befall them. Sleepwalkers typically do not remember their excursions, although they may respond to questions while they are up and about.

Truth or Fiction Revisited: Contrary to myth, there is no evidence that sleepwalkers become violent if they are awakened, although they may be confused and upset. Mild tranquilizers and maturity typically put an end to sleepwalking.

ALTERING CONSCIOUSNESS THROUGH HYPNOSIS, MEDITATION, AND BIOFEEDBACK

Perhaps you have seen films in which Count Dracula hypnotized resistant victims into a stupor. Then he could give them a bite in the neck with no further nonsense. Perhaps you have watched a fellow student try to place a friend in a “trance” after reading a book on hypnosis. Or perhaps you have seen an audience member hypnotized in a nightclub act. If so, chances are the person acted as if he or she had returned to childhood, imagined that a snake was about to have a nip, or lay rigid between two chairs for a while. In this section, we deal with what have been referred to as some of the “oddities” of psychology: hypnosis, meditation, and biofeedback. Each of these is an altered state of consciousness because they involve focusing on stimuli that are not common parts of our daily lives.

Hypnosis: On Being Entranced

Of these altered states, perhaps the one we hear of most is hypnosis. **Question 8: What is hypnosis?** Hypnosis, a term derived from the Greek word for “sleep,” is an altered state of consciousness in which people appear to be highly suggestible and behave as though they are in a trance. Hypnosis has only recently become a respectable subject for psychological inquiry. Modern hypnosis evolved from the ideas of Franz Mesmer in the 18th century. Mesmer asserted that everything in the universe was connected by forms of magnetism—which actually may not be far from the mark. However, he incorrectly claimed that people, too, could be drawn to one another by “animal magnetism.” (No bull’s-eye here.) Mesmer used bizarre props to bring people under his “spell” and managed a respectable cure rate for minor ailments. Scientists now attribute his successes to the placebo effect, not to animal magnetism.

Today, hypnotism retains its popularity in nightclubs, but it is also used as an anesthetic in dentistry, childbirth, and various medical procedures, even surgery (Vanhauzenhuysen et al., 2009). Some psychologists use hypnosis to teach clients how to reduce anxiety or overcome fears (Dufresne et al., 2009). A study with 241 surgery patients in a Boston hospital shows how hypnosis can help people deal with pain and anxiety. The patients

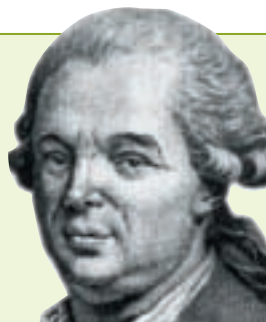
Why do we love to change our consciousness, our appreciation and feelings about the world around us? We drink, we smoke, we do lattes, we seek painkillers, we may even get runner’s high. We are always tampering with an aspect of our existence we still can’t define: phenomenal conscious experience.

MICHAEL S. GAZZANIGA

Hypnosis An altered state of consciousness in which people appear to be highly suggestible and behave as though they are in a trance.

In Profile

He was the rage of Paris and Vienna. His clients paid a fortune to be “mesmerized.” Imagine him dressed in a flowing purple robe, grandly entering mirrored rooms in palaces while music was played on an instrument called a glass harmonica. He commands one man, “Dormez” (“Sleep”), and the man’s head drops to his chest while others gasp. He points an iron rod at a woman, and she shrieks that she feels tingling sensations running through her body. Thus did Austrian Franz Anton Mesmer (1734–1815) use his theory of animal magnetism to “cure” afflictions ranging from paralysis to “vapors”—a term once used to describe feelings of depression or erroneous beliefs that one was suffering from a physical illness.



FRANZ ANTON MESMER

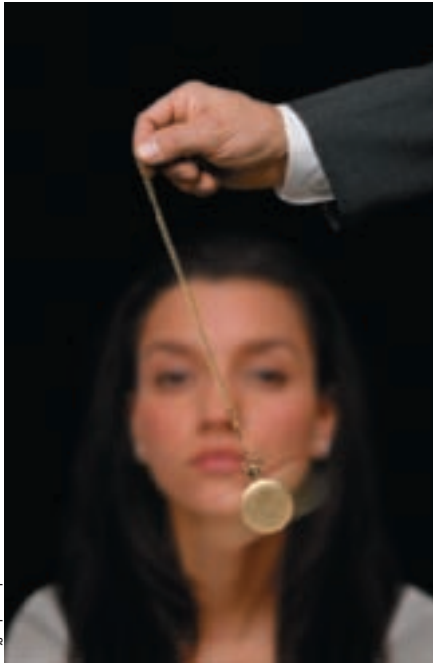
© Brown Brothers

Mesmer was trained as a physician, and his marriage to an older wealthy woman gained him entrance to Viennese society. A music lover, he became skillful with the glass harmonica, which had been invented by Benjamin Franklin. Wolfgang Amadeus Mozart’s first opera, *Bastien und Bastienne*, debuted in Mesmer’s home when Mozart was 12 years old. Mesmer’s theory held that illnesses could be cured through realignment of the magnetic forces in the body. Although his theory is nonsense, he seems to have sincerely believed it. Mesmer’s life work

has contributed to our knowledge of the power of suggestion, to modern hypnotism, and of course, to dramatic nightclub acts.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Franz Anton Mesmer.



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One Type of Hypnotic Induction What is hypnotic suggestibility? Do you have it?

underwent procedures that used only local anesthetics (Lang et al., 2000). They could use as much pain medication as they desired by means of an intravenous tube. Patients who were hypnotized during these procedures needed less additional medication for pain and experienced less anxiety as measured by blood pressure and heart rate. The hypnotized patients focused on pleasant imagery rather than the details of the surgery.

Hypnosis as an aid in relaxation training also helps people cope with stress and enhances the functioning of their immune systems (Jensen et al., 2009; Kiecolt-Glaser et al., 2001). Research also shows that hypnosis can be a useful supplement to other forms of therapy, especially in helping people control their weight and stop smoking (Tønnesen, 2009). The police also use hypnosis to prompt the memories of witnesses.

The state of consciousness called the *hypnotic trance* has traditionally been induced by asking people to narrow their attention to a small light, a spot on the wall, an object held by the hypnotist, or the hypnotist's voice. The hypnotist usually suggests that the person's limbs are becoming warm, heavy, and relaxed. People may also be told that they are becoming sleepy or falling asleep. Hypnosis is *not* sleep, however. This is shown by differences between EEG recordings for the hypnotic trance and the stages of sleep. But the word *sleep* is understood by subjects to suggest a hypnotic trance. It is also possible to induce hypnosis through instructions that direct subjects to remain active and alert (De Vos & Louw, 2009). So the effects of hypnosis probably cannot be attributed to relaxation. The key appears to be that the induction procedure encourages the subject to cooperate with the hypnotist (Barber, 2000).

People who are readily hypnotized are said to have *hypnotic suggestibility*. Part of "suggestibility" is knowledge of what is expected during the "trance state." Generally speaking, suggestible people are prone to fantasy, can compartmentalize unwanted memories, and want to cooperate with the hypnotist (Dienes et al., 2009). As a result, they pay close attention to the hypnotist's instructions. **Truth or Fiction Revisited:** It is therefore extremely unlikely that someone could be hypnotized against his or her will. However, in a nightclub act, the social pressure of the audience may further encourage the subject to play along with the suggestions of the hypnotist (Barber, 2000). Hypnotists and people who have been hypnotized report that hypnosis can bring about the changes shown in Table 5.2 ■.

Table 5.2 ■ Changes in Consciousness Attributed to Hypnosis^a

Change	Comments
Passivity	Awaiting instructions and suspending planning.
Narrowed attention	Focusing on the hypnotist's voice or a spot of light and not attending to background noise or intruding thoughts.
Pseudomemories and hypermnesia	Reporting pseudomemories (false memories) or highly detailed memories (hypermnesia). Police hypnotists attempt to heighten witnesses' memories by instructing them to focus on details of a crime and reconstruct the scene. Some studies challenge the accuracies of such memories.
Suggestibility	Responding to suggestions that an arm is becoming lighter and will rise or that the eyelids are becoming heavier and must close.
Playing unusual roles	Playing roles calling for increased strength or alertness, such as riding a bicycle with less fatigue than usual. In <i>age regression</i> , people may play themselves as infants or children. A person may speak a language forgotten since childhood.
Perceptual distortions	Acting as though hypnotically induced hallucinations and delusions are real. Behaving as though one cannot hear loud noises, smell odors, or feel pain.
Posthypnotic amnesia	Acting as though one cannot recall events that took place under hypnosis.
Posthypnotic suggestion	Following commands given "under" hypnosis after one "awakens," such as falling quickly into a deep trance when given the command "Sleep!" or—in the case of a would-be quitter of smoking—finding cigarette smoke aversive.

^aResearch evidence in support of these changes in consciousness is mixed.
Sources: Barber, 2000; Lynn, Matthews, and Barnes 2008.

Controversy in Psychology HOW DO PSYCHOLOGISTS EXPLAIN HYPNOSIS?

Hypnotism is no longer explained in terms of animal magnetism, but psychodynamic and learning theorists have offered explanations. According to Freud, hypnotized adults permit themselves to return to childish modes of responding that emphasize fantasy and impulse rather than fact and logic. Modern views of hypnosis are quite different. **Question 9: How do modern psychologists explain the effects of hypnosis?**

Role Theory

Theodore Sarbin offers a **role theory** view of hypnosis (Lynn, Matthews, & Barnes, 2008; Sarbin & Coe, 1972). He points out that the changes in behavior attributed to the hypnotic trance can be successfully imitated when people are instructed to behave as though they are hypnotized. For example, people can lie rigid between two chairs whether they are hypnotized or not. Also, people cannot be hypnotized unless they are familiar with the hypnotic “role”—the behavior that constitutes the so-called trance. Sarbin is not saying that subjects fake the hypnotic role. Research evidence suggests that most people who are hypnotized are not faking (Lynn, Matthews, & Barnes, 2008). Instead, Sarbin is suggesting that people allow themselves to enact this role under the hypnotist’s directions.

Multifactorial Theory

Nichola Spanos’s **multifactorial theory** focuses on factors such as the beliefs, attitudes, imaginings, and expectancies of the person being hypnotized in the shaping of hypnotic behavior (Lynn, Matthews, & Barnes, 2008). Spanos used the term *strategic role enactment* to explain how people transform their thoughts and feelings into behavior that is consistent with their view of how a “good” hypnotized subject should behave.

Response Set Theory

The **response set theory** of hypnosis is closely related to role theory and multifactorial theory. It suggests that response expectancies (the things we know we are expected to do) play a key role in the production of personal experiences and also in experiences suggested by the hypnotist (Lynn, Matthews, & Barnes, 2008). Response set theory focuses on the ways that a positive response to each suggestion of the hypnotist sets the stage—creates a *response set*—in which the subject is more likely to follow subsequent suggestions.

Truth or Fiction Revisited: It has not been shown that the effects of hypnotism are due to a special trance state. Role theory, multifactorial theory, and response set theory appear to be supported by research evidence that suggestible people want to be hypnotized, are good role players, have vivid and absorbing imaginings, and also know what is expected of them (Cavallaro et al., 2010; Lynn, Matthews, & Barnes, 2008). The fact that the behaviors shown by hypnotized people can be mimicked by people who know what is expected of them means that we need not resort to the concept of the “hypnotic trance”—an unusual and mystifying altered state of awareness—to explain hypnotic events.

Neodissociation Theory

Runners frequently get through the pain and tedium of long-distance races by *dissociating*—by imagining themselves elsewhere doing other things. (My students inform me that they manage the pain and tedium of *other* instructors’ classes in the same way.) Ernest Hilgard (1904–2001) similarly explained hypnotic phenomena through **neodissociation theory** (Dell, 2010; Hilgard, 1994). This is the view that we can selectively focus our attention on one thing (like hypnotic suggestions) and dissociate

ourselves from the things going on around us—just as the surgery patients in the Boston study focused on pleasant thoughts and not on the surgery itself (Lang et al., 2000).

Subjects in one study of neodissociation theory were hypnotized and instructed to submerge their arms in ice water—causing “cold pressor pain” (M. F. Miller et al., 1991). Subjects were given suggestions to the effect that they were not in pain, however. Highly hypnotizable people reported dissociative experiences that allowed them to avoid the perception of pain, such as imagining that they were at the beach or that their limbs were floating in air above the ice water.

Although hypnotized people may be focusing on the hypnotist’s suggestions and perhaps imagining themselves to be somewhere else, they still tend to perceive their actual surroundings peripherally. In a sense, we do this all the time. We are not fully conscious, or aware, of everything going on around us. Rather, at any given moment, we selectively focus on events such as tests, dates, or television shows that seem important or relevant. Yet, while taking a test, we may be peripherally aware of the color of the wall or the sound of rain.

Role theory, multifactorial theory, response set theory, and neodissociation theory do not suggest that the phenomena of hypnosis are phony. Instead, they suggest that we do not need to explain these events through an altered state of awareness called a trance. Hypnosis may not be special at all. Rather, it is *we* who are special—through our imagination, our role-playing ability, and our capacity to divide our consciousness—concentrating now on one event that we deem important and concentrating on another event later.

Let’s now consider two other altered states of consciousness that involve different ways of focusing our attention: meditation and biofeedback.

Meditation: On Letting the World Fade Away

Question 10: What is meditation? The dictionary defines *meditation* as the act or process of thinking. But the concept usually suggests thinking deeply about the universe or about one’s place in the world, often within a spiritual context. As the term is commonly used by psychologists, however, meditation refers to various ways of focusing one’s consciousness to alter one’s relationship to the world. As used by psychologists, ironically, *meditation* can also refer to a process in which people seem to suspend thinking and allow the world to fade away.

The kinds of meditation that psychologists and other kinds of helping professionals speak of are *not* the first definition you find in the dictionary. Rather, they tend to refer to rituals, exercises, and even passive observation—activities that alter the normal relationship between the person and her or his environment. They are various methods of suspending problem solving, planning, worries, and awareness of the events of the day.

Role theory A theory that explains hypnotic events in terms of the person’s ability to act *as though* he or she were hypnotized. Role theory differs from faking in that subjects cooperate and focus on hypnotic suggestions instead of pretending to be hypnotized.

Multifactorial theory The view that hypnotized people engage in *strategic role enactment* to behave in the way that they imagine a good hypnotized person will behave.

Response set theory The view that response expectancies play a key role in the production of the experiences suggested by the hypnotist.

These methods alter consciousness—that is, the normal focus of attention—and help people cope with stress by inducing feelings of relaxation.

Let's consider one common form of meditation. **Transcendental meditation (TM)** is a simplified form of Far Eastern meditation that was brought to the United States by the Maharishi Mahesh Yogi in 1959. Hundreds of thousands of Americans practice TM by repeating and concentrating on *mantras*—words or sounds that are claimed to help the person achieve an altered state of consciousness. Transcendental meditation has a number of goals that cannot be assessed scientifically, such as expanding consciousness so that it encompasses spiritual experiences, but there are also measurable goals, such as reducing anxiety and normalizing blood pressure.

Question 11: What are the effects of meditation? In early research, Herbert Benson (1975) found that TM lowered the heart and respiration rates and also produced what he labeled a *relaxation response* (A. Taylor et al., 2010). The blood pressure of people with hypertension—a risk factor in cardiovascular disease—decreased. In fact, people who meditated twice daily tended to show more normal blood pressure through the day. Meditators produced more frequent alpha waves—brain waves associated with feelings of relaxation. Meditation increases nighttime concentrations of the hormone melatonin, which is relaxing and helps people get to sleep (Rubia, 2009). Research in brain imaging also shows that meditation activates neural structures involved in attention and control of the autonomic nervous system, helping produce feelings of relaxation (Rubia, 2009).

The College of Maharishi Vedic Medicine in Fairfield, Iowa, has conducted a research program into the effectiveness of meditation in the treatment of hypertension. One study found that meditation was significantly more effective than placement on a waiting-list control in decreasing blood pressure associated with psychological distress (Nidich et al., 2009). Other studies have focused on older African Americans because they are more prone to hypertension than European Americans. Two studies compared the effects of TM, progressive relaxation (a muscle relaxation technique), and a “health education” placebo on high blood pressure (Alexander et al., 1996; Schneider et al., 1995). Both studies found that TM was significantly more effective at reducing high blood pressure than progressive relaxation or the placebo. A third study reported that TM practiced by African Americans aged 20 and older for 6 to 9 months was significantly more likely than the health education placebo to reduce the progression of atherosclerosis (hardening of the arteries) (Castillo-Richmond et al., 2000).

Neodissociation theory A theory of hypnotic events as the splitting of consciousness.

Transcendental meditation (TM) The simplified form of meditation brought to the United States by the Maharishi Mahesh Yogi and used as a method for coping with stress.

Biofeedback training (BFT) The systematic feeding back to an organism information about a bodily function so that the organism can gain control of that function.

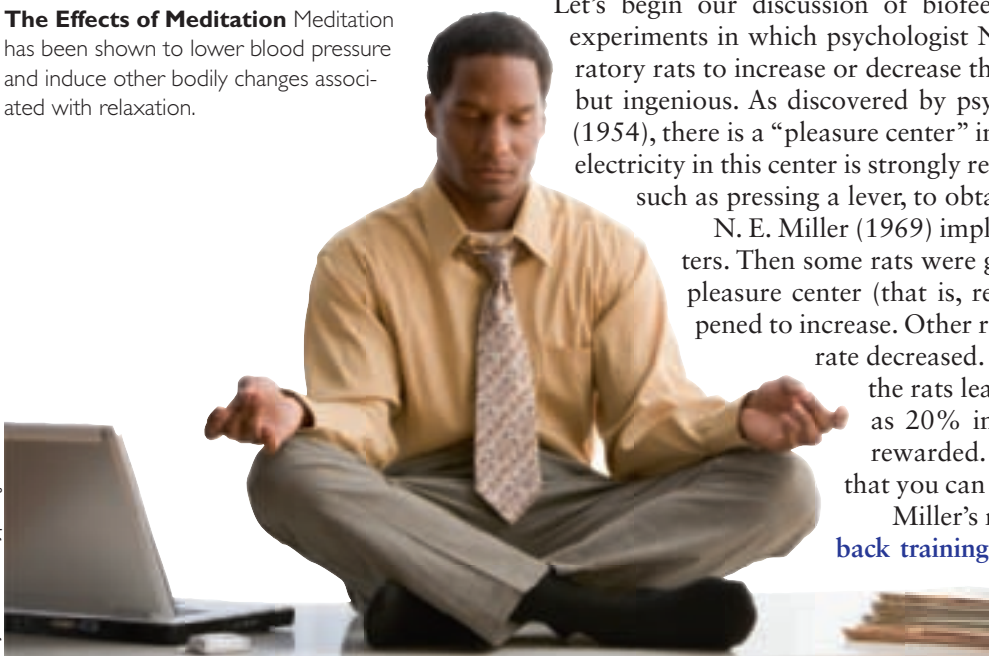
Biofeedback: On Getting in Touch with the Untouchable

The Effects of Meditation Meditation has been shown to lower blood pressure and induce other bodily changes associated with relaxation.

Let's begin our discussion of biofeedback by recounting some remarkable experiments in which psychologist Neal E. Miller (1909–2002) trained laboratory rats to increase or decrease their heart rates. His procedure was simple but ingenious. As discovered by psychologists James Olds and Peter Milner (1954), there is a “pleasure center” in the rat's hypothalamus. A small burst of electricity in this center is strongly reinforcing: Rats learn to do what they can, such as pressing a lever, to obtain this stimulus.

N. E. Miller (1969) implanted electrodes in the rats' pleasure centers. Then some rats were given a burst of electricity in their brain's pleasure center (that is, rewarded) whenever their heart rate happened to increase. Other rats received the stimulus when their heart rate decreased. After a single 90-minute training session, the rats learned to alter their heart rates by as much as 20% in the direction for which they had been rewarded. **Truth or Fiction Revisited:** It is true that you can teach a rat to raise or lower its heart rate.

Miller's research was an early example of **biofeedback training (BFT)**. **Question 12: What is biofeedback training?** Biofeedback is a system provides, or “feeds back,” information about a bodily function. Miller used



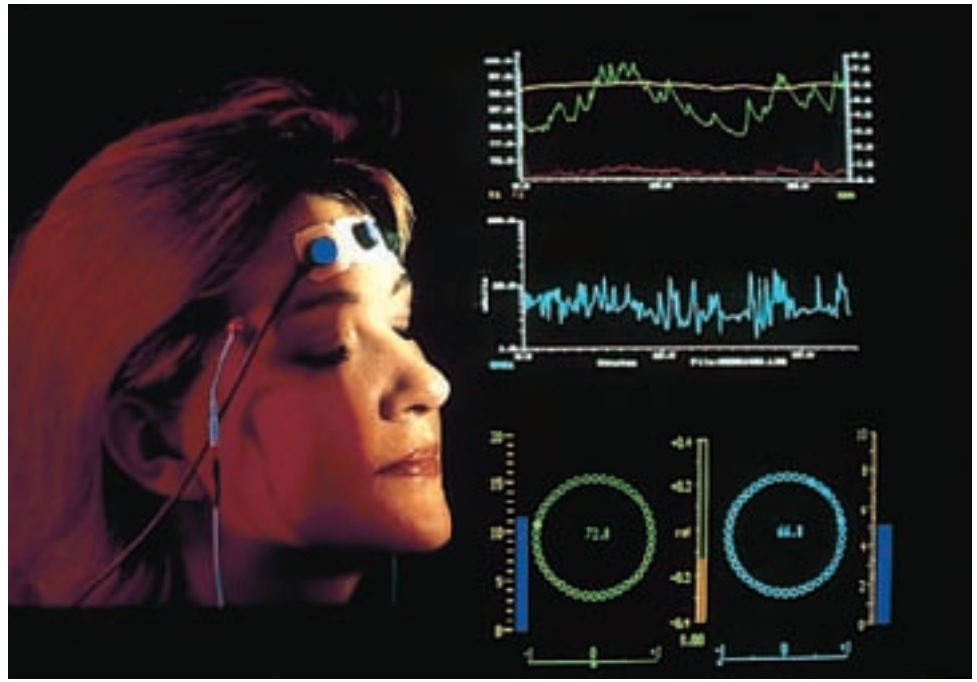
electrical stimulation of the brain to feed back information to rats when they had engaged in a targeted bodily response (in this case, raised or lowered their heart rates). Somehow, the rats then used this information to raise or lower their heart rates voluntarily.

Similarly, people have learned to change various bodily functions voluntarily, including heart rate, that were once considered beyond their control. However, electrodes are not implanted in people's brains. Rather, people hear a "blip" or observe some other signal that informs them when the targeted response is being displayed.

Question 13: How is biofeedback training used?

Biofeedback training has been used in many ways, including helping people combat stress, tension, and anxiety. For example, people can learn to emit alpha waves (and feel somewhat more relaxed) through feedback from an EEG. A blip may increase in frequency whenever alpha waves are being emitted. The psychologist's instructions are simply to "make the blip go faster." An **electromyograph (EMG)** monitors muscle tension. The EMG can be used to help paralyzed people who have lost afferent but not efferent nerves to limbs regain some control over those limbs. The EMG is also commonly used to help people become more aware of muscle tension in the forehead, fingers, and elsewhere and to learn to lower the tension (Pluess et al., 2009). Through the use of other instruments, people have learned to lower their heart rate, their blood pressure, and the amount of sweat in the palm of the hand (Greenhalgh et al., 2010). All of these changes are relaxing. Biofeedback is also widely used by sports psychologists to teach athletes how to relax muscle groups that are unessential to the task at hand so that they can control anxiety and tension.

Sleep, hypnosis, meditation, and biofeedback training all involve "natural" ways of deploying our attention or consciousness. Some altered states depend on the ingestion of psychoactive chemical substances we call "drugs." Let's now deploy our attention to the effects of alcohol and other drugs.



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Biofeedback Biofeedback is a system that provides, or "feeds back," information about a bodily function to an organism. Through biofeedback training, people have learned to gain voluntary control over a number of functions that are normally automatic, such as heart rate and blood pressure.

Electromyograph (EMG) An instrument that measures muscle tension.


LearningConnections • ALTERING CONSCIOUSNESS THROUGH HYPNOSIS, MEDITATION, AND BIOFEEDBACK

ACTIVE REVIEW (10) Franz Mesmer explained the hypnotic trance through his concept of animal _____. (11) Hypnosis typically brings about the following changes in consciousness: passivity, narrowed attention, _____ (detailed memory), suggestibility, assumption of unusual roles, perceptual distortions, posthypnotic amnesia, and posthypnotic suggestion. (12) According to _____ set theory, knowledge of what one is expected to do is a key component of being hypnotized. (13) In meditation, one focuses passively on a _____ to alter the normal person–environment relationship. (14) Investigators have shown that meditation can reduce high _____ pressure. (15) Neal Miller taught rats to increase or decrease their _____ rates by giving them an electric shock in

their "pleasure centers" when they performed the targeted response.

REFLECT AND RELATE Has anybody ever tried to hypnotize you or someone you know? How did he or she do it? What were the results? How do the results fit with the theories of hypnosis discussed in this section?

CRITICAL THINKING Is it possible to explain the behavior of the rats in Miller's research on biofeedback by referring to what the animals were "thinking" when they learned to increase or decrease their heart rates? Explain.

 Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

ALTERING CONSCIOUSNESS THROUGH DRUGS

I can get prescription drugs from different places and don't ever have to see a doctor... I have friends whose parents are pill addicts, and we "borrow" from them. Other times I have friends who have ailments who get lots of pills and sell them for cheap. As long as prescription pills are taken right, they're much safer than street drugs.

—A high school student, cited in Friedman, 2006, p. 1448

*Smoking: a "custome lothe-
some to the Eye, hatefull to the
Nose, harmefull to the Braine,
dangerous to the Lungs."*

KING JAMES I, 1604

The world is a supermarket of **psychoactive substances**, or drugs. The United States is flooded with drugs that distort perceptions and change mood—drugs that take you up, let you down, and move you across town. Some of these drugs are legal, others illegal. Some are used recreationally, others medically. Some are safe if used correctly and dangerous if they are not. Some people use drugs because their friends do or because their parents tell them not to. Some are seeking pleasure; others are seeking inner truth or escape.

For better or worse, drugs are part of American life. Young people often become involved with drugs that impair their ability to learn at school and are connected with reckless behavior (Pani et al., 2009). Alcohol is the most popular drug on high school and college campuses (Johnston et al., 2009). More than one in six people of college age smokes marijuana regularly (Substance Abuse and Mental Health Services Administration, 2007). Many Americans take **depressants** to get to sleep at night and **stimulants** to get going in the morning. Karl Marx charged that "religion... is the opium of the people," but heroin is the real "opium of the people." Cocaine was once a toy of the well-to-do, but price breaks have brought it into the lockers of high school students.

Truth or Fiction Revisited: Substance use and abuse among high school students seems to be experiencing a slight decline in the early years of the 21st century. Ongoing surveys of high school students by the Institute of Social Research at the University of Michigan find that the use of illicit drugs by 8th through 12th graders has generally declined over the past few decades (Johnston et al., 2009).

How widespread is substance abuse among adolescents? Table 5.3 ■ compares self-reported substance abuse in 1998 with that in 2008 for 8th, 10th, and 12th graders. There was a decline in the use of (any) illicit drug from about 29% to 20% among 8th graders during this decade, from about 45% to 34% among 10th graders, and from about 54% to 47% among 12th graders. Experience with drugs increased with age.

The incidence of use of some drugs was relatively high: alcohol, cigarettes (nicotine is the drug in cigarettes), and marijuana. Some drugs have been used by fewer than 10% of students: MDMA (ecstasy), cocaine, LSD, steroids, PCP, and heroin. Perhaps the most heartening news in the survey results is that messages about the dangers of cigarette smoking have apparently been getting through to youngsters; only about one in eight 8th through 12th graders says they have smoked cigarettes in the last month.

Fewer than 2% of high school students report they have used steroids. Steroids, which build muscle mass, are typically used by boys to improve their athletic performance, although some users also want to improve their physical appearance.

Substance Abuse and Dependence: Crossing the Line

Where does drug use end and abuse begin? **Question 14: What are substance abuse and dependence?** The American Psychiatric Association (2000)

Psychoactive substances Drugs that have psychological effects such as stimulation or distortion of perceptions.

Depressant A drug that lowers the rate of activity of the nervous system.

Stimulant A drug that increases activity of the nervous system.



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Table 5.3 ■ Trends in Lifetime Use of Various Drugs for 8th, 10th, and 12th Graders—1998 versus 2008 (Percents)

	1998	2008		1998	2008
Any illicit drug			MDMA (Ecstasy)		
8th Grade	29%	20%	8th Grade	3	2
10th Grade	45	34	10th Grade	5	4
12th Grade	54	47	12th Grade	6	6
Alcohol			Cocaine		
8th Grade	53	39	8th Grade	5	3
10th Grade	70	58	10th Grade	7	5
12th Grade	81	72	12th Grade	9	7
Cigarettes			LSD		
8th Grade	46	21	8th Grade	4	2
10th Grade	58	32	10th Grade	9	3
12th Grade	65	45	12th Grade	13	4
Marijuana			Steroids		
8th Grade	22	15	8th Grade	2	1
10th Grade	40	30	10th Grade	2	1
12th Grade	49	43	12th Grade	3	2
Amphetamines			PCP		
8th Grade	11	7	8th Grade	—	—
10th Grade	16	9	10th Grade	—	—
12th Grade	16	11	12th Grade	4	2
Inhalants			Heroin		
8th Grade	21	16	8th Grade	2	1
10th Grade	18	13	10th Grade	2	1
12th Grade	15	10	12th Grade	2	1
Barbiturates					
8th Grade	—	—			
10th Grade	—	—			
12th Grade	5	—			

Adapted from: Johnston, L. D., O'Malley, P.M., Bachman, J. G., & Schulenberg, J. E. (2009). *Monitoring the future national results on adolescent drug use: Overview of key findings, 2008* (NIH Publication No. 09-7401). Bethesda, MD: National Institute on Drug Abuse. Table 5.

defines **substance abuse** as repeated use of a substance despite the fact that it is causing or compounding social, occupational, psychological, or physical problems. If you are missing school or work because you are drunk or “sleeping it off,” you are abusing alcohol. The amount you drink is not as crucial as the fact that your pattern of use disrupts your life.

Dependence is more severe than abuse, having both behavioral and biological aspects (American Psychiatric Association, 2000). Behaviorally, dependence is often characterized by loss of control over one’s use of the substance. Dependent people may organize their lives around getting and using a substance. For example, biological or physiological dependence is typified by tolerance, withdrawal symptoms, or both. **Tolerance** is the body’s habituation to a substance so that, with regular usage, higher doses are required to achieve similar effects. There are characteristic withdrawal symptoms, or an **abstinence syndrome**, when the level of usage suddenly drops off. The abstinence syndrome for alcohol includes anxiety, tremors, restlessness, weakness, rapid pulse, and high blood pressure.

When living without a drug, people who are *psychologically* dependent show signs of anxiety (such as shakiness, rapid pulse, and sweating) that may be similar to abstinence syndromes. Because of these signs, they may believe that they are physiologically dependent on—or addicted to—a drug when they are actually psychologically dependent. But symptoms of abstinence from some drugs are unmistakably physiological. One symptom is **delirium tremens** (“the DTs”) experienced by some chronic alcoholics when they suddenly lower their intake of alcohol. The DTs are characterized by heavy sweating, restlessness, general disorientation, and terrifying hallucinations—often of crawling animals.

Substance abuse Repeated use of a substance despite the fact that it is causing or compounding social, occupational, psychological, or physical problems.

Tolerance Habituation to a drug, with the result that increasingly higher doses of the drug are needed to achieve similar effects.

Abstinence syndrome A characteristic cluster of symptoms that results from a sudden decrease in an addictive drug’s level of usage.

Delirium tremens A condition characterized by sweating, restlessness, disorientation, and hallucinations. The DTs occur in some chronic alcohol users when there is a sudden decrease in usage.



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Causal Factors in Substance Abuse and Dependence

Question 15: What are the causes of substance abuse and dependence? Substance abuse and dependence usually begin with experimental use in adolescence (Marlatt, 2010; Schulte et al., 2009). People experiment with drugs for various reasons, including curiosity, conformity to peer pressure, parental use, rebelliousness, escape from boredom or pressure, and the seeking of excitement or pleasure (T. T. Clark, 2010; Lindgren et al., 2009; Yang et al., 2009; Zilberman, 2009). People commonly try tranquilizing agents such as Valium (the generic name is diazepam) and alcohol on the basis of a recommendation or observation of others. Use of a substance may be reinforced by peers or by the drug's positive effects on mood and its reduction of unpleasant sensations

such as anxiety, fear, and stress. Many people use drugs as a form of self-medication for anxiety and depression and even for feelings of low self-esteem.

For people who are physiologically dependent, avoidance of withdrawal symptoms is also reinforcing. Carrying a supply of the substance is reinforcing because one need not worry about going without it.

People may have a genetic predisposition toward physiological dependence on various substances, including alcohol, opioids, cocaine, and nicotine (Agrawal et al., 2010; Dick et al., 2009; Farrer et al., 2009; Kuo et al., 2010). For example, the biological children of alcoholics who are reared by adoptive parents seem more likely to develop alcohol-related problems than the natural children of the adoptive parents. An inherited tendency toward alcoholism may involve greater sensitivity to alcohol (that is, greater enjoyment of it) and greater tolerance of it (Radcliffe et al., 2009). College students with alcoholic parents exhibit better muscular control and visual-motor coordination when they drink than do college students whose parents are not alcoholics. They also feel less intoxicated when they drink (Pihl et al., 1990).

Now that we have learned about substance abuse and dependence, let's turn to a discussion of the different kinds of psychoactive drugs. Some are depressants, others stimulants, and still others hallucinogenics.

Depressants

Depressant drugs generally act by slowing the activity of the central nervous system. There are also effects that are specific to each depressant drug. In this section, we consider the effects of alcohol, opiates, and barbiturates.

ALCOHOL—THE SWISS ARMY KNIFE OF PSYCHOACTIVE SUBSTANCES

No drug has meant so much to so many as alcohol. Alcohol is our dinnertime relaxant, our bedtime sedative, our cocktail-party social facilitator. We use alcohol to celebrate holy days, applaud our accomplishments, and express joyous wishes. The young assert their maturity with alcohol. Alcohol is used at least occasionally by the majority of high school and college students (Johnston et al., 2009). Alcohol even kills germs on surface wounds.

People use alcohol like a Swiss Army knife. It does it all. Alcohol is the all-purpose medicine you can buy without prescription. It is the relief from anxiety, depression, or loneliness that you can swallow in public without criticism or stigma. A man who takes a Valium tablet may look weak. A man who downs a bottle of beer may be perceived as "macho."

But the army knife also has a sharp blade. No drug has been so abused as alcohol. There are 10 million to 20 million people with alcoholism in the United States. In contrast, 750,000 to 1 million use heroin regularly, and about 800,000 use cocaine

Why Do Young People Turn to Drugs?

Some are bored, some are following recommendations of peers, some are experimenting, and others are rebelling.

As an example to others, and not that I care for moderation myself, it has always been my rule never to smoke when asleep, and never to refrain from smoking when awake.

MARK TWAIN

The chains of habit are too weak to be felt until they are too strong to be broken.

DR. SAMUEL JOHNSON

regularly (Johnston et al., 2009). Excessive drinking has been linked to lower productivity, loss of employment, and downward movement in social status. Yet half of all Americans use alcohol regularly.

What about alcohol on campus? A study by the National Institute of Alcohol Abuse and Alcoholism (Hingson et al., 2002) found that about four college students die each day due to alcohol-related causes, another 1,300 to 1,400 have alcohol-related injuries, and nearly 200 are raped by their dates after drinking. Binge drinking—defined as having five or more drinks in a row for a male or four or more for a female—is connected with aggressive behavior, poor grades, sexual promiscuity, and serious accidents (Hutton, 2008; Randolph et al., 2009; Swartout & White, 2010; Wong et al., 2008). About 79,000 accidents per year can be related to binge drinking (Naimi et al., 2010). Nevertheless, 44% of college students binge at least twice a month, and half this number binge three or more times every 2 weeks (Hingson et al., 2002). Males are more likely than females to binge, and they tend to drink more than females when they do (Naimi et al., 2010). The media seem to pay more attention to deaths due to heroin and cocaine overdoses, but many more college students die each year from causes related to drinking, including accidents and alcohol overdoses (Hingson et al., 2002; Hustad et al., 2010). Despite widespread marijuana use, alcohol remains the drug of choice among adolescents.

Question 16: What are the effects of alcohol? The effects of alcohol vary with the dose and the duration of use. Low doses of alcohol may be stimulating because alcohol dilates blood vessels, which ferry sugars through the body. But higher doses of alcohol have a clear sedative effect, which is why alcohol is classified as a depressant. Alcohol relaxes people and deadens minor aches and pains. Alcohol also intoxicates: It impairs cognitive functioning, slurs the speech, and reduces motor coordination. Alcohol is involved in about half of the fatal automobile accidents in the United States.

Research with rats and humans shows that alcohol lowers inhibitions (Hoffman & Friese, 2008; S. B. Johnson et al., 2010; Lam et al., 2009). Because alcohol lessens inhibitions, drinkers may do things they would not do if they were sober, such as engage in sexual activity or have unprotected sex (Collins et al., 2010; Cooper, 2002). Why? Perhaps alcohol impairs the thought processes needed to inhibit impulses (Hoffman & Friese, 2008; Sanjuan et al., 2006; Steele & Josephs, 1990). When drunk, people may be less able to foresee the consequences of their behavior. They may also be less likely to summon up their moral beliefs. Then, too, alcohol induces feelings of elation and euphoria that may wash away doubts. Alcohol is also associated with a liberated social role in our culture. Drinkers may place the blame on alcohol (“It’s the alcohol, not me”), even though they choose to drink.

Adolescent involvement with alcohol has repeatedly been linked to poor school grades and other stressors (Donovan, 2009; Wills et al., 2002). Drinking can, of course, contribute to poor grades and other problems, but adolescents may drink to reduce academic and other stresses.

Men are more likely than women to become alcoholics. Why? A cultural explanation is that tighter social constraints are usually placed on women. A biological explanation is that alcohol hits women harder, discouraging them from overindulging. If you have the impression that alcohol “goes to women’s heads” more quickly than to men’s, you are probably right. Women seem more affected by alcohol because they metabolize very little of it in the stomach. Women have less of an enzyme—*aldehyde dehydrogenase*—that metabolizes alcohol in the stomach than men do (M. A. Miller et al., 2009; Oertelt-Prigione & Regitz-Zagrosek, 2009). Thus, alcohol reaches women’s bloodstream and brain relatively intact. Women metabolize it mainly in the liver. According to one health professional, for women “drinking alcohol has the same effect as injecting it intravenously” (Lieber, 1990). Strong stuff indeed.



© PhotoKit Photography/Keir

Alcohol Is the Swiss Army Knife of Substances

We use it to fight boredom, lubricate social interactions, lower anxieties, erase inhibitions, and celebrate joyous occasions.



© Blend Images Photography/Herz

Women and Alcohol Women have less of an enzyme—aldehyde dehydrogenase—that metabolizes alcohol in the stomach than men do. Therefore, alcohol “goes to their heads” more quickly. Asians also have less of the enzyme than Europeans do, placing them at increased risk of a “flushing response” when they drink.

Levels of aldehyde dehydrogenase are also associated with levels of drinking in some ethnic groups. Asians and Asian Americans, who have lower levels of aldehyde dehydrogenase than Europeans do, are more likely than Europeans and European Americans to show a “flushing response” to alcohol, as evidenced by redness of the face, rapid heart rate, dizziness, and headaches (Kawano, 2010). Such sensitivity to alcohol may inhibit immoderate drinking among Asian Americans as well as women in general.

Culture is also connected with alcohol abuse. Native Americans and Irish Americans have the highest rates of alcoholism in the United States. Jewish Americans have relatively low rates, a fact for which a cultural explanation is usually offered. Jewish Americans tend to expose children to alcohol (wine) early in life, but they do so within a strong family or religious context. Wine is offered in small quantities, with consequent low blood alcohol levels. Alcohol therefore is not connected with rebellion, aggression, or failure in Jewish culture.

Regardless of how or why one starts drinking, regular drinking can lead to physiological dependence. People are then motivated to drink to avoid withdrawal symptoms. Still, even when alcoholics have “dried out”—withdrawn from alcohol—many return to drinking (Schuckit, 1996). Perhaps they still want to use alcohol as a way of coping with stress or as an excuse for failure (Laucht et al., 2009).

OPIATES

Opiates are a group of **narcotics** that are derived from the opium poppy, from which they obtain their name. **Opioids** are similar in chemical structure but are synthesized in a laboratory. The ancient Sumerians gave the opium poppy its name: It means “plant of joy.” Opiates include morphine, heroin, codeine, Demerol, and similar drugs.

Question 17: What are the effects of opiates? The major medical application of this group of drugs is relief from pain.

Heroin can provide a strong euphoric “rush.” Users claim that it is so pleasurable it can eradicate any thought of food or sex. Although regular users develop tolerance for heroin, high doses can cause drowsiness and stupor, alter time perception, and impair judgment. With regular use of opiates, such as morphine and heroin, the brain stops producing the neurotransmitters that are chemically similar to opiates—that is, the pain-relieving endorphins. As a result, people can become physiologically dependent on opiates, and going without them can be an agonizing experience. Withdrawal syndromes may begin with flulike symptoms and progress through tremors, cramps,

SELF ASSESSMENT

Do You Have a Problem with Alcohol?

How can you tell whether you have a drinking problem? Answering the following four questions can help you figure it out (National Institute on Alcohol Abuse and Alcoholism, 2005):

- Yes No Have you ever felt you should cut down on your drinking?
- Yes No Have people annoyed you by criticizing your drinking?
- Yes No Have you ever felt bad or guilty about your drinking?

Yes No Have you ever had a drink first thing in the morning (as an “eye opener”) to steady your nerves or get rid of a hangover?

Just one “yes” answer suggests a possible alcohol problem. Two or more “yeses” make it highly likely that a problem exists. In either case, it is advisable to discuss your answers with your doctor or another health-care provider.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this quiz.

Controversy in Psychology IS A DRINK A DAY GOOD FOR YOU?

The effects of alcohol on health are complex. Light drinking can be beneficial. One effect of having a drink or two a day is to increase levels of high-density lipoprotein (HDL, or “good” cholesterol) in the bloodstream and thus decrease the risk of cardiovascular disorders (Mukamal & Rimm, 2008). Another positive effect is cognitive: A study of 400 older adults by researchers at the Institute of Psychiatry in London found that those who had been having a drink a day from before the age of 60 were less likely to see their cognitive abilities decline with age (Cervilla et al., 2000). A drink or two a day may even cut the risk of Alzheimer’s disease (Panza et al., 2009). According to the London researchers (Cervilla et al., 2000), the path to positive cognitive results from alcohol may be through the heart: Small doses of alcohol may help maintain a healthful flow of oxygen-laden blood to the brain.

Now for the negative. As a food, alcohol is fattening. Even so, chronic

drinkers may be malnourished. Although it is high in calories, alcohol does not contain nutrients such as vitamins and proteins. Moreover, it can interfere with the body’s absorption of vitamins, particularly thiamine, a B vitamin. Thus, chronic drinking can lead to a number of disorders such as **cirrhosis of the liver**, which has been linked to protein deficiency, and **Wernicke–Korsakoff syndrome**, which has been linked to vitamin B deficiency. Chronic heavy drinking has been linked to cardiovascular disorders and cancer. In particular, heavy drinking places women at increased risk for breast cancer (S. M. Zhang et al., 2007). Drinking by a pregnant woman may also harm the embryo.

Truth or Fiction Revisited: So, is a drink a day good for you? Apparently, yes (Mukamal & Rimm, 2008). However, most health professionals are reluctant to advise that people drink regularly, though lightly. One cause for concern is that regular drinkers may

lose control of the quantity of alcohol they ingest, become physiologically dependent, and then suffer the effects of heavy drinking.

In Chapter 16, we discuss the effectiveness of the peer-support group Alcoholics Anonymous (AA) for treating alcoholism. We will compare AA to professional psychological methods of treating alcoholism. Research is also under way on the use of medicines in treating problem drinking, including naltrexone, nalmefene, acamprosate (unavailable in the United States), and disulfiram. People who take disulfiram experience symptoms such as nausea and vomiting if they drink (De Sousa et al., 2008), but it apparently only decreases the frequency of drinking, thus leading many users to focus on finding ways around it rather than returning to a nonalcoholic lifestyle. Naltrexone and acamprosate are apparently more effective because they reduce the craving for alcohol (Laaksonen et al., 2008).

chills alternating with sweating, rapid pulse, high blood pressure, insomnia, vomiting, and diarrhea.

Because of their addictive properties, the nonmedical use of opiates has been criminalized. Penalties for possession or sale are high, so they are also expensive as street drugs. For this reason, many physiologically dependent people support their habit through dealing (selling heroin), prostitution, or selling stolen goods. This information seems to have gotten through to high school students; the great majority disapprove of using heroin (Johnston et al., 2009).

Heroin, by the way, was so named because it made people feel “heroic.” It was also hailed as the “hero” that would cure physiological dependence on morphine. **Truth or Fiction Revisited:** Ironically, heroin was in fact once used as a cure for addiction to morphine.

Methadone is a synthetic opioid. It has been used to treat physiological dependence on heroin in the same way that heroin was once used to treat physiological dependence on morphine. Methadone is slower acting than heroin and does not provide the thrilling rush, but it does prevent experiencing withdrawal symptoms. Some people must be maintained on methadone for many years before they can be gradually withdrawn from it (Kakko et al., 2007). Some are maintained on methadone indefinitely because they are unwilling to undergo any withdrawal symptoms. However, many lead productive lives on methadone.

Many people who obtain prescriptions for opiates for pain relief neither experience a euphoric rush nor become psychologically dependent on them (Nguyen & Hamill-Ruth, 2009). If they no longer need opiates for pain but have become physiologically dependent on them, they can usually quit with few, if any, side effects by gradually decreasing their dosage. Thus, difficulty or ease of withdrawal may be connected with one’s motives for using psychoactive drugs. Those who are seeking habitual relief from psychological pain seem to become more dependent on them than people who are seeking time-limited relief from physical pain.

But prescription opioids can become drugs of abuse when they are used illicitly as street drugs (Friedman, 2006). About 7% of college students have used the prescription opioid Vicodin without a prescription (Srnick, 2007). Among 12th graders, about 5.5% report using another opioid, OxyContin, and 9.5% report taking Vicodin (Srnick, 2007).

Opiates A group of narcotics derived from the opium poppy that provide a euphoric rush and depress the nervous system.

Narcotics Drugs used to relieve pain and induce sleep. The term is usually reserved for opiates.

Opioids Chemicals that act on opiate receptors but are not derived from the opium poppy.

Cirrhosis of the liver A disease caused by protein deficiency in which connective fibers replace active liver cells, impeding circulation of the blood. Alcohol does not contain protein; therefore, persons who drink excessively may be prone to this disease.

Wernicke–Korsakoff syndrome A cluster of symptoms associated with chronic alcohol abuse and characterized by confusion, memory impairment, and filling in gaps in memory with false information (confabulation).

Barbiturate An addictive depressant used to relieve anxiety or pain and to treat epilepsy, high blood pressure, and insomnia.

Amphetamines Stimulants derived from *alpha-methyl-beta-phenyl-ethyl-amine*.

Attention-deficit/hyperactivity disorder A disorder that begins in childhood and is characterized by a persistent pattern of lack of attention with or without hyperactivity and impulsive behavior.



Snorting Cocaine Cocaine is a powerful stimulant that boosts self-confidence. However, health professionals have become concerned about its physical effects, including sudden rises in blood pressure, constriction of blood vessels, and acceleration of heart rate. Several athletes have died from cocaine overdoses.

BARBITURATES

Question 18: What are the effects of barbiturates? Barbiturates like Nembutal and Seconal are depressants with several medical uses, including relief of anxiety and tension, relief from pain, and treatment of epilepsy, high blood pressure, and insomnia. With regular use, barbiturates lead rapidly to physiological and psychological dependence. Physicians therefore must provide these substances with care.

Barbiturates are popular as street drugs because they are relaxing and produce mild euphoria. High doses of barbiturates result in drowsiness, motor impairment, slurred speech, irritability, and poor judgment. A highly physiologically dependent person who is withdrawn abruptly from barbiturates may experience convulsions and die. Because of additive effects, it is dangerous to mix alcohol and other depressants.

Stimulants

All stimulants increase the activity of the nervous system. Some of their effects can be positive. For example, amphetamines stimulate cognitive activity and apparently help rats (Hadamitzky & Koch, 2009) and humans (Wilner et al., 2009) control impulses. (The depressant alcohol, by contrast, can lower the inhibition of impulses.) Stimulants can be appealing as street drugs because many contribute to feelings of euphoria and self-confidence. But they also have their risks—sometimes, quite serious risks. In this section, we discuss amphetamines, cocaine, and nicotine.

AMPHETAMINES AND RELATED STIMULANTS

Question 19: What are the effects of amphetamines? Amphetamines are a group of stimulants that were first used by soldiers during World War II to help them remain alert through the night. Truck drivers have also used them to stay awake all night. Amphetamines have become perhaps more widely known through students, who have used them for all-night cram sessions, and through dieters, who use them to reduce hunger.

Called speed, uppers, bennies (for Benzedrine), and dexies (for Dexedrine), these drugs are often abused for the euphoric rush they can produce in high doses. Some people swallow amphetamines in pill form or inject liquid Methedrine, the strongest form, into their veins. As a result, they may stay awake and high for days on end. However, such highs must end. People who have been on prolonged highs sometimes “crash,” or fall into a deep sleep or depression. Some people commit suicide when crashing.

On the other hand, physicians frequently prescribe stimulants in an effort to help hyperactive children control their behavior. **Truth or Fiction Revisited:** It is therefore true that many health professionals calm hyperactive children by giving them a stimulant. Amphetamines and the stimulant methylphenidate (Ritalin) are widely used to treat **attention-deficit/hyperactivity disorder (ADHD)** in children. Ritalin and amphetamines have been shown to increase the attention span, decrease aggressive and disruptive behavior, and lead to academic gains (May & Kratochvil, 2010; Wanchoo et al., 2010). Why should stimulants calm children? Hyperactivity may be connected with immaturity of the cerebral cortex, and stimulants may stimulate the cortex to exercise control over more primitive centers in the brain. On the other hand, these stimulants place children—and adults who may continue to use them—at increased risk for sleep disorders and loss of appetite (Meijer et al., 2009).

Tolerance for amphetamines develops rapidly, and users can become dependent on them, especially when they use them to self-medicate themselves for depression. Regular use of the powerful amphetamine called methamphetamine may well be physically addictive (Embry et al., 2009), but the extent to which amphetamines cause physical addiction has been a subject of controversy. It is widely accepted, however, that high doses of amphetamines may cause restlessness, insomnia, loss of appetite, hallucinations, paranoid delusions (for example, false ideas that others are eavesdropping or intend to harm one), and irritability.

Now let's discuss some of the most widely abused stimulants.

COCAINE

Cocaine is derived from coca leaves—the plant from which the soft drink took its name. Do you recall the commercials claiming that “Coke adds life”? Given its

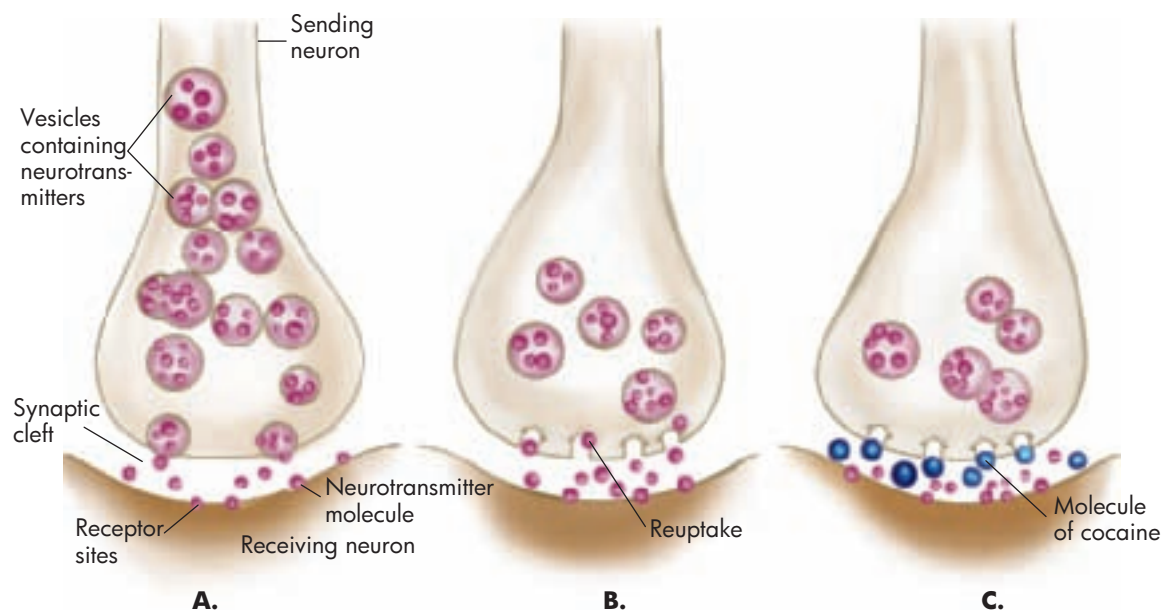


Figure 5.4 ■ How Cocaine Produces Euphoria and Why People “Crash”

A. In the normal functioning of the nervous system, neurotransmitters are released into the synaptic cleft by vesicles in terminal buttons of sending neurons. Many are taken up by receptor sites in receiving neurons.
B. In the process called reuptake, sending neurons typically reabsorb excess molecules of neurotransmitters.
C. Molecules of cocaine bind to the sites on sending neurons that normally reuptake molecules of neurotransmitters. As a result, molecules of norepinephrine, dopamine, and serotonin remain longer in the synaptic cleft, increasing their typical mood-altering effects and providing a euphoric “rush.” When the person stops using cocaine, the lessened absorption of neurotransmitters by receiving neurons causes his or her mood to “crash.”

caffeine and sugar content, Coke—Coca-Cola, that is—should provide quite a lift. **Truth or Fiction Revisited:** It is true that Coca-Cola once “added life” through the use of a powerful, then legal but now illegal, stimulant: cocaine. But Coca-Cola hasn’t been “the real thing” since 1906, when the company discontinued the use of cocaine in its formula.

Question 20: What are the effects of cocaine? Cocaine is a stimulant that produces euphoria, reduces hunger, deadens pain, and bolsters self-confidence. (See Figure 5.4.) About 5% of 10th graders and 7% of 12th graders have used cocaine (Johnston et al., 2009), but most high school students believe that the use of cocaine is harmful (Johnston et al., 2009).

Cocaine may be brewed from coca leaves as a tea, snorted in powder form, or injected in liquid form. Repeated snorting constricts blood vessels in the nose, drying the skin and sometimes exposing cartilage and perforating the nasal septum. These problems require cosmetic surgery. The potent cocaine derivatives known as “crack” and “bazooka” are inexpensive because they are unrefined.

Biologically speaking, cocaine stimulates sudden rises in blood pressure, constricts the coronary arteries, and thickens the blood (both of which decrease the oxygen supply to the heart), therefore quickening the heart rate (Kontak et al., 2009). These events occasionally result in respiratory and cardiovascular collapse (Lange & Hillis, 2010). The sudden deaths of a number of athletes have been caused in this way. Overdoses can lead to restlessness and insomnia, tremors, headaches, nausea, convulsions, hallucinations, and delusions. The use of crack has been connected with strokes.

Cocaine—also called *snow* and *coke*—has been used as a local anesthetic since the early 1800s. In 1884, it came to the attention of a young Viennese neurologist named Sigmund Freud, who used it to fight his own depression and published an article about it titled “Song of Praise.” Freud’s early ardor was tempered when he learned that cocaine is habit forming and can cause hallucinations and delusions. Cocaine causes physiological as well as psychological dependence.

A CLOSER LOOK • REAL LIFE

DEPENDENCE ON COCAINE? DENIAL AT WORK

The following clinical interview illustrates how denial can mask reality in substance abuse. A business executive was brought in by his wife for a consultation. She complained his once-successful business was jeopardized by his erratic behavior, he was grouchy and moody, and he had spent \$7,000 in the previous month on cocaine.

CLINICIAN: Have you missed many days at work recently?
EXECUTIVE: Yes, but I can afford to, since I own the business. Nobody checks up on me.
CLINICIAN: It sounds like that's precisely the problem. When you don't go to work, the company stays open, but it doesn't do very well.
EXECUTIVE: My employees are well trained. They can run the company without me.
CLINICIAN: But that's not happening.
EXECUTIVE: Then there's something wrong with them. I'll have to look into it.
CLINICIAN: It sounds as if there's something wrong with you, but you don't want to look into it.
EXECUTIVE: Now you're on my case. I don't know why you listen to everything my wife says.
CLINICIAN: How many days of work did you miss in the last two months?
EXECUTIVE: A couple.
CLINICIAN: Are you saying that you missed only two days of work?
EXECUTIVE: Maybe a few.
CLINICIAN: Only three or four days?
EXECUTIVE: Maybe a little more.
CLINICIAN: Ten? Fifteen?
EXECUTIVE: Fifteen.
CLINICIAN: All because of cocaine?
EXECUTIVE: No.
CLINICIAN: How many were because of cocaine?
EXECUTIVE: Less than fifteen.
CLINICIAN: Fourteen? Thirteen?
EXECUTIVE: Maybe thirteen.
CLINICIAN: So you missed thirteen days of work in the last two months because of cocaine. That's almost two days a week.



© Photo: Photography/Net

Denial Not me! People who are dependent on drugs frequently deny their situations.

EXECUTIVE: That sounds like a lot but it's no big deal. Like I say, the company can run itself.
CLINICIAN: How long have you been using cocaine?
EXECUTIVE: About three years.
CLINICIAN: Did you ever use drugs or alcohol before that in any kind of quantity?
EXECUTIVE: No.
CLINICIAN: Then let's think back five years. Five years ago, if you had imagined yourself missing over a third of your workdays because of a drug, and if you had imagined yourself spending the equivalent of \$84,000 a year on that same drug, and if you saw your once-successful business collapsing all around you, wouldn't you have thought that that was indicative of a pretty serious problem?
EXECUTIVE: Yes, I would have.
CLINICIAN: So what's different now?
EXECUTIVE: I guess I just don't want to think about it.

From Weiss, Mirin, & Bartell, 1994.

NICOTINE

Nicotine is the stimulant found in cigarettes and cigars. **Question 21: What are the effects of nicotine?** Nicotine stimulates discharge of the hormone adrenaline and the release of many neurotransmitters, including noradrenaline, dopamine, and acetylcholine (Haustein & Groneberg, 2009). Adrenaline creates a burst of autonomic activity that disrupts normal heart rhythms, accelerates the heart rate, and pours sugar into the blood. Acetylcholine is vital in memory formation, and nicotine

Hydrocarbons Chemical compounds consisting of hydrogen and carbon.

appears to enhance memory and attention, improve performance on simple repetitive tasks, and enhance the mood (Froeliger et al., 2009; Greenwood et al., 2009). Despite its stimulative properties, it also appears to relax people and reduce stress (A. Cohen et al., 2009).

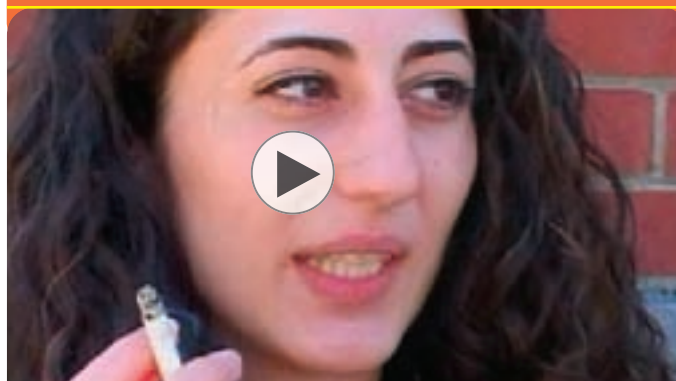
Nicotine depresses the appetite and raises the metabolic rate. Thus, some people smoke cigarettes to control their weight (J. L. Johnson et al., 2009). People also tend to eat more when they stop smoking, causing some to return to the habit.

Nicotine may be as addictive as heroin or cocaine (Franklin et al., 2009). It is the agent that creates physiological dependence on tobacco products (Small et al., 2010). Symptoms of withdrawal from nicotine include nervousness, drowsiness, loss of energy, headaches, irregular bowel movements, lightheadedness, insomnia, dizziness, cramps, palpitations, tremors, and sweating (Haustein & Groneberg, 2009). Because many of these symptoms resemble those of anxiety, it was once thought that they might reflect the anxiety of attempting to quit smoking rather than addiction.

It's no secret. Cigarette packs sold in the United States carry messages like "Warning: The Surgeon General Has Determined That Cigarette Smoking Is Dangerous to Your Health." Cigarette advertising has been banned on radio and television. Nearly 400,000 Americans die from smoking-related illnesses each year (American Lung Association, 2010). This is greater than the equivalent of two jumbo jets colliding in midair each day with all passengers lost. **Truth or Fiction Revisited:** Smoking-related deaths are higher than the number of people who die from motor vehicle accidents, alcohol and drug abuse, suicide, homicide, and AIDS *combined*.

The carbon monoxide in cigarette smoke impairs the blood's ability to carry oxygen, causing shortness of breath. The **hydrocarbons** ("tars") in cigarette and cigar smoke lead to lung cancer (American Lung Association, 2010). Smoking is responsible for about 90% of deaths from lung cancer (American Lung Association, 2010). Cigarette smoking

Video Connections—Why Is Nicotine So Addictive?



This video focuses on the role of reinforcement and how understanding cues may help people quit smoking.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

The perils of cigarette smoking are widely known today. One surgeon general declared that cigarette smoking is the chief preventable cause of death in the United States. The numbers of Americans who die from smoking are comparable to the number of lives that would be lost if two jumbo jets crashed every day. If flying were that unsafe, would the government ground all flights? Would the public continue to make airline reservations?



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An Antismoking Poster Message:
"Smoking kills."

Giving up smoking is the easiest thing in the world. I know because I've done it thousands of times.

MARK TWAIN

Table 5.4 ■ Snapshot, U.S.A.: Gender, Level of Education, and Smoking

Factor	Group	Percent Who Smoke
Gender	Women	18.3
	Men	23.1
Level of education	Fewer than 12 years	27.5
	College graduate and above	10.6

Data based on reports of persons aged 18 and above.

Source: Dube, S. R., Asman, K., Malarcher, A., & Caraballo, R. (2009). Cigarette smoking among adults and trends in smoking cessation—United States, 2008. *Morbidity and Mortality Weekly Report*, 58(44), 1227–1232.

also stiffens arteries (Campbell et al., 2010) and is linked to death from heart disease, chronic lung and respiratory diseases, and other health problems. Women who smoke show reduced bone density, increasing the risk of fracture of the hip and back (American Lung Association, 2010). Pregnant women who smoke have a higher risk of miscarriage, preterm births, low-birthweight babies, and stillborn babies (American Lung Association, 2010).

Passive smoking is also connected with respiratory illnesses, asthma, and other health problems. Prolonged exposure to household tobacco smoke during childhood is a risk factor for lung cancer (American Cancer Society, 2010). Because of the noxious effects of secondhand smoke, smoking has been banished from many public places such as airplanes, restaurants, and elevators.

Why, then, do people smoke? For many reasons—such as the desire to look sophisticated (although these days smokers may more likely be judged foolish than sophisticated), to have something to do with their hands, and—of course—to take in nicotine.

About 31% of 8th through 12th graders have used cigarettes, and some 12% to 13% of 8th through 12th graders have smoked within the past 30 days (Johnston et al., 2009). The incidence of smoking is connected with gender and level of education (see Table 5.4 ■) (Dube et al., 2009). Better-educated people are less likely to smoke and are more likely to quit if they do (Dube et al., 2009).



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Marijuana Is the Most Popular Illicit Drug

Marijuana helps some people socialize at parties and distorts the passage of time and other sensations. It also interferes with learning and impairs the sensorimotor coordination used in driving.

Hallucinogenics

Hallucinogenic drugs are so named because they produce hallucinations—that is, sensations and perceptions in the absence of external stimulation. But hallucinogenic drugs may also have additional effects such as relaxation, euphoria, or in some cases, panic.

MARIJUANA

Marijuana is a substance that is produced from the *Cannabis sativa* plant, which grows wild in many parts of the world. **Question 22: What are the effects of marijuana?** Marijuana helps some people relax and can elevate their mood. It also sometimes produces mild hallucinations, which is why we discuss it in the section on **psychedelic**, or hallucinogenic, drugs. The major psychedelic substance in marijuana is delta-9-tetrahydrocannabinol, or THC. It is found in the

branches and leaves of the plant but is highly concentrated in the sticky resin. **Hashish**, or “hash,” is derived from the resin and is more potent than marijuana.

In the 19th century, marijuana was used much as aspirin is used today for headaches and minor aches and pains. It could be bought without a prescription in any drugstore. Today, marijuana use and possession are illegal in most states.

Controversy in Psychology IS MARIJUANA HARMFUL? SHOULD IT BE AVAILABLE AS A MEDICINE?

There are many controversies concerning marijuana. One is the issue of whether marijuana should be made available as a medicine to those who could benefit from it. Marijuana has been used to treat health problems, including glaucoma and the nausea experienced by cancer patients undergoing chemotherapy (Thomas, 2010). Supporters of marijuana for medical uses refer to it as an inexpensive, versatile, and reasonably safe medicine. Other medical researchers agree that marijuana has some positive effects, but the action of THC also has its negatives (Janero & Makriyannis, 2009). THC binds to a membrane receptor, 7TM, which is found in every cell. THC displaces the natural substance that would bind with the receptor and disrupts the receptor's signaling. As a result, the functioning of the brain, the immune system, and the cardiovascular and reproductive systems (for instance, it interferes with development of sperm and conception) is impaired to some degree.

Marijuana smoke also contains more hydrocarbons—a risk factor in cancer—than cigarette smoke does (Cobb et al., 2010). Smokers of marijuana often admit they know that marijuana smoke can

be harmful, but they counter that compared with cigarette smokers, they smoke very few “joints” per day. Yet, as noted, marijuana elevates the heart rate and, in some people, the blood pressure. This higher demand on the heart and circulation poses a threat to people with hypertension and cardiovascular disorders.

Another issue is whether researchers and public figures exaggerate the dangers of marijuana to discourage people from using it. Does the information about marijuana in this textbook seem biased? Why or why not?

Marijuana has been with us for decades, but new research on its effects continues—with more sophisticated methods. And the findings are mixed. For example, some research has suggested that marijuana usage impairs learning, memory, and attention (Indlekofer et al., 2009), but it was assumed by many that the reason was that marijuana distracted people from learning tasks. Other laboratory research suggests a biological reason—that marijuana reduces the release of neurotransmitters involved in the consolidation of learning (Campolongo et al., 2009). Yet consider the results of a synthesis of

15 previously published studies on the long-term effects of marijuana on the cognitive performance of adults. The synthesis compared 704 long-term cannabis users with 484 nonusers (Grant et al., 2003). The cognitive measures included reaction time, attention, use of language, abstract thinking, perceptual–motor skills, and learning and forgetting. The only significant difference was that long-term marijuana users showed a small comparative deficit in learning new information. The importance of this difference is open to debate.

People who started using marijuana early may be generally smaller in height and weight than other people. Brain imaging studies suggest that males who began using marijuana in adolescence may have smaller brains and less gray matter than other males (Ashtari et al., 2009). These differences may reflect the effect of marijuana on pituitary and sex hormones.

More research is needed on the effects of marijuana. Some of the horror stories of the 1960s and 1970s may have been exaggerated, but a number of questions about potential harm remain. More research evidence—not more speculation—is needed.

Marijuana also carries a number of health risks. For example, it impairs the perceptual–motor coordination used in driving and operating machines. It impairs short-term memory and slows learning (Egerton et al., 2006; Lamers et al., 2006). Although it causes positive mood changes in many people, there are also disturbing instances of anxiety and confusion and occasional reports of psychotic reactions (Bonn-Miller et al., 2007).

Some people report that marijuana helps them socialize at parties. Moderate to strong intoxication is linked to reports of heightened perceptions and increases in self-insight, creative thinking, and empathy for the feelings of others. Time seems to pass more slowly for people who are strongly intoxicated. A song might seem to last an hour rather than a few minutes. There is increased awareness of bodily sensations such as heartbeat. Marijuana smokers also report that strong intoxication heightens sexual sensations. Visual hallucinations are not uncommon, and strong intoxication may cause smokers to experience disorientation. If the smoker's mood is euphoric, loss of a sense of personal identity may be interpreted as being in harmony with the universe.

Some marijuana smokers have negative experiences. An accelerated heart rate and heightened awareness of bodily sensations leads some smokers to fear that their heart will “run away” with them. Some smokers find disorientation threatening and are afraid that they will not regain their identity. Strong intoxication sometimes causes nausea and vomiting.

People can become psychologically dependent on marijuana, but the use of marijuana had not been thought to lead to physiological dependence. Recent research, however, suggests that regular users of marijuana may experience tolerance and withdrawal symptoms (Budney et al., 2007).

Passive smoking Inhaling smoke from the tobacco products and exhalations of other people; also called *secondhand smoking*.







Hallucinogenic Giving rise to hallucinations.

Marijuana The dried vegetable matter of the *Cannabis sativa* plant.

Psychedelic Causing hallucinations, delusions, or heightened perceptions.

Hashish A drug derived from the resin of *Cannabis sativa*; often called “hash.”

CONCEPT REVIEW PSYCHOACTIVE DRUGS AND THEIR EFFECTS

Drug	Type	How Taken	Desired Effects	Tolerance	Abstinence Syndrome	Side Effects
Alcohol  <small>© Paul Taylor/Corbis</small>	Depressant	By mouth	Relaxation, euphoria, lowered inhibitions	Yes	Yes	Impaired coordination, poor judgment, hangover
Opiates  <small>© Veer/Krisopher Giamert/Getty Images</small>	Depressants	Injected, smoked, by mouth	Relaxation, euphoria, relief from anxiety and pain	Yes	Yes	Impaired coordination and mental functioning, drowsiness, lethargy
Barbiturates  <small>© Alamy Photography/Veer</small>	Depressant	By mouth, injected	Relaxation, sleep, euphoria, lowered inhibitions	Yes	Yes	Impaired coordination and mental functioning, drowsiness, lethargy
Amphetamines	Stimulants	By mouth, injected	Alertness, euphoria	Yes	?	Restlessness, loss of appetite, psychotic symptoms
Cocaine  <small>© David Young-Wolf/PhotoEdit, Inc.</small>	Stimulant	By mouth, snorted, injected	Euphoria, self-confidence	Yes	Yes	Restlessness, loss of appetite, convulsions, strokes, psychotic symptoms
Nicotine  <small>© Corbis Photography/Veer</small>	Stimulant	By tobacco (smoked, chewed, or sniffed)	Relaxation, stimulation, weight control	Yes	Yes	Cancer, heart disease, lung and respiratory diseases
Marijuana  <small>© Fancy Photography/Veer</small>	Hallucinogenic	Smoked, by mouth	Relaxation, perceptual distortions, enhancement of experience	?	?	Impaired coordination and learning, respiratory problems, panic
LSD, Mescaline, PCP	Hallucinogenic	By mouth	Perceptual distortions, vivid hallucinations	Yes	No	Impaired coordination, psychotic symptoms, panic



Go to Psychology CourseMate at www.cengagebrain.com to access an interactive version of this Concept Review designed to help you test yourself on the topics presented here.

LSD AND OTHER HALLUCINOGENICS

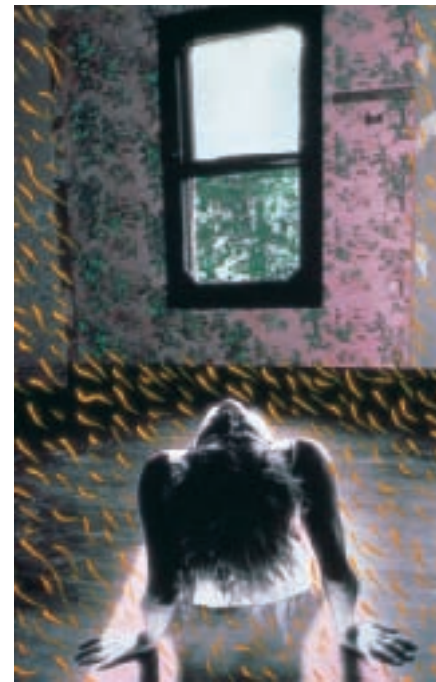
LSD is the abbreviation for lysergic acid diethylamide, a synthetic hallucinogenic drug.

Question 23: What are the effects of LSD and other kinds of hallucinogenic drugs? Users of “acid” claim that it “expands consciousness” and opens up new worlds to them. Sometimes, people believe they have achieved great insights while using LSD, but when it wears off, they often cannot apply or recall these discoveries. As a powerful hallucinogenic, LSD produces vivid and colorful hallucinations.

Some LSD users have **flashbacks**—distorted perceptions or hallucinations that mimic the LSD “trip” but occur days, weeks, or longer after usage. The experiencing of flashbacks is more technically termed *hallucinogen persisting perception disorder (HPPD)* by the American Psychiatric Association (2000). Over the years, both psychological and physiological explanations of HPPD have appeared. The psychological explanation of flashbacks, in a nutshell, is that people who would use LSD regularly are also more likely to allow flights of fancy. Yet research with people with HPPD suggests that following extensive use of LSD, the brain may fail to inhibit certain internal sources of visionlike experiences, especially when the eyes are closed (Catts & Catts, 2009).

Other hallucinogenic drugs include **mescaline** (derived from the peyote cactus) and **phencyclidine (PCP)**. Phencyclidine was developed as an anesthetic and a large animal tranquilizer, and it goes by the street names “angel dust,” “ozone,” “wack,” and “rocket fuel.” The street terms “killer joints” and “crystal supergrass” refer to PCP that is combined with marijuana.

Regular use of hallucinogenics may lead to tolerance and psychological dependence. But hallucinogenics are not known to lead to physiological dependence. High doses may induce frightening hallucinations, impaired coordination, poor judgment, mood changes, and paranoid delusions.



© Anne Marie Rousseau/The Image Works

An LSD Trip? This hallucinogenic drug can give rise to a vivid parade of colors and visual distortions. Some users claim to have achieved great insights while “tripping,” but typically, they have been unable to recall or apply them afterward.

LSD Lysergic acid diethylamide. A hallucinogenic drug.

Flashbacks Distorted perceptions or hallucinations that occur days or weeks after LSD usage but mimic the LSD experience.

Mescaline A hallucinogenic drug derived from the mescal (peyote) cactus.

Phencyclidine (PCP) Another hallucinogenic drug whose name is an acronym for its chemical structure.

Learning Connections • ALTERING CONSCIOUSNESS THROUGH DRUGS

ACTIVE REVIEW (16) Substance _____ is characterized by repeated use of a substance although it is impairing functioning. (17) Physiological dependence is evidenced by tolerance or by an _____ syndrome when one discontinues use of the substance. (18) Women seem to be (more or less?) affected by alcohol than men. (19) Opiates are used in medicine to reduce _____, but they are bought “on the street” because of the euphoric rush they provide. (20) Barbiturates are used medically to treat epilepsy, high _____, and insomnia. (21) Ritalin is used to treat _____ deficit/hyperactivity disorder in children. (22) _____ is a stimulant that boosts self-confidence but also triggers rises in blood pressure and constricts the coronary arteries. (23) Tobacco contains the stimulant _____. (24) _____ substances distort perceptions. (25) _____ often pro-

duces feelings of relaxation and empathy, the feeling that time is slowing down, and reports of new insights.

REFLECT AND RELATE The next time you are at a social occasion, note the behavior of people who are drinking and those who are not. What do you think are individuals’ motives for drinking? Does drinking visibly affect their behavior? If you drink, how does it affect your behavior?

CRITICAL THINKING Does this textbook’s presentation of information about the effects of drugs seem straightforward or biased? What is the evidence for your view?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections GETTING TO SLEEP—AND ELSEWHERE—WITHOUT DRUGS

Where do you want to go? Do you want to go to sleep? Do you want to go on a psychological trip searching for inner truth? Do you want to go on a stimulating trip that will drench your bloodstream with adrenaline? There are ways to do all these things—ways that rely on you rather than on drugs.

Check it out. There are ideas here for getting to sleep without sleeping pills. There are suggestions for thinking helpful thoughts rather than blowing the situation out of proportion. There are ways of relaxing that let you do your own mellowing out—again, drugfree. These methods are largely cognitive-behavioral.

Getting to Sleep Without Drugs

Do you have a problem with insomnia? The nearby self-assessment, *Are You Getting Your Zs?*, may offer some insight. If you decide that you have this problem, what can you do about it? No question about it: The most common medical method for getting to sleep in the United States is taking pills (Carney et al., 2010). Sleeping pills may work—for a while. So may tranquilizers. They gener-

ally work by reducing arousal and also distract you from trying to get to sleep. Expectations of success may also help.

But there are problems with sleeping pills. First, many people may attribute success to the pill and not to themselves and come to depend on the pill. Second, a person may develop tolerance for many kinds of sleeping pills and, with regular use, need higher doses to achieve the same effects. Third, high doses of these chemicals can be dangerous, especially if mixed with alcohol. Fourth, sleeping pills do not enhance your skills at handling insomnia. Thus, when you stop taking them, insomnia is likely to return (Carney et al., 2010).

There are excellent psychological methods for coping with insomnia, which can be effective alternatives for many. Some methods like muscle relaxation exercises reduce tension directly. Psychological methods also divert us from the task of trying somehow to get to sleep, which, ironically, is one of the ways we keep ourselves awake (Carney et al., 2010). You can try any or all of the following psychological methods:

- *Relax*: Take a hot bath at bedtime or try meditating. Releasing muscle

tension has been shown to reduce the amount of time needed to fall asleep and the incidence of waking up during the night (Ashworth et al., 2010; Ebben & Spielman, 2009).

- *Challenge exaggerated fears*: You need not be a sleep expert to realize that convincing yourself the day will be ruined unless you get to sleep *right now* may increase, rather than decrease, bedtime tension. However, cognitive-behavioral psychologists note that we often exaggerate the problems that will befall us if we do not sleep (Carney et al., 2010; Kaplan et al., 2009). Table 5.5 ■ shows some beliefs that increase bedtime tension and some alternatives.
- *Don't ruminate in bed*: Don't plan or worry about tomorrow while in bed (Kaplan et al., 2009). When you lie down for sleep, you may organize your thoughts for the next day for a few minutes, but then allow yourself to relax or engage in a soothing fantasy. If an important idea comes to you, jot it down on a handy pad so that you won't worry about forgetting it. If thoughts or inspirations persist, however, get up and think about them

SELF ASSESSMENT

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Table 5.5 ■ Beliefs That Increase Bedtime Tension and Alternatives

Beliefs That Increase Tension	Alternatives
If I don't get to sleep, I'll feel wrecked tomorrow.	Not necessarily. If I'm tired, I can go to bed early tomorrow night.
It's unhealthy for me not to get more sleep.	Not necessarily. Some people do very well on only a few hours of sleep.
I'll wreck my sleeping schedule for the whole week if I don't get to sleep very soon.	Not at all. If I'm tired, I'll just go to bed a bit earlier. I'll get up about the same time with no problem.
If I don't get to sleep, I won't be able to concentrate on that big test/conference tomorrow.	Possibly, but my fears may be exaggerated. I may just as well relax or get up and do something enjoyable for a while.

elsewhere. Let your bed be a place for relaxation and sleep—not your second office. A bed—even a water-bed—should not be a think tank.

- **Establish a regular routine:** Sleeping late can end up causing problems falling asleep (sleep-onset insomnia). Set your alarm for the same time each morning and get up regardless of how long you have slept (Ebben & Spielman, 2009). By rising at a regular time, you'll encourage yourself to fall asleep at a regular time.
- **Try fantasy:** Fantasies or daydreams are almost universal and may occur naturally as we fall asleep. You can allow yourself to “go with” soothing, relaxing fantasies that occur at bedtime, or purposefully use pleasant fantasies to get to sleep. You may be able to ease yourself to sleep, for example, by focusing on a sun-drenched beach with waves lapping on the shore or on a walk through a mountain meadow on a summer day. You can construct your own “mind trips” and paint in the details.

Above all: Accept the idea that it really doesn't matter if you don't get to sleep early *this night*. You will survive. In fact, you'll do just fine.

Strategies for Gaining Self-Control and Maintaining Self-Control

I can resist everything except temptation.

Oscar Wilde (*Lady Windermere's Fan*)

With a little bit of help, you probably *can* resist temptation. There are physiological and psychological aspects to coping with the temptation of drugs. People who regularly use many of the substances discussed in this chapter can become dependent on them. In the cases of alcohol, nicotine, cocaine, opiates, and sedatives, serious physiological dependence can develop. In some cases, as with nicotine and marijuana, users can stop using the substance on their own despite the discomforts of doing so. Going “cold turkey” is safe enough. This may not be true with other substances, particularly alcohol. Going cold turkey can be dangerous. So-called alcohol detoxification is a complex procedure that takes a week or so and is best carried out under medical supervision, often in a hospital.

Even when someone is no longer physiologically dependent, the battle is not over. Avoiding temptation can mean maintaining a deep personal commitment to changing one's lifestyle, sometimes including choosing a different set of friends or different leisure activities.

Cognitive-behavioral approaches to substance abuse and dependence focus on modifying abusive and dependent ideas and behavior patterns (Tripodi et al., 2010). They teach abusers either to avoid temptation or to change their behavior when they are faced with temptation. For example, people can learn to avoid socializing with others with substance abuse problems (Weingardt et al., 2009). They can avoid situations linked to abuse—bars, clubs, parties, and so on. They can learn to frequent substance-free environments such

as gyms, school-sponsored activities or lectures, or cafés and coffee shops. They can learn to use competing responses when they are tempted—taking a bath or shower, walking the dog, walking around the block, taking a drive, calling a friend, or exercising. The cognitive-behavioral method of social skills training helps people develop effective social behavior in situations that are connected with substance abuse (Schonfeld et al., 2009). They may teach individuals how to fend off social pressures to drink or have a cigarette. Many people learn how to say “no, thanks” without getting into an argument or having to leave the situation.

The cognitive-behavioral strategies outlined in Table 5.6 ■ can help readers maintain a commitment to do without drugs and deal with temptations. In the case of smoking cigarettes, some suggestions are of use in cutting down and others in going cold turkey (Hendricks et al., 2010). In the case of alcohol, the suggestions largely have to do with controlling the amount used. However, many health professionals believe that it is wisest for people who have been physiologically dependent on alcohol to avoid drinking altogether.

Cognitive-behavioral psychologists note that much of the “cure” for substance abuse lies in what we tell ourselves and other people about our behavior. For example, if you're going to quit smoking, why not tell your family and friends that you're quitting? By making a public commitment to do so, you shore up your resolve. Also plan a target date for quitting, perhaps a date when you will be on vacation or away from the usual settings in which you smoke. You can use a nicotine substitute like a skin patch to help cut down before the target date and to prove to yourself that you can survive on fewer cigarettes (and ultimately, on no cigarettes). You can plan specific things to tell yourself when you feel the urge to smoke: how you'll be stronger, free of fear of cancer, ready for the marathon, and so on. Once you have stopped, you can remind yourself repeatedly that the first few days are the hardest. After that, withdrawal symptoms weaken dramatically. And don't forget to pat yourself

Table 5.6 ■ Getting There Without Drugs: Cognitive–Behavioral Strategies for Putting an End to Substance Abuse

	Strategy	Examples of Use of the Strategy
Strategies Aimed at the Stimuli That Trigger Substance Abuse	Restriction of the stimulus field	Gradually exclude the problem behavior from more environments. At first, make smoking off limits in the car; then make it off limits in the home.
	Avoidance of powerful stimuli that trigger habits	Avoid obvious sources of temptation. (People who go window-shopping often wind up buying more than windows.) Walk briskly through the market; don't linger by the packs of cigarettes or the alcohol section. Sit in nonsmokers' sections of restaurants and trains. Go on a smoke-ending vacation to get away from places and situations in which you're used to smoking. Don't go to the bar with people you drink heavily with.
	Stimulus control	Place yourself in an environment in which desirable behavior is likely to occur. Fill your days with novel activities—things that won't remind you of smoking or having that extra beer.
Strategies Aimed at the Abusive Behavior Itself	Response prevention	Make unwanted behavior difficult or impossible. You cannot smoke the cigarettes or drink the beer you left on the shelf at the corner store.
	Competing responses	Engage in behaviors that are incompatible with the problem behavior: Stuff your mouth with sugar-free mints, not cigarettes. Consider nicotine replacement therapy in the form of a nicotine gum or skin patch. The use of nicotine replacements helps to avert withdrawal symptoms when dependent smokers discontinue cigarettes. Or use sugar-free mints or gum as substitutes for cigarettes. (Don't light them!)
	Chain breaking	Interfere with unwanted habitual behavior by complicating the process of engaging in it. Break the chain of reaching for a readily available cigarette and placing it in your mouth by wrapping the pack in aluminum foil and placing it on the top shelf of a closet. Rewrap the pack after taking one cigarette. Hold your cigarettes with your nondominant hand only. Put the cigarette out before you reach the end. (No more eating the filter.) Put your cigarette in the ashtray between puffs.
	Successive approximations	Gradually approach targets through a series of relatively painless steps. Decrease smoking by pausing for a minute when the cigarette is smoked halfway or by putting it out a minute before you would wind up eating the filter.
Strategies Aimed at the Reinforcers That Maintain Abusive Behavior	Reinforcement of desired behavior	Why give yourself something for nothing? Make pleasant activities such as going to films, walking on the beach, or reading a new novel contingent on meeting reasonable daily behavioral goals. Each day you remain abstinent from cigarettes or limit your alcohol intake to one drink, sock away a dollar toward that camera or vacation trip you have been dreaming of.
	Response cost	Heighten awareness of the long-term reasons for dieting or cutting down on smoking by punishing yourself for not meeting a daily goal or for engaging in a bad habit. For example, if you light up, make out a check to a cause you oppose and mail it at once.
	"Grandma's method"	How did Grandma persuade children to eat their vegetables? Simple: No veggies, no dessert. In this method, desired behaviors such as quitting smoking can be encouraged by insisting that you read cards such as the following before leaving the house or apartment: "Every day it becomes a little easier;" and "Your lungs will turn pink again."
	Covert sensitization ^a	Create imaginary horror stories about problem behavior. Psychologists have successfully reduced overeating and smoking by having clients imagine that a cigarette is made from vomit. Some horror stories are not "imaginary." Deliberately focusing on heart strain and diseased lungs every time you overeat or smoke, rather than ignoring these long-term consequences, might also promote self-control.
	Covert reinforcement ^b	Create rewarding imagery for desired behavior: Interpret withdrawal symptoms from stopping smoking or going without that beer as a sign that you're winning and getting healthier. After all, you wouldn't have withdrawal symptoms if you were smoking or drinking.

^aImagining punishing consequences for engaging in undesirable behavior. *Covert* means "hidden," and you use this strategy by imagining scenarios. Because you imagine them, they are hidden from the outside world and perceptible to you alone.

^bImagining rewarding consequences for engaging in desirable behavior. This strategy, like covert sensitization, is used by imagining various scenarios.



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Don't Just Say No It is easier to stay drug free if you stay active.

on the back by reminding yourself that you are accomplishing something that many millions of others find to be out of reach.

The suggestions in Table 5.6 can be generalized to nearly any substance. The following suggestions involve alternatives to substance abuse.

Getting There Without Drugs: Don't Just Say No, Do Something Else

All of us feel depressed, tense, or just plain bored from time to time. Many are intrigued by the possibility of exploring the still dark reaches of their inner selves. Many feel inadequate to face the challenges of college life now and then. Some of us see our futures as bleak and unrewarding. A vast wilderness or desert seems to lie before us.

So we all have feelings like these on occasion. Then what? If you are wavering on whether to get involved with drugs, here are some drugfree alternatives to consider.

If you are:

- Feeling tense or anxious—try practicing self-relaxation, meditation, exercise, or listen to relaxing music.

- Feeling bored—find a new activity or interest. Start an exercise program or get involved in athletics. Take up a hobby. Become involved in a political campaign or social cause. There are many student organizations on campus. Find one that appeals to you.
- Feeling angry—write down your feelings or channel your anger into constructive pursuits aimed at solving what has angered you or pursuits that allow you time to cool off.
- Feeling worthless, hopeless, or depressed—seek assistance from a friend or loved one. Focus on your abilities and accomplishments, not on your deficits. If that doesn't help, visit the college counseling center or health center. They may have suggestions for organizations you can become involved in, helping you feel that you can make a difference or have a “direction.” You may also be suffering from a treatable case of depression.
- Wanting to probe the inner depths of your consciousness—try meditation or yoga. Or seek the advice of a counselor or minister, priest, or rabbi.
- Pressured into using drugs by friends—learn how to say “no” politely but firmly. If you need help saying no, read a self-help book on self-assertion or go to the college counseling center for advice. If necessary, find new friends. (A real friend will not push you into doing anything that makes you feel uncomfortable, including using drugs.)
- Seeking to heighten your sensations—try dancing, jogging, parachuting, snowboarding, in-line skating, or mountain climbing. There are many ways to get your adrenaline flowing that do not involve chemical stimulants.
- Feeling stressed out to the point where you can't take it anymore—sit down to figure out the pressures acting upon you. List your priorities. What must be done *right now*? What can wait? If this approach fails, see your academic advisor or visit the college counseling center or health center. If you can afford the time, take a day or two off. Sometimes, the key is to establish more reasonable expectations of yourself. No drug will help you do that.
- Wanting to discover new insights on the human condition—take classes or workshops on philosophy and theology. Attend lectures by prominent thinkers. Read great works of literature. Ponder great works of art. Attend the symphony. Visit a museum. Let your mind connect with the great minds of the past and present.
- Searching for deeper personal meaning in life—become more involved in spiritual activity in your church or synagogue. Do volunteer work in hospitals or charitable organizations. Get involved in a cause you believe in. Or seek personal counseling to get in touch with your inner self.

We are all unique. We have different desires, interests, and needs. Take the time to get in touch with your own and to do things that you will find fulfilling.

The Many Meanings of Consciousness

1. What is consciousness?

The term *consciousness* has several meanings, including sensory awareness, direct inner awareness of cognitive processes, the selective aspect of attention, the sense of self, and the waking state.

Sleep and Dreams: Other Worlds Within?

2. What is a circadian rhythm?

A circadian rhythm is a cycle that is connected with the 24-hour period of the Earth's rotation, such as the sleep-wake cycle.

3. How do we describe the stages of sleep?

We undergo several stages of sleep. According to electroencephalograph (EEG) records, each stage of sleep is characterized by a different type of brain wave. There are four stages of non-rapid-eye-movement (NREM) sleep and one stage of REM sleep. Stage 1 sleep is the lightest, and stage 4 is the deepest.

4. Why do we sleep?

Sleep apparently serves a restorative function, but we do not know exactly how sleep restores us or how much sleep we need. Animals and people who have been deprived of REM sleep learn more slowly and forget what they have learned more rapidly.

5. What are dreams?

Dreams are a form of cognitive activity that occurs mostly while we are sleeping. Most dreaming occurs during REM sleep. Nightmares are dreams that tend to occur during REM sleep.

6. Why do we dream what we dream?

Freud believed that dreams reflected unconscious wishes and "protected sleep" by keeping unacceptable ideas out of awareness. The activation-synthesis hypothesis suggests that dreams largely reflect automatic biological activity by the pons and the synthesis of subsequent sensory stimulation by the frontal part of the brain. The content of most dreams is an extension of the events of the previous day.

7. What kinds of sleep disorders are there?

A common sleep disorder is insomnia, which is most often encountered by people who are anxious and tense. Deep sleep disorders include narcolepsy, sleep apnea, sleep terrors, bed-wetting, sleep talking, and sleepwalking.

Altering Consciousness Through Hypnosis, Meditation, and Biofeedback

8. What is hypnosis?

Hypnosis is an altered state of consciousness in which people are suggestible and behave as though they are in a trance. People who are hypnotized may show passivity, narrowed attention, hypermnesia (heightened memory), suggestibility, assumption of unusual roles, perceptual distortions, posthypnotic amnesia, and posthypnotic suggestion.

9. How do modern psychologists explain the effects of hypnosis?

Current theories of hypnosis deny the existence of a special trance state. Rather, they emphasize people's ability to role-play the trance (role theory), to strategically follow hypnotist's instructions (multifactorial theory), to do what is expected of them (response set theory), and to divide their consciousness (neodissociation theory) as directed by the hypnotist.

10. What is meditation?

In meditation, one focuses "passively" on an object or a mantra to alter the normal relationship between oneself and the environment. In this way, consciousness (that is, the normal focus of attention) is altered.

11. What are the effects of meditation?

Meditation often has the effect of inducing relaxation. Transcendental meditation appears to reduce the blood pressure of hypertensive individuals.

12. What is biofeedback training?

Biofeedback is a method for increasing consciousness of bodily functions. In biofeedback, the organism is continuously provided with information about a targeted biological response such as heart rate or emission of alpha waves.

13. How is biofeedback training used?

People and lower animals can learn to control their heart rate, blood pressure, and even the emission of certain brain waves through biofeedback training.

Altering Consciousness Through Drugs

14. What are substance abuse and dependence?

Substance abuse is the use of a substance that persists even though it impairs one's functioning. Dependence has behavioral and physiological aspects. It may be characterized by organizing one's life around getting and using the substance and by the development of tolerance, withdrawal symptoms, or both.

15. What are the causes of substance abuse and dependence?

People usually try drugs out of curiosity, but usage can be reinforced by anxiety reduction, feelings of euphoria, and other positive sensations. People are also motivated to avoid withdrawal symptoms once they become physiologically dependent on a drug. People may have genetic predispositions to become physiologically dependent on certain substances.

16. What are the effects of alcohol?

Alcohol, the most widely used drug, is a depressant. It belongs to the group of substances that act by slowing the activity of the central nervous system. Alcohol is also intoxicating and can lead to physiological dependence.

17. What are the effects of opiates?

The opiates morphine and heroin are depressants that reduce pain, but they are also bought on the street because of the euphoric "rush" they provide. Opiate use can lead to physiological dependence.

18. What are the effects of barbiturates?

Barbiturates are depressants. They have medical uses, including relaxation, pain management, and treatment of epilepsy, high blood pressure, and insomnia. Barbiturates lead rapidly to physiological and psychological dependence.

19. What are the effects of amphetamines?

Stimulants are substances that act by increasing the activity of the nervous system. Amphetamines are stimulants that produce feelings of euphoria when taken in high doses. But high doses may also cause restlessness, insomnia, psychotic symptoms, and a “crash” upon withdrawal. Amphetamines and a related stimulant, Ritalin, are commonly used to treat hyperactive children.

20. What are the effects of cocaine?

The stimulant cocaine provides feelings of euphoria and bolsters self-confidence. Physically, it causes spikes in blood pressure and constricts blood vessels. Overdoses can lead to restlessness, insomnia, psychotic reactions, and cardiorespiratory collapse.

21. What are the effects of nicotine?

Nicotine is the addictive stimulant in cigarettes that can paradoxically help people relax. Cigarette smoke also contains carbon monoxide and hydrocarbons. Smoking has been linked to death from heart disease and cancer and to other health problems.

22. What are the effects of marijuana?

Marijuana is a hallucinogenic substance whose active ingredients, including THC, may produce relaxation, heightened and distorted perceptions, feelings of empathy, and reports of new insights. Marijuana elevates the heart rate, and the smoke is harmful. Although it has some medical uses, it impairs learning and memory and may affect the growth of adolescents.

23. What are the effects of LSD and other kinds of hallucinogenic drugs?

LSD and other hallucinogenic drugs produce hallucinations. Some LSD users have “flashbacks” to earlier experiences.



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KEY TERMS

Abstinence syndrome (p. 169)	Hydrocarbons (p. 177)	Psychoactive substances (p. 168)
Activation–synthesis model (p. 159)	Hypnagogic state (p. 155)	Rapid-eye-movement (REM) sleep (p. 155)
Alpha waves (p. 155)	Hypnosis (p. 163)	Repression (p. 152)
Amphetamines (p. 174)	LSD (p. 181)	Response set theory (p. 165)
Attention-deficit/hyperactivity disorder (p. 174)	Marijuana (p. 178)	Role theory (p. 165)
Barbiturate (p. 174)	Mescaline (p. 181)	Selective attention (p. 152)
Biofeedback training (BFT) (p. 166)	Multifactorial theory (p. 165)	Sleep apnea (p. 161)
Circadian rhythm (p. 154)	Narcolepsy (p. 161)	Sleep terrors (p. 162)
Cirrhosis of the liver (p. 173)	Narcotics (p. 172)	Stimulant (p. 168)
Consciousness (p. 151)	Neodissociation theory (p. 165)	Substance abuse (p. 169)
Delirium tremens (p. 169)	Nonconscious (p. 153)	Suppression (p. 153)
Delta waves (p. 155)	Non-rapid-eye-movement (NREM) sleep (p. 155)	Theta waves (p. 155)
Depressant (p. 168)	Opiates (p. 172)	Tolerance (p. 169)
Direct inner awareness (p. 152)	Opioids (p. 172)	Transcendental meditation (TM) (p. 166)
Electromyograph (EMG) (p. 167)	Passive smoking (p. 178)	Unconscious (p. 152)
Flashbacks (p. 181)	Phencyclidine (PCP) (p. 181)	Wernicke–Korsakoff syndrome (p. 173)
Hallucinogenic (p. 178)	Preconscious (p. 152)	
Hashish (p. 178)	Psychedelic (p. 178)	

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6 Learning



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MAJOR TOPICS

Learning: Experience and Change

Classical Conditioning: Learning What Is Linked to What

Operant Conditioning: Learning What Does What to What

Cognitive Factors in Learning

FEATURES

In Profile: Ivan Petrovich Pavlov

In Profile: "Little Albert"

In Profile: B. F. Skinner

A Closer Look—Real Life: Robo Rats? Using Operant Conditioning to Teach Rats
How to Search for Survivors of Disasters

A Closer Look—Research: Contingency Theory

Concept Review: Kinds of Learning

Life Connections: Violence in the Media and Aggression

TRUTH OR FICTION?

- T F** A single nauseating meal can give rise to a taste aversion that lasts for years.
- T F** Psychologists helped a young boy overcome his fear of rabbits by having him eat cookies while a rabbit was brought closer and closer.
- T F** Psychologists have devised a way to teach children while they are sleeping.
- T F** During World War II, a psychologist created a guided missile that would use pigeons to take the missile to its target.
- T F** Punishment is ineffective at stopping unwanted behavior.
- T F** You can train a rat to climb a ramp, cross a bridge, climb a ladder, pedal a toy car, and do several other tasks—all in proper sequence.
- T F** You have to make mistakes to learn.
- T F** Despite all the media hoopla, no scientific connection has been established between TV violence and real-life aggression.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

I was showing my daughter Allyn how to teach our new dog, Phoebe, to fetch. I bought a soft yellow ball for the dog that squeaked when she bit into it. She enjoyed playing with it, and I assumed she would want to run after it. (Wrong!) I waved it under her nose. She sniffed at it, barked, and wagged her tail excitedly.

As my daughter watched, I tossed the ball about 20 feet away. “Fetch!” I said to Phoebe as the ball bounced invitingly in the grass.

Phoebe just stared.

My daughter scoffed. I ran after the ball, picked it up, and waved it under Phoebe’s nose again. She barked and wagged her tail rapidly like a reed in a brisk wind.

“Fetch!” I said and tossed the ball again.

Again Phoebe refused to run. She barked and snapped at my legs again. “This is ridiculous,” I muttered, and I went to get the ball. As I brought it back to Phoebe, Allyn said, “Don’t you see what’s happening?”

“What?”

“Phoebe’s teaching you to fetch.”



© Jessica Peterson/Rubberball

LEARNING: EXPERIENCE AND CHANGE

One could say that Phoebe was teaching me what to do by showing excitement when I did the “right” thing—that is, fetch the ball. She was teaching, and I was learning. Learning is a key area in psychology. **Question 1: What is learning?**

Learning as defined in psychology is more than listening to teachers, honing skateboard jumps, or mastering the use of an iPod. From the behaviorist perspective, **learning** is a relatively permanent change in behavior that arises from practice or experience. The behavioral perspective plays down the roles of cognition and choice. It suggests that psychologists learn to run after balls because they have been rewarded or reinforced for doing so.

Cognitive psychologists define learning as the process by which organisms make relatively permanent changes in the way they represent the environment because of experience. These changes influence the organism’s behavior but do not fully determine it. From this perspective, I knew that I would earn Phoebe’s attention by running after the ball, but I could have chosen not to do it. Learning, for cognitive psychologists,

Learning (a) According to behaviorists, a relatively permanent change in behavior that results from experience. (b) According to cognitive theorists, the process by which organisms make relatively permanent changes in the way they represent the environment because of experience. These changes influence the organism’s behavior but do not fully determine it.



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Instinct The bird builds a nest on the basis of its genetic code. It is an example of instinctive behavior, which is not learned through experience.

Classical conditioning A simple form of learning in which an organism comes to associate or anticipate events. A neutral stimulus comes to evoke the response usually evoked by another stimulus by being paired repeatedly with the other stimulus. (Cognitive theorists view classical conditioning as the learning of relationships among events so as to allow an organism to represent its environment.) Classical conditioning is also referred to as *respondent conditioning* or *Pavlovian conditioning*.

Reflex A simple unlearned response to a stimulus.

Stimulus An environmental condition that elicits a response.

may be *shown* by changes in behavior, but learning itself is a mental process. Cognitive psychologists suggest that people choose whether to imitate the aggressive and other behaviors they observe and that people are most likely to imitate behaviors that are consistent with their values.

In many animals, much behavior is instinctive, or inborn, rather than learned. For example, tadpoles start out life swimming, but after they develop legs, they hop on land in appropriate frog fashion—without taking hopping lessons. After they have spent sometimes years roaming the seas, salmon instinctively use their sense of smell to find, and return to spawn in, the stream where they were hatched. Robins instinctively know how to sing the song of their species and to build nests.

Among humans, however, the variety and complexity of behavior patterns are largely products of experience. We learn to read, to compute numbers, and to surf the Internet. It is natural to experience hunger, but humans learn to seek out foods that are preferred in their culture. We learn which behavior patterns are deemed socially acceptable and which are considered wrong. We also unfortunately learn prejudices and stereotypes and negative behaviors such as using violence to deal with conflict. Our families and communities use verbal guidance, set examples, and apply rewards and punishments to teach us and transmit cultural values.

Sometimes, learning experiences are direct, as when we are praised for doing something properly. But we can also learn from the experiences of others. We learn about the past, other peoples, and how to put things together from other people, books, and audiovisual media. In this chapter, we consider various kinds of learning, including conditioning and learning in which cognition plays a more central role.

CLASSICAL CONDITIONING: LEARNING WHAT IS LINKED TO WHAT

Classical conditioning involves some of the ways we learn to associate events with other events. Consider this: We have a distinct preference for a grade of A rather than F. We are also (usually) more likely to stop for a red light than for a green light. Why? We are not born with instinctive attitudes toward the letters A and F. Nor are we born knowing that red means “stop” and green means “go.” We learn the meanings of these symbols because they are associated with other events. A’s are associated with instructor approval and the likelihood of getting into graduate school. Stopping at red lights is associated with avoiding accidents and traffic citations.

Question 2: What is classical conditioning? Classical conditioning is a simple form of associative learning in which organisms come to anticipate or associate events. If the name Ivan Pavlov rings a bell with us, it is most likely because of his research on learning in dogs. **Question 3: What is the contribution of Ivan Pavlov to the psychology of learning?** Ivan Pavlov (1927) made his great contribution to the psychology of learning by accident. Pavlov was attempting to identify neural receptors in the mouth that triggered a response from the salivary glands. But his efforts were hampered by the dogs’ annoying tendency to salivate at undesired times, such as when a laboratory assistant was clumsy and banged the metal food trays.

Just as you salivate after you’ve taken a big bite of cake, a dog salivates if food (meat powder) is placed on its tongue. Pavlov was dosing his dogs with meat powder for his research because he knew that salivation in response to meat powder is a **reflex**. Reflexes are unlearned responses that are evoked by certain **stimuli**. Pavlov discovered that reflexes can also be learned, or *conditioned*, by association. His dogs began salivating in response to clanging food trays because clanging, in the past, had been repeatedly paired with the arrival of food. The dogs would also salivate when an assistant entered the laboratory. Why? In the past, the assistant had brought food.

Pavlov at first viewed the extra salivation of his dogs as a hindrance to his research. But then it dawned on him that this “problem” might be worth looking into. He found out that he could train, or condition, his dogs to salivate in response to any stimulus.

In Profile

One severe Russian winter, when he was too poor to heat his home adequately, his butterflies died. At the time, Ivan Pavlov (1849–1936) was studying the life cycle of butterflies. When his wife complained about their lack of money, he insisted that the loss of the butterflies was a greater misfortune. Despite his self-imposed poverty—he had chosen the life of a scholar—he was a generous husband. He bought his wife a pair of shoes for a trip. Yet upon her arrival, she discovered that one shoe was missing. She later learned that Ivan had kept it on his desk as a remembrance of her.

Pavlov was the son of an Orthodox priest, and his mother was the daughter of a priest. Pavlov planned to become a priest himself until he read Darwin's *Origin of Species* and Ivan Sechenov's *Reflexes of the Brain*. He decided to devote himself



IVAN PETROVICH PAVLOV

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to science and studied under Sechenov at the University of St. Petersburg thanks to the generosity of the czar.

Pavlov was a dedicated physiologist. He spent much of his professional life studying digestion. He threatened to fire anyone in his lab who used psychological terms to describe conditioned reflexes, which he saw as brain reflexes, not as examples of associative learning. Pavlov eventually obtained professorships at the St. Petersburg Military Academy and the University of St. Petersburg. Although a physiologist, Pavlov believed—as did John B. Watson—that animal and human learning are equivalent processes.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Ivan Petrovich Pavlov.

In his initial experiments, Pavlov trained dogs to salivate when he sounded a tone or a bell. Pavlov termed these trained salivary responses “conditional reflexes.” They were *conditional* upon the repeated pairing of a previously neutral stimulus (such as the clanging of a food tray) and a stimulus (in this case, food) that evoked the target response (in this case, salivation). Today, conditional reflexes are generally referred to as *conditioned responses*.

Pavlov demonstrated conditioned responses by strapping a dog into a harness like the one shown in Figure 6.1 ■. When meat powder was placed on the dog's tongue, it salivated. Pavlov repeated the process several times, with one difference. He preceded the meat powder by half a second or so with the sound of a tone on each occasion. After several pairings of the meat powder and the tone, Pavlov sounded the tone but did *not* follow it with the meat powder. Still the dog salivated. It had learned to salivate in response to the tone.



Figure 6.1 ■ Pavlov's Demonstration of Conditioned Reflexes in Laboratory Dogs From behind a one-way mirror, a laboratory assistant sounds a tone and then places meat powder on the dog's tongue. After several pairings, the dog salivates in response to the tone alone. A tube collects saliva and passes it to a vial. The quantity of saliva is taken as a measure of the strength of the animal's response.

Stimuli and Responses in Classical Conditioning

In Pavlov's experiment, the meat powder is an unlearned or **unconditioned stimulus (UCS)**. Salivation in response to the meat powder is an unlearned or **unconditioned response (UCR)**. The tone was at first a meaningless or neutral stimulus; it might have caused the dog to look in the direction of the sound—an **orienting response**. But the tone was not yet associated with food. Then, through repeated association with the meat powder, the tone became a learned or **conditioned stimulus (CS)** for the salivation response. Salivation in response to the tone (or conditioned stimulus) is a learned or **conditioned response (CR)**. Therefore, salivation can be either a conditioned response or an unconditioned response depending on the method used to evoke it (see Figure 6.2) ■.

Here is a mini-experiment that many adults have tried. They smile at infants, say something like “kitchie-coo” (don't ask me why), and then tickle the infant's foot. Perhaps the infant laughs; it also usually curls or retracts the foot. After a few repetitions—which psychologists call “trials”—the adult simply saying “kitchie-coo” is likely to be enough to cause the infant to laugh and retract its foot.

Taste Aversion: Are All Stimuli Created Equal?

When I was a child in the Bronx, my friends and I would go to the movies on Saturday mornings. One day, my friends dared me to eat two huge containers of buttered popcorn by myself. I had no problem with the first enormous basket of buttered

Unconditioned stimulus (UCS) A stimulus that elicits a response from an organism prior to conditioning.

Unconditioned response (UCR) An unlearned response to an unconditioned stimulus.

Orienting response An unlearned response in which an organism attends to a stimulus.

Conditioned stimulus (CS) A previously neutral stimulus that elicits a conditioned response because it has been paired repeatedly with a stimulus that already elicited that response.

Conditioned response (CR) A learned response to a conditioned stimulus.

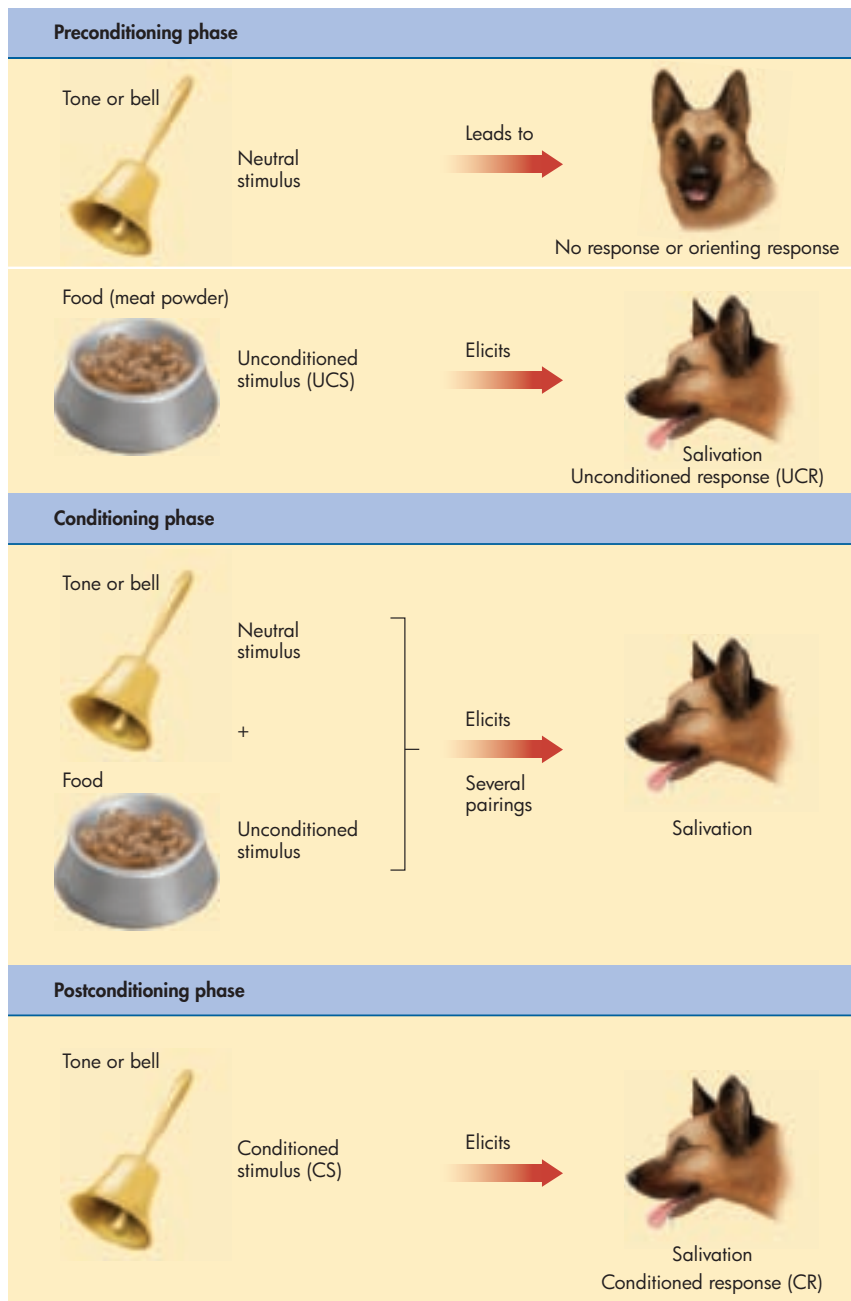


Figure 6.2 ■ A Schematic Representation of Classical Conditioning Prior to conditioning, food elicits salivation. The tone, a neutral stimulus, elicits either no response or an orienting response. During conditioning, the tone is rung just before meat is placed on the dog's tongue. After several repetitions, the tone, now a CS, elicits salivation, the CR.

imals (and humans) would be biologically prepared to develop aversions that are adaptive in their environmental settings (Bouton, 2010; Öhman & Mineka, 2001). That is, those of us who develop taste aversions quickly are less likely to feast on poisonous food, more likely to survive, and thus more likely to contribute our genes to future generations.

In a classic study, Garcia and Koelling (1966) conditioned two groups of rats. Each group was exposed to the same three-part conditioned stimulus: a taste of sweetened water, a light, and a clicker. Afterward, one group was presented with an unconditioned stimulus of nausea (induced by poison or radiation), and the other group was presented with an unconditioned stimulus of electric shock.

After conditioning, the rats who had been nauseated showed an aversion for sweetened water but not to the light or clicker. Although all three stimuli had been presented at the same time, *the rats had acquired only the taste aversion*. After conditioning, the rats that had been shocked avoided both the light and the clicker, *but they did not show a taste aversion to the sweetened water*. For each group of

popcorn. More slowly—much more slowly—I forced down the second basket. I felt bloated and nauseated. The taste of the butter, corn, and salt lingered in my mouth and nose, and my head spun. It was obvious to me that no one could talk me into even another handful of popcorn that day. But I was surprised that I couldn't face buttered popcorn again for a year.

Years later, I learned that psychologists refer to my response to buttered popcorn as a *taste aversion*. **Question 4: What is a taste aversion, and why are taste aversions of special interest to psychologists?**

Taste aversions are fascinating examples of classical conditioning. They are adaptive because they motivate organisms to avoid potentially harmful foods. Although taste aversions are acquired by association, they are of special interest because they differ from other kinds of classical conditioning in a couple of ways. First, only one association may be required. For example, many decades have now passed since the popcorn incident, but the distinctive odor of buttered popcorn still turns my stomach. **Truth or Fiction Revisited:** Thus, a single nauseating meal can give rise to a taste aversion that lasts for years. Second, whereas most kinds of classical conditioning require that the unconditioned stimulus and conditioned stimulus be close together in time, in taste aversion the unconditioned stimulus (in this case, nausea) can occur hours after the conditioned stimulus (in this case, the flavor of food).

THE EVOLUTION OF TASTE AVERSION

Research on taste aversion also challenges the behaviorist view that organisms learn to associate any stimuli that are linked in time. In reality, not all stimuli are created equal. The evolutionary perspective suggests that ani-

rats, the conditioning that took place was adaptive. In the natural scheme of things, nausea is more likely to stem from poisoned food than from lights or sounds. So, for nauseated rats, acquiring the taste aversion was appropriate. Sharp pain, in contrast, is more likely to stem from natural events involving lights (fire, lightning) and sharp sounds (twigs snapping, things falling). Therefore, it was more appropriate for the shocked animals to develop an aversion to the light and the clicker than to the sweetened water.

In classical conditioning, organisms learn to connect stimuli, such as the sound of a tone with food. Now let's consider various factors in classical conditioning, beginning with what happens when the connection between stimuli is severed. This is of great interest to psychologists because, as we will see, psychologists have used extinction to help people overcome fears.

Extinction and Spontaneous Recovery

Extinction and *spontaneous recovery* are aspects of conditioning that help us adapt by updating our expectations or revising our thinking about (representations of) the changing environment. For example, a dog may have learned to associate a new scent (a conditioned stimulus) with the appearance of a dangerous animal. It can then take evasive action when it catches a whiff of that scent. A child may have learned to connect hearing a car pull into the driveway (a conditioned stimulus) with the arrival of his or her parents (an unconditioned stimulus). Thus, the child may begin to squeal with delight (squealing is a conditioned response) when the car is heard. Let's see how extinction and spontaneous recovery may enter the picture.

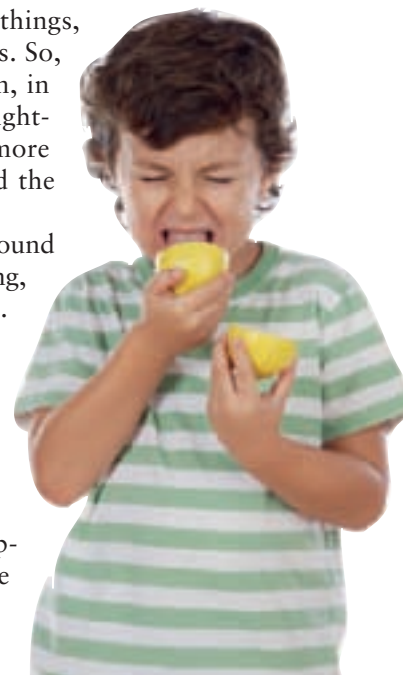
EXTINCTION

Question 5: What is the role of extinction in classical conditioning? Extinction can occur when the times—and the relationships between events—change. The once-dangerous animal may no longer be a threat to the dog. (What a puppy perceives as a threat may lose its fearsomeness once the dog matures.) After moving to a new house, the child's parents may commute by means of public transportation. The sound of a car in a nearby driveway may signal a neighbor's, not a parent's, homecoming. When conditioned stimuli (such as the scent of a dog or the sound of a car) are no longer followed by unconditioned stimuli (a dangerous animal, a parent's homecoming), they lose their ability to elicit conditioned responses. In this way, the organism adapts to a changing environment.

In classical conditioning, **extinction** is the process by which conditioned stimuli lose the ability to elicit conditioned responses because the conditioned stimuli are no longer associated with unconditioned stimuli. That is, the puppy loses its fear of the once-threatening animal's scent, or the toddler is no longer gleeful at the sounds of the car in the driveway. From the cognitive perspective, extinction changes the animal's mental representation of its environment because the conditioned stimulus no longer allows it to make the same prediction.

In experiments on the extinction of conditioned responses, Pavlov found that repeated presentations of the conditioned stimulus (in this case, the tone) without the unconditioned stimulus (in this case, meat powder) led to extinction of the conditioned response (salivation in response to the tone). Basically, the dog stopped salivating at the sound of the tone. Interestingly, Figure 6.3 ■ shows that a dog was conditioned to begin to salivate in response to a tone after two or three pairings of the tone with meat powder. Continued pairings of the stimuli led to increased salivation (measured in number of drops of saliva). After seven or eight trials, salivation leveled off at 11 to 12 drops.

In the next series of experiments, salivation in response to the tone was extinguished through several trials in which the tone was presented without the meat powder. After about 10 extinction trials, the animal no longer salivated. That is, it no longer showed the conditioned response when the tone sounded.



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Formation of a Taste Aversion? Taste aversions can be acquired by a single pairing of the UCS and the CS. Evolutionary psychologists hypothesize that the rapid acquisition of a taste aversion would make it more likely that an animal would not eat the repellent food again, would survive, and then reproduce, transmitting the genes for rapid acquisition of a taste aversion to the next generation.

Don't become a mere recorder of facts, but try to penetrate the mystery of their origin.

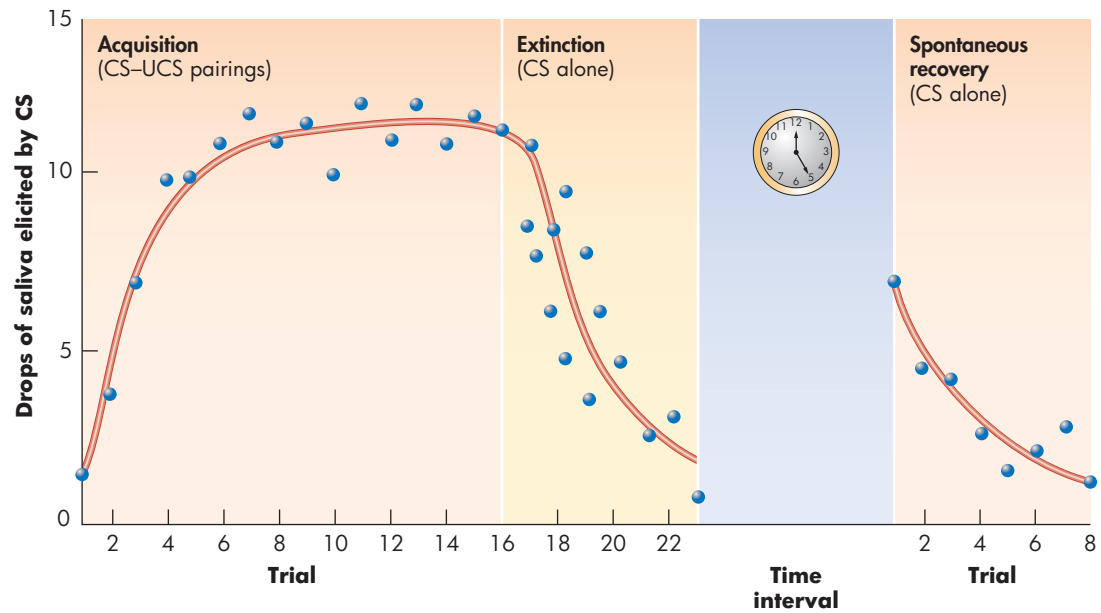
IVAN PAVLOV

[A] powerful resource: natural science with its strictly objective methods.

IVAN PAVLOV

Extinction The process by which stimuli lose their ability to evoke learned responses because the events that had followed the stimuli no longer occur. (The learned responses are said to be *extinguished*.)

Figure 6.3 ■ Learning and Extinction Curves Actual data from Pavlov (1927) compose the jagged line, and the curved lines are idealized. In the acquisition phase, a dog salivates (shows a CR) in response to a tone (CS) after a few trials in which the tone is paired with meat powder (the UCS). Afterward, the CR is extinguished in about 10 trials during which the CS is not followed by the UCS. After a rest period, the CR recovers spontaneously. A second series of extinction trials leads to more rapid extinction of the CR.



Spontaneous recovery The recurrence of an extinguished response as a function of the passage of time.

Spontaneous Recovery of the Tendency to Revisit a Water Hole after Time Has Passed If a water hole dries up, animals' tendencies to visit the water hole in a given season may be extinguished. But when a new season rolls around, the tendency to visit the water hole may spontaneously recover. Evolution would favor the survival of animals that associate thirst with the water hole from time to time so that they are likely to revisit when it again holds water.

Now, what will happen if we allow a couple of days to pass and then sound the tone again? **Question 6: What is the role of spontaneous recovery in classical conditioning?**

SPONTANEOUS RECOVERY

We asked what would happen if we were to allow a day or two to pass after we had extinguished salivation in Pavlov's dog and then again sounded the tone. Where would you place your bet? Would the dog salivate or not?

If you bet that the dog would again show the conditioned response (in this case, salivation in response to the tone), you were correct. Organisms tend to show **spontaneous recovery** of extinguished conditioned responses merely as a function of the passage of time. For this reason, the term *extinction* may be a bit misleading. When a species of animal becomes extinct, all the members of that species capable of reproducing have died. The species vanishes. But the experimental extinction of conditioned responses does not lead to their permanent eradication. Rather, it seems that they *inhibit* the response. The response remains available for future performance under the "right" conditions.

Evolutionary psychologists note that spontaneous recovery, like extinction, is adaptive. What would happen if the child heard no car in the driveway for several months? Possibly, the next time a car entered the driveway, the child would associate the sounds with a parent's homecoming (rather than with the arrival of a neighbor). This expectation could be appropriate. After all, *something* had changed when no car entered the nearby driveway for so long. In the wild, a water hole may contain water for only a couple of months during the year. But evolution would favor the survival of animals that associate the water hole with the thirst drive from time to time so that they will return to it when it again holds water.

As time passes and the seasons change, things sometimes follow

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circular paths and arrive where they were before. Spontaneous recovery seems to function as a mechanism whereby organisms can adapt successfully to situations that recur from time to time.

Generalization and Discrimination

No two things are exactly alike. Traffic lights are hung at slightly different heights, and shades of red and green differ a little. The barking of two dogs differs, and the sound of the same animal differs slightly from one bark to the next. Rustling sounds in the undergrowth differ, but evolution would favor the survival of rabbits and deer that flee when they perceive any one of many possible rustling sounds. Adaptation requires us to respond similarly (or *generalize*) to stimuli that are equivalent in function and to respond differently to (or *discriminate* between) stimuli that are not.

GENERALIZATION

Question 7: What is the role of generalization in classical conditioning? Pavlov noted that responding to different stimuli as though they are functionally equivalent—*generalizing*—is adaptive for animals. **Generalization** is the tendency for a conditioned response to be evoked by stimuli that are similar to the stimulus to which the response was conditioned. Pavlov demonstrated generalization by first getting his dog to salivate when it was shown a circle. Later, the dog salivated in response to being shown closed geometric figures—even squares! The more closely the figure resembled a circle, however, the greater the strength of the response (as measured by drops of saliva).

But what happens if food follows the presentation of a circle but not a square?

DISCRIMINATION

Question 8: What is the role of discrimination in classical conditioning? Organisms must also learn that (a) many stimuli perceived as being similar are functionally different, and (b) they must respond adaptively to each. During the first couple of months of life, for example, babies can discriminate their mother's voice from those of other women. They often stop crying when they hear their mother but not when they hear a stranger.

Pavlov showed that a dog conditioned to salivate in response to circles could be trained *not* to salivate in response to ellipses. After a while, the dog no longer salivated in response to the ellipses. Instead, it showed **discrimination**: It salivated only in response to circles. Pavlov found that increasing the difficulty of the discrimination task apparently tormented the dog. After the dog was trained to salivate in response to circles but not ellipses, Pavlov showed it a series of progressively rounder ellipses. Eventually, the dog could no longer distinguish the ellipses from circles. The animal was so stressed that it urinated, defecated, barked profusely, and snapped at laboratory personnel.

How do we explain the dog's belligerent behavior? In a classic work written more than 70 years ago, titled *Frustration and Aggression*, a group of behaviorally oriented psychologists suggested that frustration induces aggression (Dollard et al., 1939). Why is failure to discriminate circles from ellipses frustrating? For one thing, in such experiments, rewards—such as food—are usually contingent on correct discrimination. That is, if the dog errs, it doesn't get fed. Cognitive theorists, however, disagree (Rescorla, 1988). They would say that in Pavlov's experiment, the dog lost the ability to adjust its mental map of the environment as the ellipses grew more circular. Thus, it was frustrated.

Daily living requires appropriate generalization and discrimination. No two hotels are alike, but when we travel from one city to another, it is adaptive to expect to stay in a hotel. It is encouraging that a green light in Washington has the same meaning as a green light in Paris. But returning home in the evening requires the ability to discriminate between our home and those of others. And imagine the confusion that would occur if we could not discriminate our friends, mates, or coworkers from other people!



Stop and Check This Out You have never seen this traffic light before and are unlikely to come across it. However, you would show excellent judgment to stop at it if you did—or at least we assume that you would. This is because of generalization from your other experiences with traffic lights.

— ■ —
Learning never exhausts the mind.

LEONARDO DA VINCI

— ■ —

Generalization In conditioning, the tendency for a conditioned response to be evoked by stimuli that are similar to the stimulus to which the response was conditioned.

Discrimination In conditioning, the tendency for an organism to distinguish between a conditioned stimulus and similar stimuli that do not forecast an unconditioned stimulus.

Higher Order Conditioning

Consider a child who is burned by touching a hot stove. After this experience, the sight of the stove may evoke fear. And because hearing the word *stove* may evoke a mental image of the stove, just hearing the word may evoke fear.

Recall the mini-experiment in which an adult smiles, says “kitchie-coo,” and then tickles an infant’s foot. After a few repetitions, just smiling at the infant may cause the infant to retract its foot. In fact, just walking into the room may have the same effect! The experiences with touching the hot stove and tickling the infant’s foot are examples of higher order conditioning. **Question 9: What is higher order conditioning?**

In **higher order conditioning**, a previously neutral stimulus (for example, hearing the word “stove” or seeing the adult who had done the tickling enter the room) comes to serve as a learned or conditioned stimulus after being paired repeatedly with a stimulus that has already become a learned or conditioned stimulus (for example, seeing the stove or hearing the phrase “kitchie-coo”). Pavlov demonstrated higher order conditioning by first conditioning a dog to salivate in response to a tone. He then repeatedly paired the shining of a light with the sounding of the tone. After several pairings, shining the light (the higher order conditioned stimulus) came to evoke the response (salivation) that had been elicited by the tone (the first-order conditioned stimulus).

In the nearby In Profile, we meet one of the celebrities of the science of psychology, “Little Albert.” Albert did not seek his fame; after all, he was not even a year old at the time. At that tender age, he was conditioned by John B. Watson and Rosalie Rayner to fear rats and, by generalization, all furry animals.

Video Connections—Conditioning of Fear



View the video to see how fear can be conditioned.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

In Profile

People such as “Little Albert,” who participate in well-known, controversial research studies, “have become unwilling protagonists whose stories are told over and over in psychology textbooks. So people become very curious. Who were they, and how did they feel about the experiment?”

—Cathy Faye, Archives of the History of American Psychology, University of Akron

One of psychology’s mysteries appears to have been recently solved (DeAngelis, 2010). An investigative team—led by Hall P. Beck and including Sharman Levinson and Gary Irons (2009)—pored over public records, conducted interviews with relatives of the lad they suspected of being Albert, and consulted facial recognition experts who compared the photos of the boy in the experiment to family photos. Ultimately, they determined that Little Albert, who was conditioned to fear furry objects before his first birthday, was the son of a wet nurse who had lived and worked at a Johns Hopkins campus pediatric hospital—the Harriet Lane Home—at the time of Watson and Rayner’s famous experiment. Her name was Arvilla Merritte, and Albert’s actual name was Douglas Merritte. Arvilla was paid all of a dollar for her 9-month-old son’s participation.

In 1920, the behaviorist John B. Watson and his future wife, Rosalie Rayner, published the report of their demonstration that emotional reactions can be acquired through classical



“LITTLE ALBERT”

© Archives of the History of American Psychology

conditioning. The subject of their demonstration became known as “Little Albert” (a counterpart to Freud’s famous case study of “Little Hans”—see Chapter 15). As an infant, Albert was a phlegmatic fellow. He wasn’t given to ready displays of emotion. But he did enjoy playing with a laboratory rat. Using a method that many psychologists have criticized as unethical, Watson startled Little Albert by clanging steel bars behind his head whenever the infant played with the rat. After repeated pair-

ings, Albert showed fear of the rat even when the clanging was halted. Albert’s fear also generalized to objects that were similar in appearance to the rat, such as a rabbit and the fur collar on a woman’s coat. This study has become a hallmark in psychology, although Watson has also been criticized for not attempting to countercondition Albert’s fear.

Many have wondered what became of Little Albert. Some imagined him as an adult, even an old man, avoiding small animals and trembling at the sight of women’s muffs in winter. Sadly, Albert’s life was not long. Nobody ever asked a reflective, adult Albert how he felt about participating in the Watson and Rayner experiment. His mother and he left the home on campus in the early 1920s, and he died of hydrocephalus at the age of 6.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about “Little Albert”

Preparedness and the Conditioning of Fear

Little Albert developed his fear of rats easily enough, but would Watson and Rayner have been able to condition him to fear flowers or potted plants? Perhaps not. **Question 10: Was Little Albert “prepared” to acquire his fear of rats?** As suggested by Arne Öhman and Susan Mineka (2003), humans (and other primates) may be **biologically prepared** by evolutionary forces to rapidly develop fears of certain animals, including snakes:

Snakes are commonly regarded as slimy, slithering creatures worthy of fear and disgust. . . . Human fear of snakes and other reptiles may be a distant effect of the conditions under which early mammals evolved. In the world they inhabited, the animal kingdom was dominated by awesome reptiles, the dinosaurs, and so the prerequisite for early mammals to deliver genes to future generations was to avoid getting caught in the fangs of *Tyrannosaurus rex* and its relatives.

—Öhman and Mineka, 2003

People also seem to be prepared to fear other reptiles, spiders, thunder, threatening faces, sharp objects, darkness, and heights—all of which would have been sources of danger to our ancestors and which, to some degree, may still threaten us (Gerdes et al., 2009; Mineka & Oehlberg, 2008; Starratt & Shackelford, 2010). Susan Mineka and Arne Öhman (2002) ran an experiment in which they paired electric shock with slides of spiders, snakes, and other objects, including mushrooms, flowers, and firearms. Physiological monitoring of participants showed that the spiders and snakes produced more rapid conditioning, greater fear responses, and more resistance to having the fear responses extinguished. Therefore, it would seem that painful experiences with evolutionarily neutral objects—such as plant life, modern tools, hot stoves, and electrical appliances and outlets—are not as likely to lead to the development of severe fears. Of course, these objects were recently invented. If they are around for a few million years, perhaps our descendants will be prepared to learn to fear them.

Öhman and Mineka (2001) suggest that four elements are crucial in the effective conditioning of fear:

1. That the fear be triggered by stimuli that posed threats to our survival in our evolutionary history;
2. That we be able to easily recognize stimuli that were related to recurrent survival threats with “a minimum of neural computations”;
3. That fears, once developed, be resistant to conscious efforts to reduce or extinguish them; and
4. That the fear be controlled by “a specific neural circuit that has been shaped by evolution.”

Applications of Classical Conditioning

Watson did not attempt to eliminate Little Albert’s fear of rats. However, soon afterward, a protégé of Watson carried out a well-known experiment in counter-

Video Connections—Little Albert

Watch the video to see the historic albeit unethical footage of John B. Watson and Rosalie Rayner conditioning Little Albert. You will learn more about the process of classical conditioning and have the opportunity to decide how you would go about reversing Albert’s fear of rats.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.



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An Unlikely Encounter in the 21st Century

Visitors to the Dinosaur Park in Kleinwelka, Germany, are walking past a model of a *Tyrannosaurus rex*. Preparedness theory suggests that we humans are likely to develop fears of snakes and other reptiles (the *Tyrannosaurus* was a reptile) because of events in our evolutionary history. Öhman and Mineka write: “The prerequisite for early mammals to deliver genes to future generations was to avoid getting caught in the fangs of *Tyrannosaurus rex*.”

Higher order conditioning A classical conditioning procedure in which a previously neutral stimulus comes to elicit the response brought forth by a *conditioned* stimulus by being paired repeatedly with that conditioned stimulus.

Biological preparedness Readiness to acquire a certain kind of conditioned response due to the biological makeup of the organism.

Counterconditioning A fear-reduction technique in which pleasant stimuli are associated with fear-evoking stimuli so that the fear-evoking stimuli lose their aversive qualities.

Flooding A behavioral fear-reduction technique based on principles of classical conditioning. Fear-evoking stimuli (CSs) are presented continuously in the absence of actual harm so that fear responses (CRs) are extinguished.

Systematic desensitization A behavioral fear-reduction technique in which a hierarchy of fear-evoking stimuli is presented while the person remains relaxed.

conditioning fears. In **counterconditioning**, an organism learns to respond to a stimulus in a way that is incompatible with a response that was conditioned earlier. For example, relaxation is incompatible with a fear response. Even if the concept of counterconditioning did not do Little Albert any good, psychologists have used it to reduce fears in other people. Let's consider counterconditioning and other applications of classical conditioning.

COUNTERCONDITIONING

The reasoning behind counterconditioning is this: If fears, as Watson had shown, could be conditioned by painful experiences, perhaps fears could be *counterconditioned* by substituting pleasant experiences. In 1924, Watson's protégé Mary Cover Jones attempted counterconditioning with a boy called Peter, 2 years and 10 months old, as a method of counteracting fear.

Peter had an intense fear of rabbits. Jones arranged for a rabbit to be gradually brought closer to Peter while he engaged in some of his favorite activities, such as munching on candy and cookies. **Truth or Fiction Revisited:** Thus, it is true that psychologists helped a young boy overcome his fear of rabbits by having him eat cookies while a rabbit was brought progressively closer. Jones first placed the rabbit in a far corner of the room while Peter munched and crunched. Peter cast a wary eye, but he continued to consume the treat. Over a couple of months, the animal was brought gradually closer until, eventually, Peter ate treats and touched the rabbit at the same time. Jones theorized that the joy of eating was incompatible with fear and thus counterconditioned it.

FLOODING AND SYSTEMATIC DESENSITIZATION

If Mary Cover Jones had simply plopped the rabbit on Peter's lap rather than bring it gradually closer, she would have been using the method of **flooding**. Had she done so, the cookies on the plate, not to mention those already eaten, might have decorated the walls—even if the method eventually worked.

Flooding, like counterconditioning, is a behavior therapy method for reducing fears. It is based on the classical conditioning principle of extinction (Mystkowski & Mineka, 2007). In flooding, the client is exposed to the fear-evoking stimulus until the fear response is extinguished. Little Albert, for example, might have been placed in close contact with a rat until his fear had become fully extinguished. In extinction, the conditioned stimulus (in this case, the rat) is presented repeatedly in the absence of the unconditioned stimulus (the clanging of the steel bars) until the conditioned response (fear) is no longer evoked. But note that according to preparedness theory, fear responses rooted in our evolutionary history can be very difficult to extinguish.

A German study of 75 people aged 18 to 54 evaluated the effectiveness of a flooding-type treatment for agoraphobia (fear of being out in busy open areas) (Fischer et al., 1998). Agoraphobic participants were exposed persistently—for 2 to 3 weeks, all day long—to densely populated open places. Participants were assessed immediately after, 6 months after, and as much as 53 months after treatment, and they showed significant reductions in anxiety and in avoidance of busy open places.

Although flooding is usually effective, it is unpleasant. (When you are fearful of rats, being placed in a small room with one is no picnic.) For this reason, behavior therapists frequently prefer to use **systematic desensitization**, in which the client is gradu-

ally exposed to fear-evoking stimuli under relaxing circumstances. For example, while feeling relaxed, Little Albert might have been given an opportunity to look at photos of rats or to see live rats from a distance before they were brought closer to him. Systematic desensitization takes longer than flooding but is not as unpleasant.



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Will Fear of Busy Open Places Be Extinguished by Persistent Exposure?

Research results are encouraging. It seems that persistent exposure of agoraphobic individuals to busy open areas reduces their anxiety and their avoidance of such places.

THE BELL-AND-PAD TREATMENT FOR BED-WETTING

By the age of 5 or 6, children normally awaken in response to the sensation of a full bladder. They inhibit the urge to urinate immediately, which is an automatic or reflexive response to bladder tension, and instead go to the bathroom to do so. However, some children tend not to respond to bladder tension while asleep. They remain asleep and frequently wet their beds.

By means of the bell-and-pad method, children are taught to wake up in response to bladder tension. They sleep on a special sheet or pad that has been placed on the bed. When the child starts to urinate, the water content of the urine causes an electrical circuit in the pad to close. The closing of the circuit triggers a bell or buzzer, and the child is awakened. (Similar buzzer circuits have been built into training pants as an aid to toilet training.) In terms of classical conditioning, the bell is an unconditioned stimulus that wakes the child (waking up is the unconditioned response). By means of repeated pairings, a stimulus that precedes the bell becomes associated with the bell and also gains the capacity to awaken the child. What is that stimulus? The sensation of a full bladder. **Truth or Fiction Revisited:** In this way, bladder tension gains the capacity to awaken the child *even though the child is asleep during the classical conditioning procedure*.

The bell-and-pad method is a superb example of why behaviorists prefer to explain the effects of classical conditioning in terms of the pairing of stimuli and not in terms of what the learner knows. The behaviorist may argue that we cannot assume a sleeping child “knows” that wetting the bed will cause the bell to ring. We can only note that by repeatedly pairing bladder tension with the bell, the child eventually *learns* to wake up in response to bladder tension alone. *Learning* is demonstrated by the change in the child’s behavior. One can only speculate on what the child *knows* about the learning process.

In any event, it appears that humans are capable of learning by means of simple association. In terms of the evolutionary perspective, it would appear that organisms that can learn by means of several routes—including conditioning and conscious reflection—would have a greater chance of survival than organisms whose learning is limited to a single route.

LearningConnections • CLASSICAL CONDITIONING: LEARNING WHAT IS LINKED TO WHAT

ACTIVE REVIEW (1) Behaviorists define learning in terms of a change in _____. (2) Cognitive psychologists define learning in terms of a change in the way organisms mentally _____ the environment. (3) A _____ is an environmental condition that evokes a response from an organism. (4) A response to an unconditioned stimulus (UCS) is called an _____ response (UCR). (5) A response to a conditioned stimulus (CS) is termed a _____ response (CR). (6) In conditioning a taste aversion, (only one or several?) association(s) is/are usually required. (7) Repeated presentation of a CS (such as a tone) without the UCS (such as meat) will _____ the CR (salivation). (8) Extinguished responses often show _____ recovery as a function of the passage of time. (9) In stimulus _____, organisms show a conditioned response in response to a range of stimuli similar to the conditioned stimulus. (10) In stimulus _____, organisms learn to show a conditioned response in response to a more limited range of stimuli. (11) In _____ order conditioning, a previously neutral stimulus comes to serve as a conditioned stimulus after being paired repeatedly with another conditioned stimulus. (12) John B. Watson and Rosalie Rayner used conditioning to teach “Little _____” to fear rats. (13) Mary Cover Jones taught a little boy to overcome his fear of rabbits by means of _____. (14) In the behavior-therapy method

of _____, a client is continuously exposed to a fear-evoking stimulus until the fear response is extinguished. (15) In systematic _____, the client is gradually exposed to fear-evoking stimuli under relaxing circumstances. (16) In the _____-and-pad treatment for bed-wetting, a child is taught to awaken in the night when he or she has to urinate.

REFLECT AND RELATE Have you heard or used the expression “That rings a bell”? If so, what do you think it means? Do you know where the expression comes from? Is the phrase historically accurate?

CRITICAL THINKING Critical thinkers pay attention to the definitions of terms. Psychologists disagree on the definition of learning. Behaviorists define learning as a relatively permanent change in behavior that arises from experience. Cognitive psychologists define learning as a change in the way an organism mentally represents the environment due to experience. Why do they have these different approaches?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

OPERANT CONDITIONING: LEARNING WHAT DOES WHAT TO WHAT

Through classical conditioning, we learn to associate stimuli so that a simple, usually passive, response made to one stimulus is then made in response to the other. In the case of Little Albert, clanging noises were associated with presentation of a rat. As a result, the rat came to elicit the fear response caused by the clanging. However, classical conditioning is only one kind of learning that occurs in these situations. After Little Albert acquired his fear of the rat, his voluntary behavior changed. He avoided the rat as a way of reducing his fear. Thus, Little Albert had also engaged in another kind of learning—*operant conditioning*. **Question 11: What is operant conditioning?** In operant conditioning, organisms learn to do things—or *not* to do things—because of the outcomes of their behavior. For example, I avoided buttered popcorn to prevent nausea. But we also seek fluids when we are thirsty, sex when we are aroused, and an ambient temperature of 68° to 70°F when we feel too hot or too cold. *Classical conditioning focuses on how organisms form anticipations about their environments. Operant conditioning focuses on what they do about them.*

We begin this section with the historic research of psychologist Edward L. Thorndike. Then we will examine the more recent work of B. F. Skinner.

Edward L. Thorndike and the Law of Effect

In this monograph are presented the results of some experiments which I have been carrying on during two years, and some theories which these results seem to support. The subjects of the experiments were dogs, cats and chicks, and the method was to put them, when hungry, in boxes from which they could escape and so get food by manipulating some simple mechanism (e.g., by pulling down a loop of wire, depressing a lever, turning a button).

—E. L. Thorndike, 1898

In the 1890s, stray cats were mysteriously disappearing from the streets and alleyways of Harlem. Some of them, it turned out, were being brought to the quarters of Columbia University doctoral student Edward Thorndike. Thorndike was using the cats as subjects in experiments on the effects of rewards and punishments on learning.

Thorndike placed the cats in so-called puzzle boxes. If the animal managed to pull a dangling string, a latch would be released, allowing it to jump out and reach a bowl of food. When first placed in a puzzle box, a cat would try to squeeze through any opening and would claw and bite at the confining bars and wire. It would claw at anything it could reach. Through such random behavior, it might take 3 to 4 minutes for the cat to chance upon the response of pulling the string. Pulling the string would open the cage and allow the cat to reach the food. When placed back in the cage, it might again take several minutes for the animal to pull the string. But with repetition, it took the cat progressively less time. After seven or eight repetitions, the cat might pull the string immediately when placed back in the box.

THE LAW OF EFFECT

Thorndike explained the cat's learning to pull the string in terms of his **law of effect**. **Question 12: What is the law of effect?** According to this law, a response (such as string pulling) is—to use Thorndike's term—“stamped in” (that is, strengthened) in a particular situation (such as being inside a puzzle box) by a reward (escaping from the box and eating). That is, **rewards** stamp in S–R (stimulus–response) connections. **Punishments**—using Thorndike's terminology once again—“stamp out”

It is an open question whether any behavior based on fear of eternal punishment can be regarded as ethical or should be regarded as merely cowardly.

MARGARET MEAD

Your most unhappy customers are your greatest source of learning.

BILL GATES

Law of effect Thorndike's view that pleasant events stamp in responses, and unpleasant events stamp them out.

Reward A pleasant stimulus that increases the frequency of the behavior it follows.

Punishment An unpleasant stimulus that suppresses the behavior it follows.

In Profile

During his first TV appearance, psychologist B. F. Skinner (1904–1990) was asked, “Would you, if you had to choose, burn your children or your books?” He said with a wry smile that he would have chosen to burn his children because his contribution to the future lay more in his writings than in his genes. Skinner delighted in controversy and enjoyed shocking TV viewers with his irreverent wit.

Skinner was born into a middle-class Pennsylvania family. As a youth, he was continually building things—scooters, sleds, wagons, rafts, slides, and merry-go-rounds. Later, he would become famous for building the so-called Skinner box, which improved on Thorndike’s puzzle box as a way of studying operant behavior. He earned an undergraduate degree in English and turned to psychology only after failing to make his mark as a writer in New York’s Greenwich Village.

A great popularizer of his own views, Skinner used reinforcement to teach pigeons to play basketball and the



B. F. SKINNER

© Nina Leifer/Time & Life Pictures/Getty Images

piano—sort of. On a visit to his daughter’s grammar school class, it occurred to him that similar techniques might work with children. Thus, he developed programmed learning. Although he had earlier failed at writing, he gathered a cultish following when he published *Walden Two* (1948), a novel in which children are socialized to want to behave prosocially.

Skinner and his followers have applied his principles not only to programmed learning but also to behavior modification programs for helping people with disorders ranging from substance abuse to phobias to sexual dysfunctions. He died in 1990, eight days after receiving an unprecedented Lifetime Contribution to Psychology award from the American Psychological Association.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Burrhus Frederic Skinner.

stimulus–response connections. That is, organisms would learn not to engage in behavior that brings on punishment. Later, we shall see that the effects of punishment on learning are not so certain.

B. F. Skinner and Reinforcement

When it comes to unusual war stories, few will top that of B. F. Skinner. One of Skinner’s wartime efforts was Project Pigeon. **Truth or Fiction Revisited:** During World War II, Skinner proposed that pigeons be trained to guide missiles to their targets. In their training, the pigeons would be reinforced with food pellets for pecking at targets projected onto a screen (see Figure 6.4). Once trained, the pigeons would be placed in missiles. Their pecking at similar targets displayed on a screen would correct the missile’s flight path, resulting in a “hit” and a sacrificed pigeon. However, plans for building the necessary missile—for some reason called the *Pelican* and not the *Pigeon*—were scrapped. The pigeon equipment was too bulky, and Skinner lamented his suggestion was not taken seriously. Might one conclude that the Department of Defense decided that Project Pigeon was—forgive me—for the birds?

Question 13: What is the contribution of B. F. Skinner to the psychology of learning? Project Pigeon may have been scrapped, but the principles of learning that Skinner applied to the project have found wide application. Skinner taught pigeons and

A man who carries a cat by the tail learns something he can learn in no other way.

MARK TWAIN

Reinforce To follow a response with a stimulus that increases the frequency of the response.

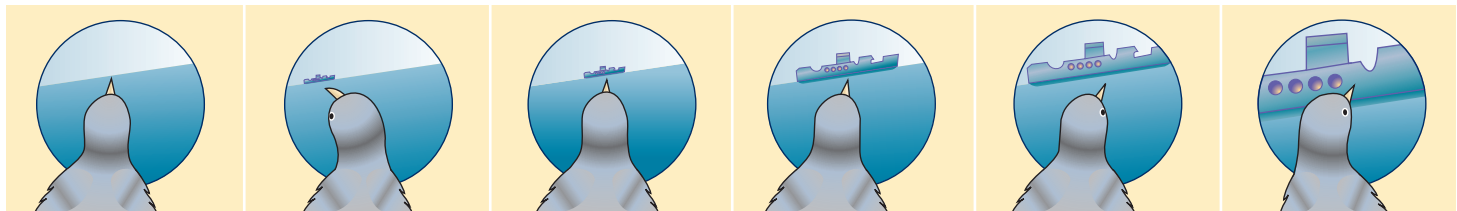


Figure 6.4 ■ **Project Pigeon** During World War II, B. F. Skinner suggested using operant conditioning to train pigeons to guide missiles to their targets. The pigeons would first be reinforced for pecking targets projected on a screen. Afterward, in combat, pecking the on-screen target would keep the missile on course.

— ■ —
*Society attacks early, when the
 individual is helpless.*

B. F. SKINNER
 — ■ —

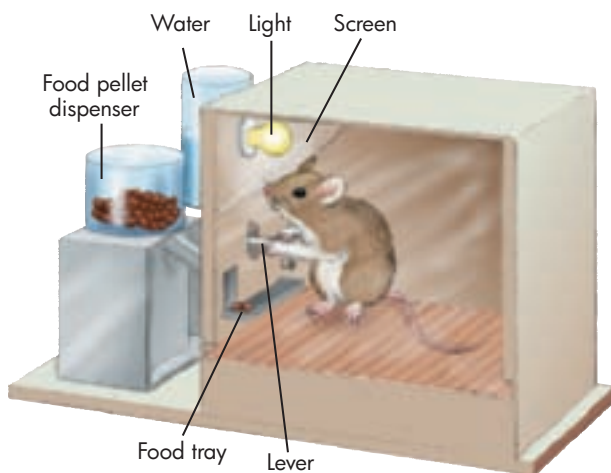


Figure 6.5 ■ The Effects of Reinforcement One of the celebrities of modern psychology, a laboratory rat, earns its keep in a Skinner box. The animal presses a lever because of reinforcement—in the form of food pellets—delivered through the feeder. The habit strength of this operant is the frequency of lever pressing.

Operant behavior Behavior that operates on, or manipulates, the environment.

Operant conditioning A simple form of learning in which an organism learns to engage in certain behavior because it is reinforced.

Operant The same as an operant behavior.

Cumulative recorder An instrument that records the frequency of an organism's operants (or “correct” responses) as a function of the passage of time.

other animals to engage in **operant behavior**, behavior that operates on, or manipulates, the environment. In classical conditioning, involuntary responses such as salivation or eyeblinks are often conditioned. In operant conditioning, *voluntary* responses such as pecking at a target, pressing a lever, or many of the skills required for playing tennis are acquired, or conditioned.

Operant conditioning is therefore defined as a simple form of learning in which an organism learns to engage in certain behavior because of the effects of that behavior. In operant conditioning, we learn to engage in operant behaviors, also known simply as **operants**, that result in presumably desirable outcomes such as food, a hug, an A on a test, attention, or social approval. For example, some children learn to conform their behavior to social rules to earn the attention and approval of their parents and teachers. Other children, ironically, may learn to “misbehave,” because misbehavior also gets attention from other people. In particular, children may learn to be “bad” when their “good” behavior is routinely ignored. Some children who do not do well in school, in fact, seek reinforcement from deviant peers (G. R. Patterson et al., 2000).

Methods of Operant Conditioning

In his influential work *The Behavior of Organisms*, Skinner (1938) made many theoretical and technological innovations. Among them was his focus on discrete behaviors such as lever pressing as the *unit*, or type, of behavior to be studied (Glenn et al., 1992). Other psychologists might focus on how organisms think or “feel.” Skinner focused on measurable things that they do. Many psychologists have found these kinds of behavior inconsequential, especially when it comes to explaining and predicting human behavior. But Skinner’s supporters point out that focusing on discrete behavior creates the potential for helpful changes. For example, in helping people combat depression, one psychologist might focus on their “feelings.” A Skinnerian psychologist would focus on cataloging (and modifying) the types of things that depressed people actually *do*. Directly modifying depressive behavior might also brighten clients’ self-reports about their feelings of depression. The Life Connections section in the chapter on Methods of Therapy (Chapter 16) explains how people can use this principle in their own lives.

To study operant behavior efficiently, Skinner devised an animal cage (or “operant chamber”) that has been dubbed the *Skinner box*. (Skinner himself repeatedly requested that his operant chamber *not* be called a Skinner box. History has thus far failed to honor his wishes, however.) Such a box is shown in Figure 6.5 ■. The cage is ideal for laboratory experimentation because experimental conditions can be carefully introduced and removed, and the effects on laboratory animals (defined as changes in rates of lever pressing) can be carefully observed. The operant chamber (or Skinner box) is also energy efficient—in terms of the experimenter’s energy. In contrast to Thorndike’s puzzle box, a “correct” response does not allow the animal to escape and have to be recaptured and placed back in the box. According to psychologist John Garcia, Skinner’s “great contribution to the study of behavior was the marvelously efficient operant methodology” (1993, p. 1158).

The rat in Figure 6.5 was deprived of food and placed in a Skinner box with a lever at one end. At first, it sniffed its way around the cage and engaged in random behavior. The rat’s first pressing of the lever was inadvertent. However, because of this action, a food pellet dropped into the cage. The arrival of the food pellet increased the probability that the rat would press the lever again. The pellet is thus said to have *reinforced* lever pressing.

Skinner further mechanized his laboratory procedure by making use of a turning drum, or **cumulative recorder**, a tool that had previously been used by physiologists. The cumulative recorder provides a precise measure of operant behavior.

Therefore, the experimenter need not even be present to record the number of correct responses.

Skinner's operant methodology even works when pigeons can fly in and out of Skinner boxes in the wild. Japanese researcher Ken'ichi Fuji (2002) poured commercial grain into the feeder, and several hundred pigeons flew in and out of the box over a 3-month period. Although the pigeons generally learned to peck a key to obtain the grain, one pair of pigeons showed a fascinating variation on the theme. One of them always did the pecking, while the other always ate the grain!

In operant conditioning, it matters little how the first response that is reinforced comes to be made. The animal can happen on it by chance, as in random learning. The animal can also be physically guided to make the response. You may command your dog to "Sit!" and then press its backside down until it is in a sitting position. Finally, you reinforce sitting with food or a pat on the head and a kind word. Animal trainers use physical guiding or coaxing to bring about the first "correct" response. Can you imagine how long it would take to train your dog if you waited for it to sit or roll over and then seized the opportunity to command it to sit or roll over? Both of you would age significantly in the process.

People, of course, can be verbally guided into desired responses when they are learning tasks such as spelling, adding numbers, or operating a machine. But they need to be informed when they have made the correct response. Knowledge of results often is all the reinforcement people need to learn new skills.

Types of Reinforcers

Any stimulus that increases the probability that responses preceding it—whether pecking a button in a Skinner box or studying for a quiz—will be repeated serves as a reinforcer. Reinforcers include food pellets when an animal has been deprived of food, water when it has been deprived of liquid, the opportunity to mate, and the sound of a tone that has previously been associated with eating. **Question 14: What are the various kinds of reinforcers?** Skinner distinguished between *positive* and *negative* reinforcers and *primary* and *secondary* reinforcers.

POSITIVE AND NEGATIVE REINFORCERS

Positive reinforcers increase the probability that a behavior will occur when they are applied. Food and approval usually serve as positive reinforcers. **Negative reinforcers** increase the probability that a behavior will occur when the reinforcers are removed (see Figure 6.6) ■. People often learn to plan ahead so that they need not fear things will go wrong. In such cases, fear acts as a negative reinforcer because removal of fear increases the probability that the behaviors preceding it (such as planning ahead) will be repeated.

Positive reinforcer A reinforcer that when *presented* increases the frequency of an operant.

Negative reinforcer A reinforcer that when *removed* increases the frequency of an operant.

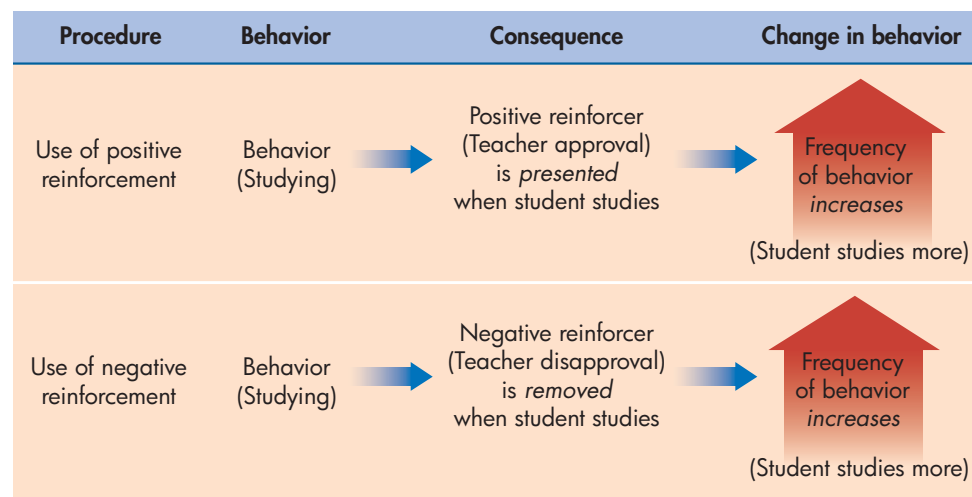


Figure 6.6 ■ Positive Versus Negative Reinforcers All reinforcers increase the frequency of behavior. However, negative reinforcers are aversive stimuli that increase the frequency of behavior when they are removed. In these examples, teacher approval functions as a positive reinforcer when students study harder because of it. Teacher disapproval functions as a negative reinforcer when its removal increases the frequency of studying. Can you think of situations in which teacher approval might function as a negative reinforcer?



Now Versus Later? For those who are addicted to nicotine, smoking provides immediate reinforcement. Most of the negative consequences of smoking, such as respiratory illnesses, are off in the future. How can smokers who want to quit keep those long-term outcomes in mind?

Some reinforcers have more impact than others. For example, pigeons that learn one food tray has more food than another choose the tray with more food (Olthof & Roberts, 2000). Similarly, you would probably choose a job that paid \$1,000 over a similar job that paid \$10. (If not, get in touch with me—I have some chores for you.) With sufficient reinforcement, operants become *habits*. They have a high probability of recurrence in certain situations.

IMMEDIATE VERSUS DELAYED REINFORCERS

Immediate reinforcers are more effective than delayed reinforcers. This means that the short-term consequences of behavior often provide more of an incentive than the long-term consequences.

For example, some students socialize when they should be studying because the pleasure of socializing is immediate. Studying may not pay off until the final exam or graduation. (This is why younger students do better with frequent tests.) It is difficult to quit smoking cigarettes because the reinforcement of nicotine is immediate and the health hazards of smoking are more distant. Focusing on short-term reinforcement is also connected with risky sexual behavior, such as engaging in sexual activity with a stranger or failing to use devices to prevent pregnancy and sexually transmitted infections (Castor et al., 2010; Shuper et al., 2010). One of the aspects of being human is the ability to foresee the long-range consequences of one's behavior and choices. But immediate reinforcers—such as those cookies staring a would-be dieter in the face—can be powerful temptations indeed.

PRIMARY AND SECONDARY REINFORCERS

We can also distinguish between primary and secondary, or conditioned, reinforcers. **Primary reinforcers** are effective because of the organism's biological makeup. Food, water, warmth (positive reinforcers), and pain (a negative reinforcer) all serve as primary reinforcers. **Secondary reinforcers** acquire their value through being associated with established reinforcers. For this reason, they are also termed **conditioned reinforcers**. We may seek money because we have learned that it may be exchanged for primary reinforcers. Part of understanding others lies in the ability to predict what they will find reinforcing.

Extinction and Spontaneous Recovery in Operant Conditioning

Keisha's teacher writes "Good" on all of her homework assignments before returning them. One day, her teacher no longer writes anything on the assignments—the reinforcement ends. Reinforcers are used to strengthen responses. What happens when reinforcement stops? **Question 15: What is the role of extinction in operant conditioning?**

In Pavlov's experiment, the meat powder was the event that followed and confirmed the appropriateness of salivation. In operant conditioning, the ensuing events are reinforcers. In operant conditioning, the extinction of learned responses results from the repeated performance of operant behavior without reinforcement. If you go for a month without mail, you may stop checking the mailbox because the mail served as reinforcement. In other words, reinforcers maintain operant behavior or strengthen habitual behavior in operant conditioning.

Question 16: What is the role of spontaneous recovery in operant conditioning? Spontaneous recovery of learned responses occurs in operant conditioning as well as in classical conditioning. That is, checking the mailbox again after going without letters for a while is spontaneous recovery of checking the mailbox. Spontaneous recovery is adaptive in operant conditioning as well as in classical conditioning. Reinforcers may once again become available after time elapses, just as there are new tender sprouts on twigs when the spring arrives.

Primary reinforcer A reinforcer whose effectiveness is based on the biological makeup of the organism and not on learning.

Secondary reinforcer A stimulus that gains reinforcement value through association with established reinforcers.

Conditioned reinforcer Another term for a secondary reinforcer.

Reinforcers Versus Rewards and Punishments

Reinforcers are defined as stimuli that increase the frequency of behavior. **Question 17: Why did Skinner distinguish between reinforcers on the one hand and rewards and punishments on the other?** Reinforcers are known by their effects, whereas rewards and punishments are known by how they feel. Perhaps most reinforcers—food, hugs, having the other person admit to starting the argument, and so on—feel good, or are pleasant events. Yet things that we might assume would feel bad, such as a slap on the hand, disapproval from a teacher, even suspensions and detention may be positively reinforcing to some—perhaps because such experiences confirm negative feelings toward teachers or one’s belonging within a deviant subculture (Atkins et al., 2002).

Skinner preferred the concept of reinforcement to that of reward because reinforcement does not suggest trying to “get inside the head” of an organism (whether a human or lower animal) to guess what it would find pleasant or unpleasant. A list of reinforcers is arrived at scientifically, *empirically*—that is, by observing what sorts of stimuli increase the frequency of the behavior.

Punishments are aversive events that suppress or decrease the frequency of the behavior they follow (see Figure 6.7) ■. Punishment can rapidly suppress undesirable behavior (Gershoff, 2002) and may be warranted in “emergencies,” such as when a child tries to run into the street. **Truth or Fiction Revisited:** Actually, punishment can work; that is, it can decrease the frequency of unwanted behavior.

Question 18: Why do many psychologists disapprove of punishment? Many psychologists argue that punishment—especially corporal punishment—often fails to achieve the goals of parents, teachers, and others. Psychologist Elizabeth Gershoff (2002) analyzed 88 studies of more than 36,000 children and found connections between physical punishment (for example, spanking) and various behavior patterns in childhood and adulthood. For example:

- Children who are physically punished are less likely to develop internal moral standards.
- Physical punishment is connected with poorer parent–child relationships.
- Physically punished children are more likely to be aggressive toward other children and to engage in criminal behavior later on.
- Physically punished children are more likely to abuse their spouses or their own children as adults.

Gershoff (2002) adds that punishment tends to suppress undesirable behavior only under circumstances when its delivery is guaranteed. It does not take children long to

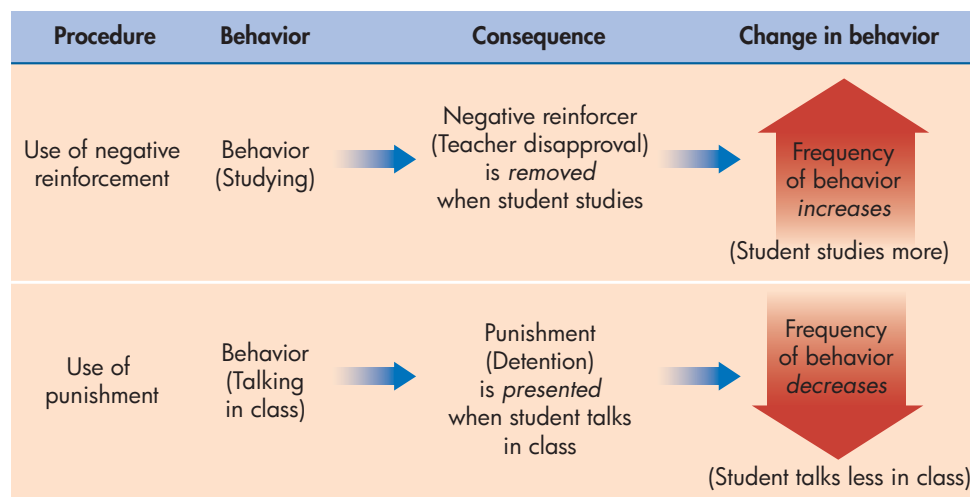


Figure 6.7 ■ Negative Reinforcers Versus Punishments Negative reinforcers and punishments both tend to be aversive stimuli. However, reinforcers increase the frequency of behavior. Punishments decrease the frequency of behavior. Negative reinforcers increase the frequency of behavior when they are removed. Punishments decrease or suppress the frequency of behavior when they are applied. Can you think of situations in which punishing students might have effects other than those desired by the teacher?

learn that they can “get away with murder” with one parent or teacher but not with another. Moreover, punishment does not in itself suggest an alternative acceptable form of behavior.

There are some other reasons for not using physical punishment:

- It hurts.
- Punished individuals may withdraw from the situation. Severely punished children may run away, cut class, or drop out of school.
- Children also *learn* responses that are punished. Whether or not children choose to perform punished responses, punishment rivets their attention on them.

Gershoff’s research findings have not gone unchallenged. Diana Baumrind and her colleagues (2002) point out, for example, that most of the studies examined by Gershoff were correlational, not experimental. Therefore, we cannot be certain about cause and effect. Consider the connection between parental punishment and childhood aggression. Does parental punishment contribute to childhood aggression, or are more aggressive children likely to frustrate their parents, leading their parents to use physical punishment? In any event, most psychologists tend to prefer rewarding children for desirable behavior to punishing them for unwanted behavior. By ignoring misbehavior, or by using **time out** from positive reinforcement, one can avoid reinforcing misbehavior.

To reward or positively reinforce children for desired behavior takes time and care. Avoiding the use of punishment is not enough. First, we must pay attention to children when they are behaving well. If we take their desirable behavior for granted and respond to them only when they misbehave, we may be encouraging misbehavior. Second, we must be certain that children are aware of, and capable of performing, desired behavior. It is harmful and fruitless merely to punish children for unwanted behavior. We must also carefully guide them, either physically or verbally, into making the desired responses and then reward them. We cannot teach children table manners by waiting for them to exhibit proper responses at random and then reinforcing them for their responses. Try holding a reward of ice cream behind your back and waiting for a child to exhibit proper manners. You will have a slippery dining room floor long before the child develops good table manners.

Discriminative Stimuli: Do You Step on the Accelerator When the Light Is Green or Red?

B. F. Skinner might not have been able to get his pigeons into the drivers’ seats of missiles, but he had no problem training them to respond to traffic lights. Imagine yourself trying the following experiment.

You find a pigeon. Or you sit on a park bench, close your eyes, and one finds you. You place it in a Skinner box with a button on the wall. You drop a food pellet into the cage whenever the pigeon pecks the button. (Soon it will learn to peck the button whenever it has not eaten for a while.) Now you place a small green light in the cage and turn it on and off intermittently throughout the day. You reinforce button pecking with food whenever the green light is on but not when the light is off. It will not take long for this clever city pigeon to learn that it will gain as much by grooming itself or cooing and flapping around as it will by pecking the button when the light is off.

The green light has become a discriminative stimulus. **Question 19: What are discriminative stimuli?** Discriminative stimuli, such as green lights, act as signals or cues. They provide information about when an operant (in the case of the pigeon, pecking a button) will be reinforced (by a food pellet being dropped into the cage).

Operants that are not reinforced tend to be extinguished. For the pigeon in our experiment, the behavior of pecking the button *when the light is off* is extinguished.

A moment’s reflection will suggest many ways that discriminative stimuli influence our behavior. Isn’t it more efficient to answer the telephone when it is ringing? Do you



© Hank Morgan/Rainbow

A Discriminative Stimulus You might not think that pigeons are very discriminating, yet they readily learn that pecking will not bring food in the presence of a discriminative stimulus such as a red light.

Time out Removal of an organism from a situation in which reinforcement is available when unwanted behavior is shown.

Discriminative stimulus In operant conditioning, a stimulus that indicates that reinforcement is available.

think it is wise to ask someone for a favor when she or he is displaying anger and disapproval toward you?

We noted that a pigeon learns to peck a button if food drops into its cage when it does so. What if you want the pigeon to continue to peck the button, but you're running out of food? Do not despair. (Worse things have happened.) As we see in the following section, you can keep that bird pecking away indefinitely, even as you hold up on most of the food.

Schedules of Reinforcement: How Often? Under What Conditions?

In operant conditioning, some responses are maintained by means of **continuous reinforcement**. You probably become warmer every time you put on heavy clothing. You probably become less thirsty every time you drink water. Yet if you have ever watched people toss their money down the maws of slot machines, you know that behavior can also be maintained by means of **partial reinforcement**.

Folklore about gambling is based on solid learning theory. You can get a person "hooked" on gambling by fixing the game so as to allow heavy winnings at first. Then you gradually space out the winnings (reinforcements) until gambling is maintained by infrequent winning—or even no winning at all. Partial reinforcement schedules can maintain gambling, like other behavior, for a great deal of time, even though it goes unreinforced (Pulley, 1998).

New operants or behaviors are acquired most rapidly through continuous reinforcement or, in some cases, through "one-trial learning" that meets with great reinforcement. People who cannot control their gambling often had big wins at the racetrack or casino or in the lottery in their late teens or early 20s (J. Greene, 1982). But once the operant has been acquired, it can be maintained by tapering off to a schedule of partial reinforcement.

Responses that have been maintained by partial reinforcement are more resistant to extinction than responses that have been maintained by continuous reinforcement (Rescorla, 1999). From the cognitive perspective, we could suggest that organisms that have experienced partial reinforcement do not expect reinforcement every time they engage in a response. Therefore, they are more likely to persist in the absence of reinforcement.

Question 20: What are the various schedules of reinforcement? How do they affect behavior? There are four basic types of reinforcement schedules. They are determined by changing either the *interval* of time that must elapse between correct responses before reinforcement occurs or the *ratio* (number) of responses that must occur before reinforcement is provided. If reinforcement of responses is immediate (zero seconds), the reinforcement schedule is continuous. A larger interval of time, such as 1 or 30 seconds, is one kind of partial-reinforcement schedule. A one-to-one (1:1) ratio of correct responses to reinforcements is also a continuous-reinforcement schedule. A higher ratio such as 2:1 or 5:1 creates another kind of partial-reinforcement schedule.

More specifically, the four basic reinforcement schedules are *fixed-interval*, *variable-interval*, *fixed-ratio*, and *variable-ratio* schedules, which we discuss next.

INTERVAL SCHEDULES

In a **fixed-interval schedule**, a fixed amount of time—say, a minute—must elapse before the correct response will result in a reinforcer. With a fixed-interval schedule, an organism's response rate falls off after each reinforcement and then picks up again as the time that reinforcement will occur approaches. For example, in a 1-minute fixed-interval schedule, a rat is reinforced with, say, a food pellet for the first operant—for example, the first pressing of a lever—that occurs after a minute has elapsed. After each reinforcement, the rat's rate of lever pressing slows down, but as the end of the 1-minute interval draws near, lever pressing increases in frequency, as suggested in Figure 6.8 ■. It is as if the rat has learned that it must wait a while before it is reinforced. The resultant record on the

Continuous reinforcement A schedule of reinforcement in which every correct response is reinforced.

Partial reinforcement One of several reinforcement schedules in which not every correct response is reinforced.

Fixed-interval schedule A schedule in which a fixed amount of time must elapse between the previous and subsequent times that reinforcement is available.

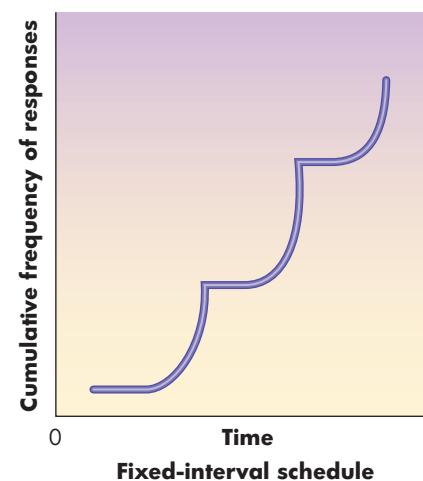


Figure 6.8 ■ The “Fixed-Interval Scallop” Organisms that are reinforced on a fixed-interval schedule tend to slack off responding after each reinforcement. The rate of response picks up as they near the time when reinforcement will become available. The results on the cumulative recorder look like upward-moving waves, or scallops.



© Fuse/Getty Images

Slot Machines Pay Off on Unpredictable Variable-Ratio Schedules Because reinforcement from these “one-armed bandits” is unpredictable, people tend to maintain a high response rate—that is, to drop coins into them in rapid succession.

cumulative recorder shows a series of characteristic upward-moving waves, or scallops, which are referred to as *fixed-interval scallops*.

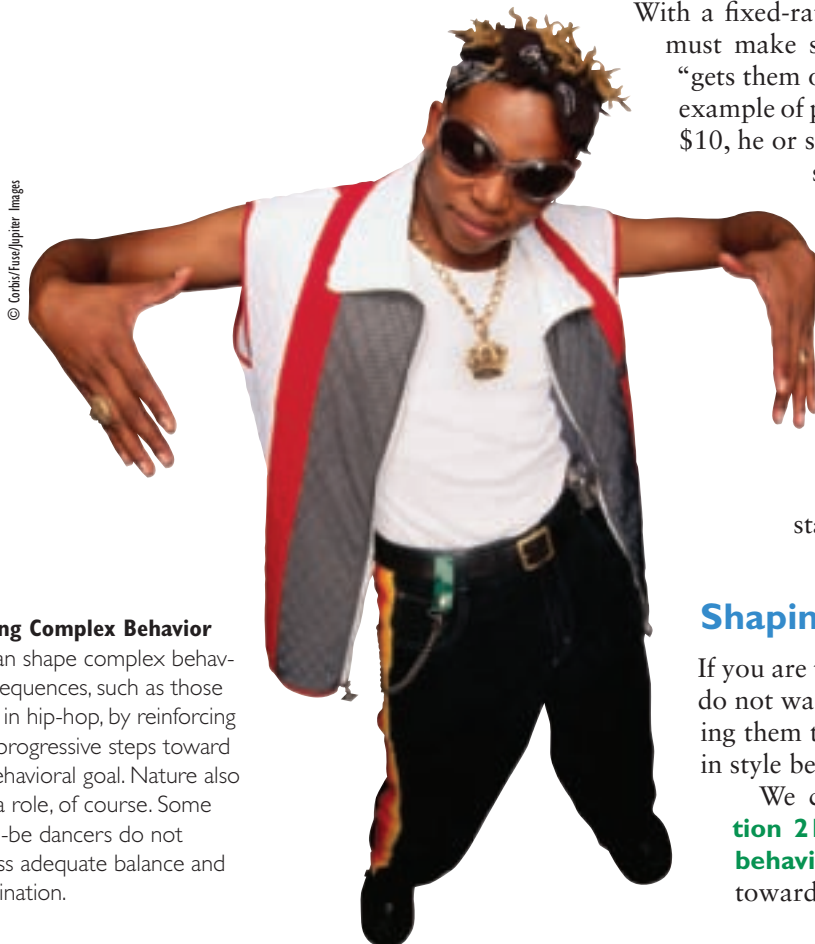
Car dealers use fixed-interval reinforcement schedules when they offer incentives for buying up the remainder of the year’s line every summer and fall. In a sense, they are suppressing buying at other times, except for consumers whose current cars are in their death throes or those with little self-control. Similarly, you learn to check your e-mail only at a certain time of day if your correspondent writes at that time each day.

Reinforcement is more unpredictable in a **variable-interval schedule**. Therefore, the response rate is steadier but lower. If the boss calls us in for a weekly report, we probably work hard to pull things together just before the report is to be given, just as we might cram the night before a weekly quiz. But if we know that the boss might call us in for a report on the progress of a certain project at any time (variable-interval schedule), we are likely to keep things in a state of reasonable readiness at all times. However, our efforts are unlikely to have the intensity they would in a fixed-interval schedule (for example, a weekly report). Similarly, we are less likely to cram for unpredictable pop quizzes than we are to study for regularly scheduled quizzes. But we are likely to do at least some studying on a regular basis. Likewise, if you receive e-mail from your correspondent irregularly, you are likely to check your e-mail regularly but with less eagerness.

RATIO SCHEDULES

In a **fixed-ratio schedule**, reinforcement is provided after a fixed number of correct responses have been made. In a **variable-ratio schedule**, reinforcement is provided after a variable number of correct responses have been made. In a 10:1 variable-ratio schedule, the mean number of correct responses that would have to be made before a subsequent correct response would be reinforced is 10, but the ratio of correct responses to reinforcements might be allowed to vary from, say, 1:1 to 20:1 on a random basis.

Fixed- and variable-ratio schedules maintain a high response rate. With a fixed-ratio schedule, it is as if the organism learns that it must make several responses before being reinforced. It then “gets them out of the way” as rapidly as possible. Consider the example of piecework. If a worker must sew five shirts to receive \$10, he or she is on a fixed-ratio (5:1) schedule and is likely to sew at a uniformly high rate, although there might be a brief pause after each reinforcement. With a variable-ratio schedule, reinforcement can come at any time. This unpredictability also maintains a high response rate. Slot machines tend to pay off on variable-ratio schedules, and players can be seen popping coins into them and yanking their “arms” with barely a pause. I have seen players who do not even stop to pick up their winnings. Instead, they continue to pop in the coins, whether from their original stack or from the winnings tray.



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Shaping Complex Behavior

We can shape complex behavioral sequences, such as those found in hip-hop, by reinforcing small progressive steps toward the behavioral goal. Nature also plays a role, of course. Some would-be dancers do not possess adequate balance and coordination.

Shaping

If you are teaching hip-hop to people who have never danced, do not wait until they have performed it precisely before telling them they’re on the right track. The foxtrot will be back in style before they have learned a thing.

We can teach complex behaviors by **shaping**. **Question 21: How can we use shaping to teach complex behavior patterns?** Shaping reinforces progressive steps toward the behavioral goal. At first, for example, it may be

wise to smile and say, “Good,” when a reluctant newcomer gathers the courage to get out on the dance floor, even if your feet are flattened by his initial clumsiness. If you are teaching someone to drive a car with a standard shift, at first generously reinforce the learner simply for shifting gears without stalling.

But as training proceeds, we come to expect more before we are willing to provide reinforcement. We reinforce **successive approximations** of the goal. If you want to train a rat to climb a ladder, first reinforce it with a food pellet when it turns toward the ladder. Then wait until it approaches the ladder before giving it a pellet. Then do not drop a pellet into the cage until the rat touches the ladder. In this way, the rat will reach the top of the ladder more quickly than if you had waited for the target behavior to occur at random. **Truth or Fiction Revisited:** Through the use of shaping, one can indeed train a rat to climb a ramp, cross a bridge, climb a ladder, and so on in a desired sequence.

Learning to drive a standard-shift automobile to a new job also involves a complex sequence of operant behaviors. At first, we actively seek out all the discriminative stimuli or landmarks that give us cues for when to turn—signs, buildings, hills, valleys. We also focus on shifting to a lower gear as we slow down so the car won’t stall. After many repetitions, these responses, or chains of behavior, become habitual, and we need to pay very little attention to them.

Have you ever driven home and suddenly realized that you couldn’t recall exactly how you got there? Your entire trip may seem “lost.” Were you in great danger? How could you allow such a thing to happen? Actually, your driving and your responses to the demands of the route may have become so habitual that you did not have to focus on them. As you drove, you were able to think about dinner, work, or the weekend. But if something unusual had occurred on the way, such as an engine problem or a rainstorm, you would have devoted as much attention to your driving as was needed to arrive home. Your trip was probably quite safe after all.

Applications of Operant Conditioning

Operant conditioning, like classical conditioning, is not just an exotic laboratory procedure. We use it every day to influence other people. Parents and peers induce children to acquire so-called gender-appropriate behavior patterns through rewards and punishments. Peers influence peers by playing with peers who are generous and nonaggressive and by avoiding those who are not (Warman & Cohen, 2000). Adults often reward children for expressing attitudes that coincide with their own and punish or ignore them for expressing contradictory attitudes.

BIOFEEDBACK TRAINING

Biofeedback training (BFT) is based on operant conditioning. It has enabled people and lower animals to learn to control autonomic responses to attain reinforcement (N. E. Miller, 1969; Vernon et al., 2003). In BFT, people receive reinforcement in the form of *information*. For example, we can learn to emit alpha waves—the kind of brain wave associated with relaxation—through feedback from an electroencephalograph, which measures brain waves. People use other instruments to learn to lower muscle tension, heart rates, and blood pressure.

BEHAVIOR MODIFICATION

Remember that reinforcers are not defined as pleasant events but rather as stimuli that increase the frequency of behavior. Ironically, adults frequently reinforce undesirable behavior in children by paying attention to them, or punishing them, when they misbehave but ignoring them when they behave in desirable ways. Similarly, teachers who raise their voices when children misbehave may be unintentionally conferring hero status on those pupils in the eyes of their peers. To the teacher’s surprise, some children may then go out of their way to earn disapproval. But teachers can learn to use **behavior modification** to reinforce children when they are behaving appropriately and, when possible, to extinguish misbehavior by ignoring it.

Teachers also frequently use time out from positive reinforcement to discourage misbehavior. In this method, children are placed in a drab environment for a specified

Variable-interval schedule A schedule in which a variable amount of time must elapse between the previous and subsequent times that reinforcement is available.

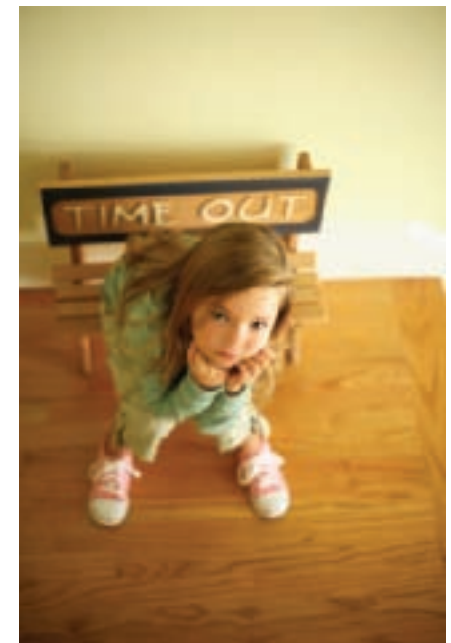
Fixed-ratio schedule A schedule in which reinforcement is provided after a fixed number of correct responses.

Variable-ratio schedule A schedule in which reinforcement is provided after a variable number of correct responses.

Shaping A procedure for teaching complex behaviors that at first reinforces approximations of the target behavior.

Successive approximations Behaviors that are progressively closer to a target behavior.

Behavior modification Therapy techniques based on principles of learning that teach adaptive behavior and extinguish or discourage maladaptive behavior.



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Time Out Teachers may use time out from positive reinforcement as a way of maintaining classroom discipline. This young student has been assigned some time on a special “time out” chair:

Programmed learning A method of teaching that breaks down tasks into small steps, each of which is reinforced and then combined to form the correct behavioral chain.

period, usually about 10 minutes, when they are disruptive. While isolated, they cannot earn the attention of peers or teachers.

PROGRAMMED LEARNING

B. F. Skinner developed an educational method called **programmed learning** that is based on operant conditioning. This method assumes that any complex task can be broken down into a number of small steps. These steps can be shaped individually and then combined in sequence to form the correct behavioral chain. Programmed learning does not punish errors. Instead, correct responses are reinforced. **Truth or Fiction Revisited:** Actually, one can learn *without* making mistakes.

A CLOSER LOOK • REAL LIFE

ROBO RATS? USING OPERANT CONDITIONING TO TEACH RATS HOW TO SEARCH FOR SURVIVORS OF DISASTERS

City dwellers know that rats rustle through garbage, but will we one day use rats to search through rubble where people cannot go to find survivors of disasters? The results of a study carried out in Brooklyn suggest that this is a real possibility.

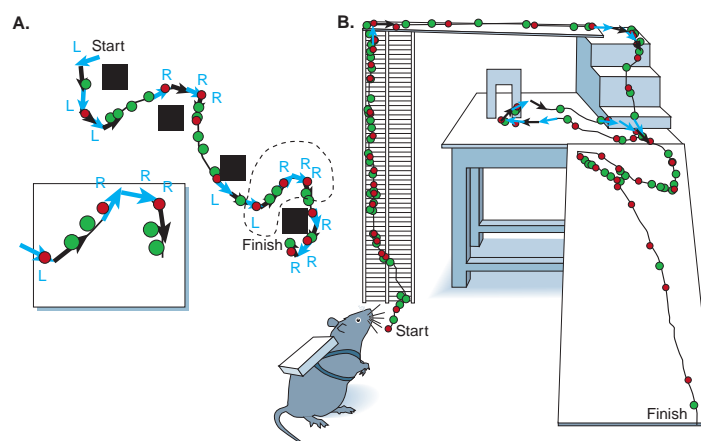
Sanjiv Talwar and his colleagues (2002) used operant conditioning to guide rats through mazes by means of “remote control.” They were inspired by an earthquake in India and the terrorist attacks of September 11, 2001, to test the method. The Haitian earthquake of 2010 provides an additional incentive for experimentation with new methods for finding out where people might be buried alive and in need of assistance.

The researchers outfitted five rats with electrodes in their brains and backpacks containing various electronic devices. One goal was to inform the rats whether they should turn right or left. Another was to reinforce them for doing so. To point the rats in the right direction, the team sent electric signals to brain

regions that receive sensations from whiskers. The researchers inserted electrodes in the animals’ pleasure centers to provide reinforcement.

The researchers placed the rats in a maze. As the animals approached a choice point where they could turn left or right, the researchers stimulated their brains as would a whisker touch on the left or right side of the head. When the animals turned in the direction of the “virtual touches,” the researchers zapped their brains’ pleasure centers.

Not only did the bursts of electricity teach the rats which way to turn, but they also apparently motivated the rats to move faster, even if it meant climbing steps or hopping from a shelf. The rat is apparently seeking the next burst. Talwar says that “the rats figure it out in 5 or 10 minutes” (Milius, 2002). The researchers steered the rats across a jagged pile of concrete, an area that was so brightly lit that rats would normally avoid it, even steered them up a tree.



Robo-Rat? Part A of the figure shows how Talwar and his colleagues guided a rat through a zigzag course. They cued the rat to turn left (L) or right (R) and then reinforced it with a burst of electricity in the rat’s pleasure center for doing so. Part B shows a more complex 3-D course through which a rat was guided. The goal is to shape rats to rustle through rubble to help find survivors of a disaster.

Source: “Behavioral neuroscience: Rat navigation guided by remote control” by Sanjiv K. Talwar et al., *Nature*, 417 (2002), fig. 1, p. 37. Reprinted by permission of Nature Publishing Group.

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ACTIVE REVIEW (17) Thorndike originated the law of _____ in learning. (18) He believed that _____ stamp in behavior and punishments stamp it out. (19) Skinner developed the concept of _____ as an alternative to the concepts of reward and punishment. (20) _____ reinforcers increase the probability that operants will occur when they are applied. (21) _____ reinforcers increase the probability that operants will occur when they are removed. (22) _____ reinforcers such as food have their value because of the biological makeup of the organism. (23) _____ reinforcers, such as money, acquire their value through association with established reinforcers. (24) In operant conditioning, repeated performance of a learned response in the absence of reinforcement leads to _____ of that response. (25) _____ are aversive events that suppress the frequency of the behavior they follow. (26) A _____ stimulus indicates when an operant will be reinforced. (27) In a(n) _____ schedule, a specific amount of time must elapse since a previous correct response before reinforcement again becomes available. (28) In a(n) _____ schedule, the number of correct responses that must be performed before reinforcement becomes available is allowed to vary. (29) In

shaping, we reinforce _____ approximations to the goal. (30) _____ training enables organisms to gain control of autonomic responses to attain reinforcement. (31) In using behavior _____, teachers reinforce desired behavior and extinguish undesired behavior by ignoring it. (32) _____ learning breaks down learning tasks into small steps and reinforces correct performance of each step.

REFLECT AND RELATE How have teachers in your own experience maintained—or failed to maintain—control over their classrooms? Has the information in this chapter helped you understand what they did right or wrong?

CRITICAL THINKING Every time I tell my classes that many psychologists frown on the use of punishment, students chide me for being unrealistic and “goody-goody.” Let’s try some critical thinking: What are the effects of punishment? Does it stop undesirable behavior? If so, when? Are there other ways of encouraging desirable behavior? Which is preferable? How can we judge?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

COGNITIVE FACTORS IN LEARNING

Classical and operant conditioning were originally conceived of as relatively simple forms of learning. Much of conditioning’s appeal is that it can be said to meet the behaviorist objective of explaining behavior in terms of observable events—in this case, laboratory conditions. Building on this theoretical base, some psychologists have suggested that the most complex human behavior involves the summation of a series of instances of conditioning. However, many psychologists believe that conditioning is too mechanical a process to explain all instances of learned behavior, even in laboratory rats (B. Weiner, 2006). They turn to cognitive factors to describe and explain additional findings in the psychology of learning. **Question 22: How do we explain what happens during classical conditioning from a cognitive perspective?**

In addition to concepts such as *association* and *reinforcement*, cognitive psychologists use concepts such as *mental structures*, *schemas*, *templates*, and *information processing*. Cognitive psychologists see people as searching for information, weighing evidence, and making decisions. Let’s consider some classic research that points to cognitive factors in learning as opposed to mechanical associations. These cognitive factors are not limited to humans—although, of course, humans are the only species that can talk about them.

Education is what remains after one has forgotten what one has learned in school.

ALBERT EINSTEIN

Latent Learning: Forming Cognitive Maps

Many behaviorists argue that organisms acquire only responses, or operants, for which they are reinforced. E. C. Tolman (1886–1959), however, showed that rats also learn about their environment in the *absence* of reinforcement. In doing so, he demonstrated that rats must form **cognitive maps** of their surroundings. **Question 23: What is the evidence that people and other animals form cognitive maps of their environments?**

Tolman trained some rats to run through mazes for standard food goals. Other rats were permitted to explore the same mazes for several days without food goals or other rewards. After the unrewarded rats had been allowed to explore the mazes for 10 days,

Cognitive map A mental representation of the layout of one’s environment.

A CLOSER LOOK • RESEARCH

CONTINGENCY THEORY

Behaviorists and cognitive psychologists interpret the conditioning process in different ways. Behaviorists explain it in terms of the pairing of stimuli. Cognitive psychologists explain classical conditioning in terms of the ways stimuli provide information that allows organisms to form and revise mental representations of their environment (S. H. Stewart & Watt, 2008). Robert Rescorla conducted research in an effort to demonstrate which view is more accurate. His viewpoint, contingency theory, suggests that learning occurs only when the conditioned stimulus provides information about the unconditioned stimulus.

In classical conditioning experiments with dogs, Rescorla (1967) obtained some results that are difficult to explain without reference to cognitive concepts. Each phase of his work paired a tone (a conditioned stimulus) with an electric shock (an unconditioned stimulus) but in different ways. With one group of animals, the shock was consistently presented after the tone. That is, the unconditioned stimulus followed on the heels of the conditioned stimulus, as in Pavlov's studies. The dogs in this group learned to show a fear response when the tone was presented.

A second group of dogs heard an equal number of tones and received an equal number of electric shocks, but the shock never immediately followed the tone. That is, the tone and the shock were not paired. Now, from the behaviorist perspective, the dogs should not have learned to associate the tone and the shock because one did not predict the other. Actually, the dogs learned quite a lot: They learned that they had nothing to fear when the

tone was sounded! They showed vigilance and fear when the laboratory was quiet—for the shock could apparently come at any time—but they were calm in the presence of the tone.

The third group of dogs also received equal numbers of tones and shocks, but the stimuli were presented at purely random intervals. Occasionally, they were paired, but most often, they were not. According to Rescorla, behaviorists might argue that intermittent pairing of the tones and shocks should have brought about some learning. Yet it did not. The animals showed no fear in response to the tone. Rescorla suggests that the animals in this group learned nothing because the tones did not allow them to make predictions about electric shock.

Rescorla concluded that contiguity—that is, the coappearance of unconditioned stimulus and the conditioned stimulus—cannot in itself explain classical conditioning. Learning occurs only when the conditioned stimulus (in this case, the tone) provides information about the unconditioned stimulus (in this case, the shock). According to contingency theory, learning occurs because a conditioned stimulus indicates that the unconditioned stimulus is likely to follow (P. D. Balsam et al., 2006).

Behaviorists might counter, of course, that for the second group of dogs the absence of the tone became the signal for the shock. Shock may be a powerful enough event that the fear response becomes conditioned to the laboratory environment. For the third group of dogs, the shock was as likely to occur in the presence of the neutral stimulus as in its absence. Therefore, many behaviorists would expect no learning to occur.



How Mechanical Is Learning in Rats? For example, do they learn to turn left or right in a maze only when they are reinforced for doing so? Or do they develop “cognitive maps” of mazes and sometimes even explore new routes through them?

food rewards were placed in a box at the far end of the maze. The previously unrewarded rats reached the food box as quickly as the rewarded rats after only one or two reinforced trials (Tolman & Honzik, 1930).

Tolman concluded that rats learned about mazes in which they roamed even when they were unrewarded for doing so. He distinguished between *learning* and *performance*. Rats would acquire a cognitive map of a maze. Even though they would not be motivated to follow an efficient route to the far end, they would learn rapid routes from one end to the other just by roaming about within the maze. Yet this learning might remain hidden, or be considered **latent learning**, until they were motivated to follow the rapid routes to obtain food goals.

Observational Learning: Monkey See, Monkey May Choose to Do?

How many things have you learned from watching other people in real life, in films, and on television? From films and television, you may have gathered vague ideas about how to skydive, ride a surfboard, climb sheer cliffs, run a pattern to catch a touchdown pass in the Super Bowl, and dust for fingerprints, even if you have never tried these activities yourself. **Question 24: How do people learn by observing others?**

When we sit in a classroom, check out the behavior of other people in a high-class restaurant, go to a film, or watch television, we are seeking to learn or to be entertained. Our behavior is intentional; it has purpose. One of the theoretical lures of conditioning is that it allows scientists to explain behavior in mechanical terms—without resorting to concepts such as wants or desires. We can say that a rat presses a lever in a Skinner box because lever pressing is reinforced with food pellets. We need not try to “get into” the rat’s mind and speculate on its motives. We need not even say

that the rat was hungry; we can note, instead, that it had been deprived of food for a certain amount of time.

THE BANDURA STUDIES

In their studies of social learning, Albert Bandura and his colleagues conducted experiments (e.g., Bandura et al., 1963) that show we can learn skills by observing the behavior of others. We may need some practice to refine the skills, but we can learn them through observation alone. We may also allow these skills to remain latent. For example, we may not imitate aggressive behavior unless we are provoked and believe that we are more likely to be rewarded than punished for it.


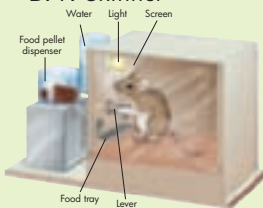

Observational learning may account for a good deal of human learning. It occurs when, as children, we watch our parents cook, clean, or repair a broken appliance. Observational learning takes place when we watch teachers solve problems on the

Soap and education are not as sudden as a massacre, but they are more deadly in the long run.

MARK TWAIN

Latent learning Learning that is hidden or concealed.

CONCEPT REVIEW KINDS OF LEARNING

	Kind of Learning	What Is Learned	How It Is Learned
	<p>Classical conditioning</p> <p>Major proponents:</p> <ul style="list-style-type: none"> Ivan Pavlov (known for basic research with dogs) John B. Watson (known as originator of behaviorism) 	<p>Association of events; anticipations, signs, expectations; automatic responses to new stimuli.</p>	<p>A neutral stimulus is repeatedly paired with a stimulus (an unconditioned stimulus, or UCS) that elicits a response (an unconditioned response, or UCR) until the neutral stimulus produces a response (conditioned response, or CR) that anticipates and prepares for the unconditioned stimulus. At this point, the neutral stimulus has become a conditioned stimulus (CS).</p>
	<p>Operant conditioning</p> <p>Major proponents:</p> <ul style="list-style-type: none"> B. F. Skinner 	<p>Behavior that operates on, or affects, the environment to produce outcomes.</p>	<p>A response is rewarded or reinforced so that it occurs with greater frequency in similar situations.</p>
	<p>Observational learning</p> <p>Major proponents:</p> <ul style="list-style-type: none"> Albert Bandura Julian Rotter Walter Mischel 	<p>Expectations, knowledge, and skills. May also acquire fears and other emotions displayed by others.</p>	<p>A person observes the behavior of another person (live or through media such as films, television, or books) and its effects.</p>
	<p>Go to Psychology CourseMate at www.cengagebrain.com to access an interactive version of this Concept Review designed to help you test yourself on the topics presented here.</p>		

Video Connections—Mirror Neurons



See the video for an explanation of the action of “mirror neurons” while exploring the case of a boy with Asperger’s.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

Model An organism that engages in a response that is then imitated by another organism.

chalkboard or hear them speak in a foreign language. Observational learning is not mechanically acquired through reinforcement. We can learn through observation without engaging in overt responses at all. It appears sufficient to pay attention to the behavior of others.

In the terminology of observational learning, a person who engages in a response to be imitated is a **model**. When observers see a model being reinforced for displaying an operant, the observers are said to be *vicariously* reinforced. Display of the operant thus becomes more likely for the observer as well as for the model.

It would be of little use to discuss how we learn if we were not capable of remembering what we learn from second to second, from day to day, or in many cases, for a lifetime. In the next chapter, we turn our attention to the subject of memory. In Chapter 8, we will see how learning is intertwined with thinking, language, and intelligence.

MIRROR NEURONS AND OBSERVATIONAL LEARNING

Could some observational learning indeed be mechanical? Is there something in us (and monkeys and apes) that leads us to automatically imitate the behavior of others? The answer is apparently yes, and we are referring to *mirror neurons*—the neurons that fire both when an animal acts and when the animal observes the same action performed by another—discovered in rhesus monkeys in the 1990s (see Chapter 3; Gallese et al., 1996). We now know that mirror neurons are involved when newborn babies return the favor if their caregivers stick out their tongues at them (Meltzoff & Prinz, 2002; see Figure 6.9) ■.



© A. N. Meltzoff & M. K. Moore, “Imitation of facial and manual gestures by human neonates,” *Science*, 198 (1977), 75–78.

Figure 6.9 ■ **Imitation in Infants** These 2- to 3-week-old infants are imitating the facial gestures of an adult experimenter. How are we to interpret these findings? Can we say that the infants are *learning* to stick out their tongues? That they *know* what the experimenter is doing and *choose* to imitate the behavior? That the response is *instinctive* or *reflexive*? The biological truth of the matter apparently has to do with mirror neurons.

Mirror neurons also allow us—as children and adults—to anticipate other people’s intentions when they reach for things. Neurons in our brains fire to mimic the firing in the brains of the actors, and the chambers of our memories flood our minds with the likely outcomes—not always correctly. For example, it occasionally tragically happens that a police officer or soldier erroneously responds to the movements of another person when that person appears to be pulling out a weapon but isn’t (Cañal-Bruland et al., 2010).

We also yawn when other people yawn. We may laugh or feel the urge to laugh when other people laugh. I know of someone who has been unofficially dubbed a “black hole” in terms of mood. When he comes around, many turn away to avoid being sucked into his moods. We apparently *learn* what other people are feeling when we pick up cues that lead our own mirror neurons to fire in the ways that mirror neurons are firing in the brains of others. Some of us, of course, are experts at empathizing with the feelings of others, and some of us are “clueless.” In Chapter 13, we will see that women may have the advantage—or disadvantage—of being better able to understand what other people are feeling (Cheng et al., 2009).

LearningConnections • COGNITIVE FACTORS IN LEARNING

ACTIVE REVIEW (33) Tolman’s work with rats suggests that they develop _____ maps of the environment. (34) Tolman labels learning without performing _____ learning. (35) Bandura believes that observational learning (is or is not?) a mechanical process. (36) However, we may mechanically imitate other people because of the action of _____ neurons in the brain and not because of reinforcement. (37) According to _____ theory, learning occurs because a CS indicates that the UCS is likely to follow.

REFLECT AND RELATE Have you ever studied an atlas, a road map, a cookbook, or a computer manual for the

pleasure of doing so? What kind of learning were you engaging in?

CRITICAL THINKING How do the results of research into cognitive factors in learning challenge behaviorist principles? Refer to contingency theory, latent learning, and observational learning in your answer.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections VIOLENCE IN THE MEDIA AND AGGRESSION



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What Do We Learn from Playing Violent Video Games?

Dylan Klebold and Eric Harris were engrossed in violent video games for hours at a time. They were particularly keen on a game named *Doom*. Harris had managed to reprogram *Doom* so that he, the player, became invulnerable and had an endless supply of weapons. He would “mow down” all the other characters in the game. His program caused some of the characters to ask God why they had been shot as they lay dying. Later on, Klebold and Harris asked some of their shooting victims at Columbine High School in Colorado whether they believed in God. One of the killers also referred to his shotgun as Arlene, the name of a character in *Doom* (Saunders, 2003).

In the small rural town of Bethel, Alaska, Evan Ramsey would play *Doom*, *Die Hard*, and *Resident Evil* for endless hours. Ramsey shot four people, killing two and wounding two. Afterward, he said the video games taught him that being shot would reduce a player’s “health factor” but probably not be lethal.

Michael Carneal was also a fan of *Doom*—and another video game, *Redneck Rampage*. He showed up at school one morning with a semiautomatic pistol, two shotguns, and two rifles. He aimed them at people in a prayer group. Before he was finished, three of them lay dead and five were wounded. Although Carneal had no appreciable experience with firearms,

authorities noted that his aim was uncannily accurate. He fired just once at each person’s head, as one would do to rack up points in a video game—especially a game that offers extra points for head shots.

The debate as to whether violence in media such as films, television, and video games fuels violence in the real world has been going on for more than 50 years. However, research strongly suggests that media violence is a risk factor for increasing emotional arousal, aggressive behavior, and violent thoughts (Anderson et al., 2008; Dubow et al., 2010; Fanti et al., 2009).

One reason to be particularly concerned about violent video games is that they require audience participation (Anderson et al., 2008). Players don’t just watch; they *participate*. Violent games like *Grand Theft Auto* have grown increasingly popular. Some games reward players for killing police, prostitutes, and bystanders. Virtual weapons include guns, knives, flamethrowers, swords, clubs, cars, hands, and feet. Sometimes, the player assumes the role of a hero, but it is also common for the player to assume the role of a criminal.

Much human learning occurs through observation. We learn by observing parents and peers, attending school, reading books, and watching media such as television and films. Nearly all of us have been exposed to television, videotapes, and films in the classroom. Children in day-care centers often watch *Sesame Street*. There are filmed and electronic versions of great works of literature such as Orson Welles’s *Macbeth* or Laurence Olivier’s *Hamlet*. Nearly every school shows films of laboratory experiments. Sometimes, we view “canned lectures” by master teachers.

But what of our exposure to these media *outside* the classroom? Television is one of our major sources of informal observational learning. Children are routinely exposed to scenes of murder, beating, and sexual assault—just by turning on the TV set (Huesmann et al., 2003; Potter, 2008). If a child watches 2 to 4 hours of TV a day, she or he will have seen 8,000 murders and another 100,000 acts of violence *by the time she or he has*

finished elementary school (Eron, 1993). Are kids less likely to be exposed to violence by going to the movies? No. One study found that virtually all G-rated animated films have scenes of violence, with a mean duration of 9 to 10 minutes per film (Yokota & Thompson, 2000). Other media that contain violence include movies, music, music videos, advertising, video games, the Internet—even comic books.

Bandura’s Classic Research on the Effects of Violence in the Media

A classic experiment by Bandura, Ross, and Ross (1963) suggests the powerful influence of televised models on children’s aggressive behavior. One group of preschool children observed a film of an adult model hitting and kicking an inflated Bobo doll, while a control group saw an aggression-free film. The experimental and control children were then left alone in a room with the same doll as hidden observers recorded their behavior. The children who had observed the aggressive model showed significantly more aggressive behavior toward the doll themselves (see Figure 6.10) ■. Many children imitated bizarre attack behaviors devised for the model in this experiment—behaviors that they would not have thought up themselves. **Truth or Fiction Revisited:** Actually, a scientific connection has been established between violence in the media and real-life aggression (Bushman & Anderson, 2007).

The children exposed to the aggressive model also showed aggressive behavior patterns that had not been modeled. Observing the model, therefore, not only led to imitation of modeled behavior patterns but also apparently disinhibited previously learned aggressive responses. The results were similar whether children observed human or cartoon models on film.

Violence tends to be glamorized in the media. For example, in one cartoon show, superheroes battle villains who are trying to destroy or take over the world. Violence is often shown to have only temporary or minimal effects. (How often has



© Albert Bandura

Figure 6.10 ■ Classic Research on the Imitation of Aggressive Models

Albert Bandura and his colleagues showed that children frequently imitate the aggressive behavior that they observe. In the top row, an adult model strikes a clown doll. The lower rows show a boy and a girl imitating the aggressive behavior.

Wile E. Coyote fallen from a cliff and been pounded into the ground by a boulder, only to bounce back and pursue the Road Runner once more?) In the great majority of violent TV shows, there is no remorse, criticism, or penalty for violent behavior (Potter, 2008). Few TV programs show harmful long-term consequences of aggressive behavior. Seeing the perpetrator of the violence go unpunished increases the chances that the child will act aggressively (Potter, 2008). Children may not even view death as much of a problem. How many times do video-game characters “die”—only to be reborn to fight again because the children have won multiple lives?

Why all this violence? Simple: Violence sells. But does violence do more than sell? That is, does media violence *cause* real violence? If so, what can parents and educators do to prevent the fictional from spilling over into the real world?

Consensus on the Effects of Violence in the Media?

In any event, most organizations of health professionals agree that media violence does contribute to aggression (Bushman & Anderson, 2007). This relationship has been found for girls and

boys of different ages, social classes, ethnic groups, and cultures (Huesmann et al., 2003). Consider a number of ways that depictions of violence make such a contribution (Anderson et al., 2010; Bushman & Anderson, 2007):

- **Observational learning:** Children learn from observation. Television violence supplies *models* of aggressive “skills,” which children may acquire. In fact, children are more likely to imitate what their parents do than to heed what they say. If adults say that they disapprove of aggression but smash furniture or slap each other when frustrated, children are likely to develop the notion that aggression is the way to handle frustration. Classic experiments show that children tend to imitate the aggressive behavior they see in the media (Bandura et al., 1963). Media violence also provides viewers with aggressive *scripts*—that is, ideas about how to behave in situations like those they have observed.
- **Disinhibition:** Punishment inhibits behavior. Conversely, media violence may disinhibit aggressive behavior, especially when media characters “get away” with violence or are rewarded for it.

- **Increased emotional arousal:** Media violence and aggressive video games increase viewers’ level of emotional arousal. That is, television “works them up.” We are more likely to be aggressive when we are highly aroused.
- **Priming of aggressive thoughts and memories:** Media violence “primes” or arouses aggressive ideas and memories.
- **Habituation:** We become “habituated to,” or used to, repeated stimuli. Repeated exposure to TV violence may decrease viewers’ sensitivity to real violence. If children come to perceive violence as the norm, they may become more tolerant of it and place less value on restraining aggressive urges.

A joint statement by the American Medical Association, the American Academy of Pediatrics, the American Psychological Association, and the American Academy of Child and Adolescent Psychiatry (J. J. Holland, 2000) made some additional points:

- Children who see a lot of violence are more likely to view violence as an effective way of settling conflicts. Children exposed to violence are more likely to assume that violence is acceptable.
- Viewing violence can decrease the likelihood that one will take action on behalf of a victim when violence occurs.
- Viewing violence may lead to real-life violence. Children exposed to violent programming at a young age are more likely to be violent themselves later in life.

On the other hand, longitudinal research suggests that individuals are more likely to imitate media violence when they identify with the characters and when the portrayal of violence is realistic (Huesmann et al., 2003). Therefore, viewers may be more likely to imitate violence when the perpetrator looks like them and lives in a similar environment than when it is perpetrated by Wile E. Coyote.

Violent video games are also connected with aggressive behavior, including a history of juvenile delinquency (Dubow et al., 2010). Playing violent video games increases aggressive

thoughts and behavior in the laboratory (Anderson et al., 2010). However, males are relatively more likely than females to act aggressively after playing violent video games and are more likely to see the world as a hostile place. Students who obtain higher grades are also less likely to behave aggressively following exposure to violent video games. Thus, cultural stereotyping of males and females, possible biological gender differences, and moderating variables like academic achievement also figure into the effects of media violence. There is no simple one-to-one connection between media violence and violence in real life.

There seems to be a circular relationship between exposure to media violence and aggressive behavior (Anderson et al., 2010). Yes, TV violence and violent video games contribute to aggressive behavior, but aggressive youngsters are also more likely to seek out this kind of “entertainment.” Figure 6.11 ■ explores the possible connections between TV violence and aggressive behavior among viewers.

Aggressive children are frequently rejected by age-mates who are not aggressive—at least in middle-class culture (Eron, 1982; Warman & Cohen, 2000). Aggressive children may watch more television because their peer relationships are less fulfilling and because the high incidence of TV violence tends to confirm their view that aggressive behavior is normal (Eron, 1982). Media violence interacts with other contributors to violence. The family also affects the likelihood that children will imitate the violence they see on TV. Studies find that parental substance abuse, parental

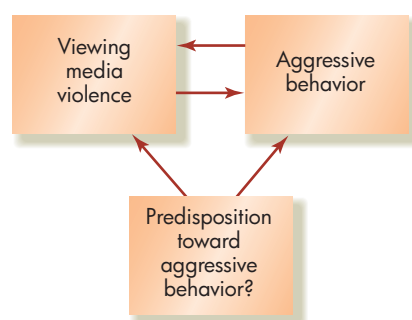


Figure 6.11 ■ What Are the Connections Between Media Violence and Aggressive Behavior? Does media violence cause aggressive behavior? Do aggressive children prefer to tune in to violent shows? Or do other factors, such as personality traits that create a disposition toward aggression, contribute both to aggressive behavior and the observation of violent shows?

rejection, paternal physical punishments, and single motherhood contribute to the likelihood of aggression in early childhood (Jester et al., 2008; Wareham et al., 2009). These family factors suggest that the parents of aggressive children understand that the kinds of socially inappropriate behaviors they see in the media are not for them. A harsh home life may also confirm the TV viewer’s vision of the world as a violent place and further encourage reliance on television for companionship.

Teaching Children Not to Imitate Media Violence

Children are going to be exposed to media violence—if not in Saturday morning cartoon shows, then in evening dramas

and in the news. Or they’ll hear about violence from friends, watch other children get into fights, or read about violence in the newspapers. If all those sources of violence were somehow hidden from view, they would learn about violence in *Hamlet*, *Macbeth*, and the Bible. The notion of preventing children from being exposed to violent models may be impractical.

What, then, should be done? Parents and educators can do many things to tone down the impact of media violence (Huesmann et al., 2003; Potter, 2008). Children who watch violent shows act less aggressively when they are informed that:

- The violent behavior they observe in the media does *not* represent the behavior of most people.
- The apparently aggressive behaviors they watch are not real. They reflect camera tricks, special effects, and stunts.
- Most people resolve conflicts by nonviolent means.
- The real-life consequences of violence are harmful to the victim and, often, the aggressor.

Despite our history of evolutionary forces, and despite the fact that in most species successful aggression usually wins individuals the right to transmit their genes to future generations, humans are thinking beings. If children consider violence to be inappropriate for them, they will be less likely to act aggressively, even when they have acquired aggressive skills from exposure to the media or other sources.

Learning: Experience and Change

1. What is learning?

Learning is the process by which experience leads to modified representations of the environment (the cognitive perspective) and relatively permanent changes in behavior (the behavioral perspective).

Classical Conditioning: Learning What Is Linked to What

2. What is classical conditioning?

Classical conditioning is a simple form of associative learning in which a previously neutral stimulus (the conditioned stimulus, or CS) comes to elicit the response evoked by a second stimulus (the unconditioned stimulus, or UCS) as a result of repeatedly being paired with the second stimulus.

3. What is the contribution of Ivan Pavlov to the psychology of learning?

Russian physiologist Ivan Pavlov happened upon conditioning by chance when he was studying salivation in laboratory dogs. Pavlov discovered that reflexes can be learned, or conditioned, through association.

4. What is a taste aversion, and why are taste aversions of special interest to psychologists?

Taste aversions are examples of classical conditioning in which organisms learn that a food is noxious on the basis of a nauseating experience. Taste aversions are of special interest because learning may occur on the basis of a single association and because the unconditioned stimulus (in this case, nausea) can occur hours after the conditioned stimulus (in this case, the flavor of food). Taste aversions apparently provide organisms with an evolutionary advantage.

5. What is the role of extinction in classical conditioning?

Extinction is the process by which conditioned stimuli lose the ability to elicit conditioned responses because the conditioned stimuli are no longer associated with unconditioned stimuli. Extinction helps organisms adapt to environmental changes. After a UCS–CS association has been learned, for example, repeated presentation of the CS (for example, a tone) without the UCS (meat powder) extinguishes the CR (salivation).

6. What is the role of spontaneous recovery in classical conditioning?

Extinguished responses may show spontaneous recovery as a function of the time that has elapsed since extinction occurred. Spontaneous recovery is adaptive in that environmental conditions may have reverted to what they were before.

7. What is the role of generalization in classical conditioning?

Generalization is the tendency for a conditioned response to be evoked by stimuli that are similar to the stimulus to

which the response was conditioned. Generalization helps organisms adapt to new events by responding to a range of stimuli similar to the CS.

8. What is the role of discrimination in classical conditioning?

In discrimination, organisms learn to show a CR in response to a more limited range of stimuli by pairing only the limited stimulus with the UCS.

9. What is higher order conditioning?

In higher order conditioning, a previously neutral stimulus comes to serve as a CS after being paired repeatedly with a stimulus that has already become a CS.

10. Was Little Albert “prepared” to acquire his fear of rats?

Evolutionary theorists believe that humans are indeed prepared, biologically, to readily develop fears of objects and situations that threatened our survival in our evolutionary history.

Operant Conditioning: Learning What Does What to What

11. What is operant conditioning?

Operant conditioning is a simple form of learning in which organisms learn to engage in behavior that is reinforced. Reinforced responses occur with greater frequency.

12. What is the law of effect?

This is Thorndike’s view that responses are “stamped in” by rewards and “stamped out” by punishments.

13. What is the contribution of B. F. Skinner to the psychology of learning?

Skinner developed the concept of reinforcement, encouraged the study of discrete behaviors such as lever pressing by rats, and innovated many techniques for studying operant conditioning such as the “Skinner box” and the cumulative recorder. He was also involved in the development of behavior modification and programmed learning.

14. What are the various kinds of reinforcers?

These include positive, negative, primary, and secondary reinforcers. Positive reinforcers increase the probability that a behavior will occur when they are applied. Negative reinforcers increase the probability that a behavior will occur when they are removed. Primary reinforcers (such as food and water) have their value because of the organism’s biological makeup. Secondary reinforcers (such as money and approval) acquire their value through association with established reinforcers.

15. What is the role of extinction in operant conditioning?

Extinction is adaptive in operant conditioning. Learned responses are extinguished as a result of repeated performance in the absence of reinforcement. (Why continue to engage in a response that goes unreinforced?)

16. What is the role of spontaneous recovery in operant conditioning?

As in classical conditioning, spontaneous recovery occurs as a function of the passage of time, which is adaptive because things may return to the way they once were.

17. Why did Skinner distinguish between reinforcers on the one hand and rewards and punishments on the other?

Rewards and punishments are defined, respectively, as pleasant and aversive events that affect behavior. Skinner preferred the concept of reinforcement because its definition does not rely on getting inside the head of the organism. Instead, lists of reinforcers are obtained empirically by observing their effects on behavior.

18. Why do many psychologists disapprove of punishment?

Many psychologists recommend not using punishment because it hurts, it does not suggest acceptable behavior, it may create feelings of hostility, it may only suppress behavior in the specific situation in which it is used, it may generalize to the suppression of wide varieties of behavior, and it may suggest that recipients punish others as a way of coping with stress.

19. What are discriminative stimuli?

Discriminative stimuli (such as green lights) act as signals or cues that indicate when an operant (such as pecking a button) will be reinforced (as with food).

20. What are the various schedules of reinforcement?

Continuous reinforcement leads to the most rapid acquisition of new responses, but operants are maintained most economically through partial reinforcement. There are four basic schedules of reinforcement. In a fixed-interval schedule, a specific amount of time must elapse after a previous correct response before reinforcement again becomes available. In a variable-interval schedule, the amount of time is allowed to vary. In a fixed-ratio schedule, a fixed number of correct responses must be performed before one is reinforced. In a variable-ratio schedule, this number is allowed to vary. Ratio schedules maintain high response rates.

21. How can we use shaping to teach complex behavior patterns?

In shaping, successive approximations of the target response are reinforced, leading to the performance of a complex sequence of behaviors.

Cognitive Factors in Learning

22. How do we explain what happens during classical conditioning from a cognitive perspective?

From the cognitive perspective, classical conditioning is not merely the mechanical association of stimuli such that a new stimulus comes to elicit the same response elicited by another; rather, the new stimulus provides information about how events are related. According to contingency theory, organisms learn associations between stimuli only when stimuli provide new information about each other.

23. What is the evidence that people and other animals form cognitive maps of their environments?

Some evidence is derived from Tolman's research on latent learning. He demonstrated that rats can learn—that is, they can modify their cognitive map of the environment—in the absence of reinforcement.

24. How do people learn by observing others?

Bandura has shown that people can learn to do things simply by observing others; it is not necessary that they emit responses that are reinforced to learn. Learners may then choose to perform the behaviors they have observed “when the time is ripe”—that is, when they believe that the learned behavior is appropriate or is likely to be rewarded. Some learning of motor acts and emotional responses by observation appears to be automatic and enabled by mirror neurons.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of this feature.

KEY TERMS

Behavior modification (p. 209)

Biological preparedness (p. 197)

Classical conditioning (p. 190)

Cognitive map (p. 211)

Conditioned reinforcer (p. 204)

Conditioned response (CR) (p. 191)

Conditioned stimulus (CS) (p. 191)

Contingency theory (p. 212)

Continuous reinforcement (p. 207)

Counterconditioning (p. 198)

Cumulative recorder (p. 202)

Discrimination (p. 195)

Discriminative stimulus (p. 206)

Extinction (p. 193)

Fixed-interval schedule (p. 207)

Fixed-ratio schedule (p. 208)

Flooding (p. 198)

Generalization (p. 195)

Higher order conditioning (p. 196)

Latent learning (p. 212)

Law of effect (p. 200)

Learning (p. 189)

Model (p. 214)

Negative reinforcer (p. 203)

Operant (p. 202)

Operant behavior (p. 202)

Operant conditioning (p. 202)

Orienting response (p. 191)
Partial reinforcement (p. 207)
Positive reinforcer (p. 203)
Primary reinforcer (p. 204)
Programmed learning (p. 210)
Punishment (p. 200)
Reflex (p. 190)

Reinforce (p. 201)
Reward (p. 200)
Secondary reinforcer (p. 204)
Shaping (p. 208)
Spontaneous recovery (p. 194)
Stimulus (p. 190)
Successive approximations (p. 209)

Systematic desensitization (p. 198)
Time out (p. 206)
Unconditioned stimulus (UCS) (p. 191)
Unconditioned response (UCR) (p. 191)
Variable-interval schedule (p. 208)
Variable-ratio schedule (p. 208)

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7

Memory: Remembrance of Things Past—and Future



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MAJOR TOPICS

Kinds of Memory: Pressing the “Rewind” and “Fast-Forward” Buttons

Processes of Memory: Processing Information in Our Most Personal Computers

Stages of Memory: Making Sense of the *Short* and the *Long* of It

Forgetting: Will You Remember How We Forget?

The Biology of Memory: The Brain as a Living Time Machine

FEATURES

Self-Assessment: Five Challenges to Your Memory

A Closer Look—Research: Will You Remember Your Psychology Grade in 2061?

Concept Review: The Relationships among the Various Kinds of Memories

Controversy in Psychology: Can We Trust Eyewitness Testimony?

In Profile: Elizabeth Loftus

In Profile: Hermann Ebbinghaus

Controversy in Psychology: Do People Really Recover Repressed Memories of Childhood Sexual Abuse, or Are These “Memories” Implanted by Interviewers?

Life Connections: Using the Psychology of Memory to Enhance Your Memory

TRUTH OR FICTION?

- T F** A woman who could not remember who she was automatically dialed her mother's number when the police gave her a telephone.
- T F** Learning must be meaningful if we are to remember it.
- T F** Oh say, can you see? If the answer is yes, you have a photographic memory.
- T F** It may be easier for you to recall the name of your first-grade teacher than the name of someone you just met at a party.
- T F** All of our experiences are permanently imprinted on the brain, so the proper stimulus can cause us to remember them exactly.
- T F** You may always recall where you were and what you were doing on the morning of September 11, 2001.
- T F** If you study with the stereo on, you would probably do better to take the test with the stereo on.
- T F** Learning Spanish can make it harder to remember French—and vice versa.
- T F** After part of his hippocampus was surgically removed, a man could not form new memories. Each time he was reminded of his uncle's death, he grieved as he had when he first heard about it.
- T F** You may improve your memory by sniffing antidiuretic hormone.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

Jeff would never forget his sudden loss of memory.

He watched in horror as his cell phone slipped from his pocket and fell to the floor of the Blockbuster store in Boston. Before he could grab it, it shattered into pieces. A New York college student, Jeff experienced the trauma of phone loss on his winter break.

Why was the loss traumatic? Why was it a memory problem? Simple: There was no way for Jeff to retrieve his phone book. “I was at the store and it was snowing out and I suddenly realized that I had no way of getting in touch with anyone,” he explains (Metz, 2005). The worst part of the loss was that Jeff had been seeing someone in New York, and because her cell phone was her only phone, he now had no way to contact her. A day later, he showed up on her doorstep, hoping she wouldn't think he had been avoiding her calls. She forgave him but had him write her number down—*on paper*. Still, Jeff would not forget the day his cell phone lost its memory. After all, he also had his family, his friends, his pizza-delivery service, his tutor, and his mother's pet groomer in it.

Jeff now copies every cell-phone entry into a little black book—made of paper. Other people back up their phone books—and their pictures and downloads—on servers provided by cellular telephone operating companies or cell-phone manufacturers. Verizon Wireless, for example, offers Backup Assistant. Motorola's version is My Backup Pro. Most people transfer their memories from their old cell phone to the new one when they make a change.

Jeff's cell-phone memory is electronic. Information is stored on a chip smaller than a fingernail. His own memory is much more complex—involving biological structures as well as chemical and electrical processes.

This chapter is all about the “backup assistant” in your brain—your memory. Without your memory, there is no past. Without your memory, experience is trivial and learning is lost. Let's see what psychologists have learned about the ways we remember things—other than keying them into a cell phone's memory chip. However, first try to meet the challenges to your memory we pose in the Self-Assessment on page 224. We'll be talking about your responses throughout the chapter.

SELF ASSESSMENT

Five Challenges to Your Memory

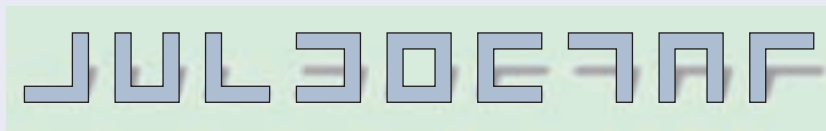
Let's challenge your memory. This is not an actual memory test of the sort used by psychologists to determine whether people's memory functioning is within normal limits. Instead, it will provide you with some insight into how your memory works and may also be fun.

Directions: Find four sheets of blank paper and number them 1 through 4. Also use a watch with a second hand. Then follow these instructions:

1. Following are ten letters. Look at them for 15 seconds. Later in the chapter, I will ask you if you can write them on sheet 1. (No cheating! Don't do it now.)

THUNSTOFAM

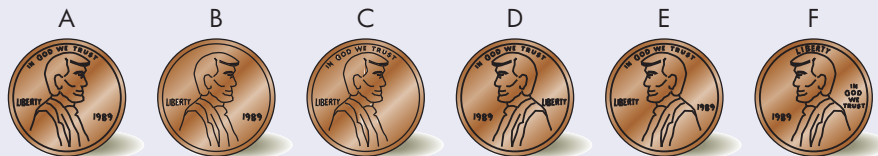
2. Look at these nine figures for 30 seconds. Then try to draw them in the proper sequence on sheet 2. (Yes, right after you've finished looking at them. We'll talk about your drawings later, on p. 237.)



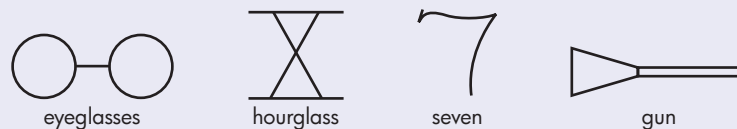
3. Okay, here's another list of letters, 17 this time. Look at the list for 60 seconds and then see whether you can reproduce it on sheet 3. (I'm being generous this time—a full minute.)

GMC-BSI-BMA-TTC-IAF-BI

4. Which of these pennies is an accurate reproduction of the Lincoln penny you see every day? This time there's nothing to draw on another sheet; just circle or put a checkmark by the penny that you think resembles the ones you throw in the back of your sock drawer.



5. Examine the following drawings for 1 minute. Then copy the names of the figures on sheet 4. When you're finished, just keep reading. Soon I'll ask you to draw those figures.



That's it. You'll find out about the results of this self-assessment as you read through the chapter.

KINDS OF MEMORY: PRESSING THE “REWIND” AND “FAST-FORWARD” BUTTONS

Jeff remembered things he had personally done, like dropping his cell phone in Boston and showing up at his girlfriend's doorstep on a blustery day in January. Remembering a dropped cell phone is an *episodic memory*—a memory of an event in one's life. According to psychologists who have extensively researched memory, episodic memory is one kind of memory system (L. J. Carver & Cluver, 2009; B. C. Dickerson & Eichenbaum, 2009).

And when I learned of Jeff’s experience, I tried to remind myself repeatedly not to forget to jot down notes about it and write it up as soon as I could. (I was trying to jog my *prospective memory*—remembering to do something in the future.) Let’s consider several memory systems.

Explicit Memory: When Memory Is Out in the Open

Question 1: What is explicit memory? **Explicit memory**—also referred to as *declarative memory*—is memory for specific information. Things that are explicit are clear, or clearly stated or explained. The use of the term *declarative* indicates that these memories state or reveal (that is, declare) specific information. The information may be autobiographical or refer to general knowledge. (“Well, I declare!”) There are two kinds of explicit memories described by psychologist Endel Tulving (1985; Tulving & Markowitsch, 1998): episodic and semantic. They are identified according to the type of information they hold.

EPISODIC MEMORY

Question 2: What is episodic memory? **Episodic memories** are kinds of explicit memories. They are memories of the things that happen to us or take place in our presence (B. C. Dickerson & Eichenbaum, 2009; Grillon et al., 2010). Episodic memory is also referred to as *autobiographical memory*. Your memories of what you ate for breakfast and of what your professor said in class this afternoon are examples of episodic memory.

It is common for us to build or “reconstruct” inaccurate memories that have a bit of this and a bit of that. These memories might reflect autobiographical experience, such as things we hear about from family members and others, the stuff we read about or see in the media, and even things that other people suggest might have happened to us. These memories are fiction, as we see in novels, but we may believe that they are truly autobiographical (Mori, 2008).

SEMANTIC MEMORY: ON NOT GETTING PERSONAL

Question 3: What is semantic memory? General knowledge is referred to as **semantic memory**. *Semantics* concerns meanings. You can “remember” that the United States has 50 states without visiting them and personally adding them up. You “remember” who authored *Hamlet*, although you were not looking over Shakespeare’s shoulder as he did so. These, too, are examples of semantic memory.

Your future recollection that there are several kinds of memory is more likely to be semantic than episodic. That is, you are more likely to “know” that there are several types of memory than to recall the date on which you learned about them, where you were, how you were sitting, and whether you were also thinking about dinner at the time. We tend to use the phrase “I remember . . .” when we are referring to episodic memories, as in “I *remember* the blizzard of 1998.” But we are more likely to say “I know . . .” in reference to semantic memories, as in “I *know* about . . .” (or “I heard about . . .”) “. . . the blizzard of 1898.” Put another way, you may *remember* that you wrote to your mother, but you *know* that Shakespeare wrote *Hamlet*.

Implicit Memory: When Remembering Is Doing

Question 4: What is implicit memory? **Implicit memory**—also referred to as *nondeclarative memory*—is memory of how to perform a task. It is the act itself; it is doing something (Schacter, 1992). As the term *implicit* implies (should I start this sentence again?), implicit memories are suggested (or implied) but not plainly stated or expressed (not declared). Implicit memories are illustrated by the things people *do* but not by the things they state clearly. Implicit memories involve skills, both cognitive and physical; they reveal habits; and they involve the effects of conditioning. My taste aversion to buttered popcorn—which I described in Chapter 6—is an implicit memory. Because I was once nauseated by buttered popcorn, I still feel somewhat queasy when

If any one faculty of our nature may be called more wonderful than the rest, I do think it is memory. There seems something more speakingly incomprehensible in the powers, the failures, the inequalities of memory, than in any other of our intelligences. The memory is sometimes so retentive, so serviceable, so obedient; at others, so bewildered and so weak; and at others again, so tyrannic, so beyond control!

JANE AUSTEN

Explicit memory Memory that clearly and distinctly expresses (explicitates) specific information; also referred to as *declarative memory*.

Episodic memory Memories of events experienced by a person or that take place in the person’s presence.

Semantic memory General knowledge, as opposed to episodic memory.

Implicit memory Memory that is suggested (implied) but not plainly expressed, as illustrated in the things that people *do* but do not state clearly; also referred to as *nondeclarative memory*.

— ■ —

For the sense of smell, almost more than any other, has the power to recall memories and it is a pity that you use it so little.

RACHEL CARSON

— ■ —

I smell it. It's a conditioned response. I don't have to think about it. (And I don't want to think about it, to tell you the truth. I wrote about it here because of my deep commitment to you.)

Here are some other examples of implicit memories: You have learned and now remember how to speak at least one language, how to ride a bicycle, how to swim or swing a bat, how to type, how to turn on the lights, and how to drive a car. It is said that you never “forget” how to ride a bicycle. This is because implicit memories can persist even when we have not used them for many years. Getting to class “by habit”—without paying attention to landmarks or directions—is another instance of implicit memory. If someone asked you what 2 times 2 equals, the number 4 would probably “jump” into your mind without much thought or conscious calculation. After going over the alphabet or multiplication tables hundreds of times, our memory of them becomes automatic or implicit. We don't have to pay conscious attention to them to remember them.

Your memory of the alphabet or the multiplication tables is the result of a great deal of repetition that makes associations automatic, a phenomenon that psychologists refer to as **priming**. Studies involving brain imaging reveal that priming makes it possible for people to carry out a mental task with less neural activity (Koenig et al., 2008; T. J. Spencer et al., 2009). Years of priming helps people make complete words out of word fragments (Friedrich et al., 2009; Schacter et al., 2007). Even though the perceptual cues in the following word fragments are limited, you may very well make them into words:

PYGY MRCA TXT BUFL

(Sample answers would be “pygmy,” “merchant,” “text,” and “buffalo.”) Let's jump ahead to the next chapter (“Thinking, Language, and Intelligence”) to mention a couple of factors that will be involved in how many words you can make out of these fragments. One is your expertise with the English language. If English is your second language, you will probably make fewer associations to these fragments than if English is your first language. In fact, you might not perceive any complete words. Another factor could be creativity. Can you think of other factors?

Daniel Schacter (1992) also illustrates implicit memory with the story of a woman with amnesia who was wandering the streets. The police picked her up and discovered that she could not remember who she was or any other fact about her life, and she had no identification. After extensive fruitless interviewing, the police hit on the idea of asking her to dial phone numbers—just any number at all. Even though the woman did not “know” what she was doing, she dialed her mother's number.

Truth or Fiction Revisited: It is true that a woman who could not remember who she was automatically dialed her mother's number when the police gave her a telephone. When asked for the phone numbers of people she knew, the woman had no answer. She could not *declare* her mother's phone number. She could not make the number *explicit*. She could not even remember her mother's name or whether she had a mother. All this explicit information was gone. But dialing her mother's phone number was apparently a habit, and she did it “on automatic pilot.” We can assume that she had been *primed* for this task by dialing the number hundreds of times, perhaps many thousands of times. Implicit memory reveals the effects of experience when we are not specifically trying to recall information.

Priming The activation of specific associations in memory, often as a result of repetition and without making a conscious effort to access the memory.

Retrospective memory Memory for past events, activities, and learning experiences, as shown by explicit (episodic and semantic) and implicit memories.

Prospective memory Memory to perform an act in the future, as at a certain time or when a certain event occurs.

Retrospective Memory Versus Prospective Memory

Question 5: What is the difference between retrospective memory and prospective memory? **Retrospective memory** is the recalling of information that has been previously learned. *Episodic, semantic, and implicit memories* all involve remembering things that were learned.

Prospective memory involves remembering to do things in the future (Klein et al., 2010). Tasks that depend on prospective memory include remembering to brush your teeth before going out, to pay your bills (yuck), to take out some cash, and to make the list of things to do so that you won't forget what to do! And if one does make a list of

A CLOSER LOOK • RESEARCH

WILL YOU REMEMBER YOUR PSYCHOLOGY GRADE IN 2061?

Will you remember your grade in this course when there is gray in your hair and the hint of a creak in your bones? When, considering inflation, your salary is \$1.2 million per year but gasoline costs \$400 a gallon?

Chances are that the answer is yes, especially now that we've drawn your attention to the task. Harry Bahrick and his colleagues (2008) recruited 276 alumni of Ohio Wesleyan University who had graduated 1 to 50 years earlier. Subjects thus ranged in age from early adulthood to late adulthood. They were asked to recall their college grades, and their recollections were checked against their actual grades. They found that the alumni accurately recalled 3,025 of 3,967 college grades. As you can see in Figure 7.1 ■, the number of correct recollections fell off with the age of the respondent, generally due to errors of omission—that is, leaving items blank rather than entering the wrong grade. But graduates who were out of school more than 40 years made no more errors of commission—that is, entered no more wrong grades—on average, than those who were out of school 8 years or so. Students who received better grades made fewer errors. The more confident alumni were that they were correct, the more likely it was that they were.

Chances are also that if you recall your grade inaccurately, you will have bumped it up a notch or two. Eighty-one percent of errors of commission inflated the grade. Inaccuracies—distortions—occur shortly after graduation, tend to remain constant over time, and are greater for the courses that students enjoyed the most—like this one.

The researchers suggest that we bring in relevant generic memories to fill in gaps (“I was sort of a good student; I got a B+.”) after our actual episodic memory fails and that most of us distort our memories in a more emotionally gratifying fashion. Some of us, unfortunately, expect the worst and fill in the gaps with the worst. Of course, it will be difficult to distort your A or A+ “in a more emotionally gratifying fashion.”



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A or B? Will you remember your grade in this course 50 years from now? Will your memory be accurate or will you bump the grade up or down a notch?

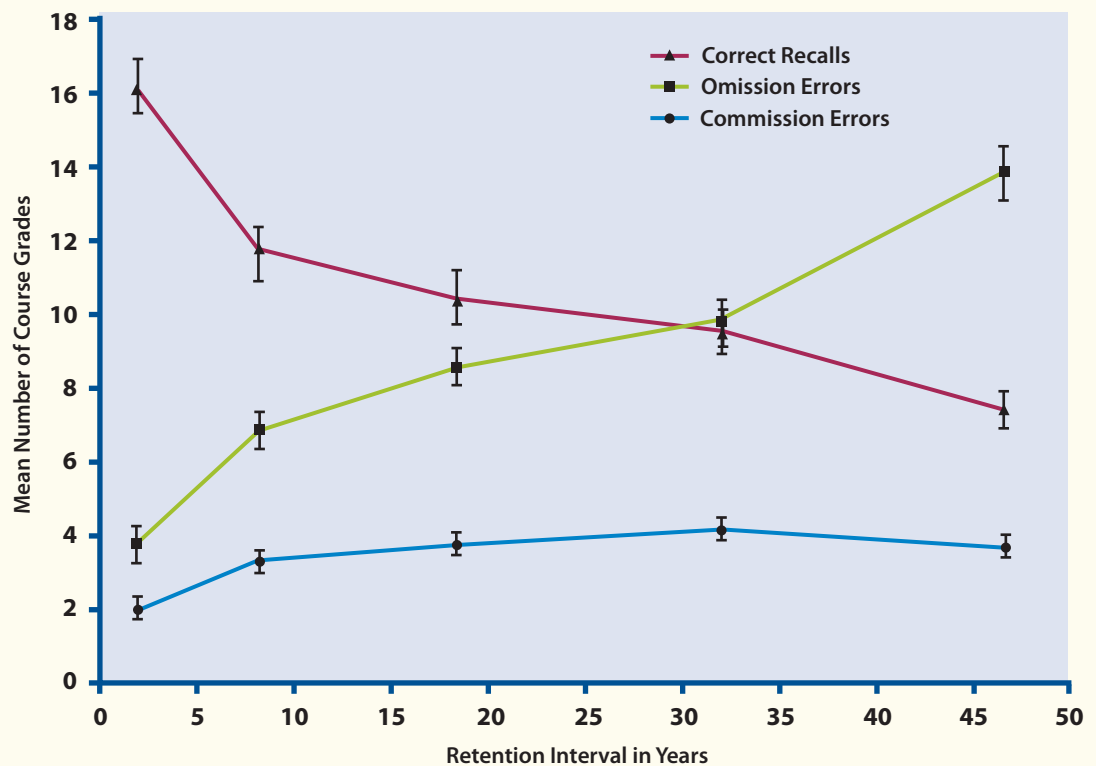


Figure 7.1 ■ Memory for College Grades, Half a Century Later

— ■ —
*The true art of memory is the
art of attention.*

DR. SAMUEL JOHNSON
— ■ —

things to do, one must remember to use it. Most of us have had failures of prospective memory when we have the feeling that we were supposed to do something, but we can't remember what. Prospective memory tends to fail when we are preoccupied (caught up on the Internet or fantasizing about you-know-who), distracted (we get a phone call just as we are about to get going on something), or feeling the stress of time pressure (Knight & Titov, 2009).

There are various kinds of prospective memory tasks. For example, *habitual tasks* such as getting to class on time are easier to remember than occasional tasks such as meeting someone for coffee at an arbitrary time (J. D. Henry et al., 2004). But motivation also plays a role. You are more likely to remember the coffee date if the person you are meeting is extremely attractive and someone you are interested in getting to know better. Psychologists also distinguish between event-based and time-based prospective memory tasks. *Event-based tasks* are triggered by events, such as remembering to take one's medicine at breakfast or to brush one's teeth after eating. *Time-based tasks* are performed at a certain time or after a certain amount of time has elapsed between occurrences, such as tuning in to a favorite news program at 7:30 P.M. or taking a pill every 4 hours.

There is an age-related decline in both retrospective and prospective memory (Old & Naveh-Benjamin, 2008). Generally speaking, the decline in older adults often appears to be related to the speed of cognitive processing rather than "loss" of memory per se. In the case of prospective memory, older adults appear about equally aware of specific cues or reminders as young adults; however, it takes them longer to respond to the cues or reminders (Old & Naveh-Benjamin, 2008). That is, if they meet with a friend, they are likely to remember that they were supposed to ask something, but it may take longer for them to remember the particular question. However, older adults with greater verbal ability and occupational status and more social involvement are better able to keep their intentions in mind (Engelhardt et al., 2010; T. F. Hughes et al., 2008).

Moods and attitudes have an effect on prospective memory. For example, negative emotional states such as depression also impair prospective memory. Depressed people are less likely to push to remind themselves to do what they intend to do (Altgassen et al., 2008). On the other hand, older people who are confident in their ability to remember to carry out tasks are more likely to actually remember to do them (McDonald-Miszczak et al., 1999; Pansky et al., 2009). Yet the same confidence in one's memory does not appear to be associated with better performance at *retrospective* memory tasks (recalling the past) (McDonald-Miszczak et al., 1999). The various kinds of memory are summarized in the nearby Concept Review.

Before proceeding to the next section, why don't you turn to the piece of paper on which you wrote the names of the four figures—that is, sheet 4—and draw them from memory as exactly as you can. Hold on to the drawings. We'll talk about them a bit later.

LearningConnections • KINDS OF MEMORY: PRESSING THE "REWIND" AND "FAST-FORWARD" BUTTONS

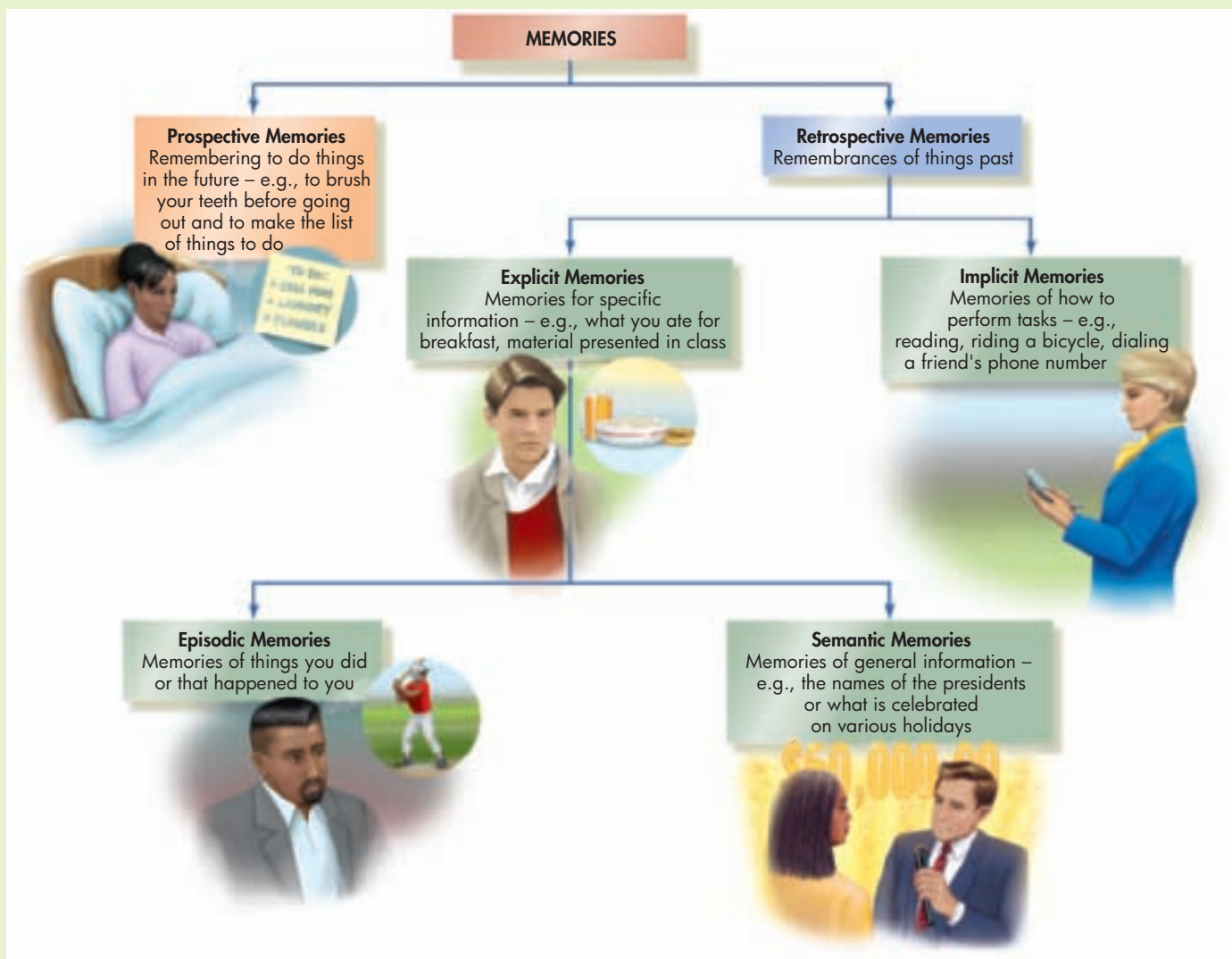
ACTIVE REVIEW (1) _____ memories are memories of specific information. (2) Memories of the events that happen to a person are _____ memories. (3) _____ memories concern generalized knowledge.

REFLECT AND RELATE Try a mini-experiment. Take out a pen or pencil and write your name. (Or if you are using a keyboard, type your name.) Now reflect: You remembered how to hold and write with the pen or pencil or how to type. What type of memory was this?

CRITICAL THINKING Definitions matter. Should this chapter be called *Memory* or *Memories*? You have retrospective versus prospective memories, implicit versus explicit memories, and so on. Do they represent different *systems* of memory, or are they just different examples of memory?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.



Memories can address past events (*retrospective memories*) or future events (*prospective memories*). Memories of the past can be explicit (declarative) or implicit (nondeclarative). Explicit memories include memories of personal episodes (which are called *episodic* or *autobiographical memories*) or of general information (*semantic memories*).



Go to Psychology CourseMate at www.cengagebrain.com to access an interactive version of this Concept Review designed to help you test yourself on the topics presented here.

PROCESSES OF MEMORY: PROCESSING INFORMATION IN OUR MOST PERSONAL COMPUTERS

Both psychologists and computer scientists speak of processing information. Think of using a computer to write a term paper. Once the system is up and operating, you begin to enter information. You can enter information into the computer's memory by, for example, typing letters on a keyboard or—in the case of voice recognition technology—speaking. If you were to do some major surgery on your computer and open up its memory, however, you wouldn't find these letters or sounds inside it. This is because the computer is programmed to change the letters or sounds—that is, the information you

have entered—into a form that can be placed in its electronic memory. Similarly, when we perceive information, we must convert it into a form that can be remembered if we are to place it in our memory.

Encoding: The Memory’s “Transformer”

Information about the outside world reaches our senses in the form of physical and chemical stimuli. The first stage of information processing is changing information so that we can place it in memory: **encoding**. **Question 6: What is the role of encoding in memory?** When we encode information, we transform it into psychological formats that can be represented mentally. To do so, we commonly use visual, auditory, and semantic codes.

Let’s illustrate the uses of coding by referring to the list of letters you first saw in the section on challenges to memory. Try to write the letters on sheet 1. Go on, take a minute, and then come back.

Okay, now: If you had used a **visual code** to try to remember the list, you would have mentally represented it as a picture. That is, you would have maintained—or attempted to maintain—a mental image of the letters. Some artists and art historians seem to maintain marvelous visual mental representations of works of art. This enables them to quickly recognize whether a work is authentic.

You may also have decided to read the list of letters to yourself—that is, to silently say them in sequence: “t,” “h,” “u,” and so on. By so doing, you would have been using an **acoustic code**, or representing the stimuli as a sequence of sounds. You may also have read the list as a three-syllable word, “thun-sto-fam.” This is an acoustic code, but it also involves the “meaning” of the letters in the sense that you are interpreting the list as a word. This approach has elements of a semantic code.

Semantic codes represent stimuli in terms of their meaning. Our 10 letters were meaningless in and of themselves. However, they can also serve as an acronym—a term made up of the first letters of a phrase—for the familiar phrase “The United States Of America.” This observation lends them meaning.

Storage: The Memory’s “Save” Function

The second memory process is **storage**. **Question 7: What is the role of storage in memory?** Storage means maintaining information over time. If you were given the task of storing the list of letters—that is, told to remember it—how would you attempt to place it in storage? One way would be by **maintenance rehearsal**—by mentally repeating the list, or saying it to yourself. Our awareness of the functioning of our memory, referred to by psychologists as **metamemory**, becomes more sophisticated as we develop.

You could also have condensed the amount of information you were rehearsing by reading the list as a three-syllable word; that is, you could have rehearsed three syllables (said “thun-sto-fam” over and over again) rather than 10 letters. In either case, repetition would have been the key to memory. (We talk more about such condensing, or “chunking,” very soon.)

However, you could also encode the list of letters by relating it to something that you already know. This coding is called **elaborative rehearsal**. You are “elaborating” or extending the semantic meaning of the letters you are trying to remember. For example, did you recognize that the list of 10 letters is an acronym for “The United States of America”? (That is, you take the first two letters of each of the words in the phrase and string them together to make up the 10 letters of THUNSTOFAM.) If you had recognized this, storage of the list of letters might have been almost instantaneous, and it would probably have been permanent.

However, adequate maintenance rehearsal can do the job. **Truth or Fiction Revisited:** Therefore, it is not true that learning must be meaningful if we are to remember it.

Retrieval: The Memory’s “Find” Function

The third memory process is **retrieval**. **Question 8: What is the role of retrieval in memory?** The retrieval of stored information means locating it and returning it to consciousness. With well-known information such as our names and occupations, retrieval is effortless and, for all practical purposes, immediate. But when we are trying

Encoding Modifying information so that it can be placed in memory; the first stage of information processing.

Visual code Mental representation of information as a picture.

Acoustic code Mental representation of information as a sequence of sounds.

Semantic code Mental representation of information according to its meaning.

Storage The maintenance of information over time; the second stage of information processing.

Maintenance rehearsal Mental repetition of information to keep it in memory.

Metamemory Self-awareness of the ways memory functions, allowing the person to encode, store, and retrieve information effectively.

Elaborative rehearsal The kind of coding in which new information is related to information that is already known.

Retrieval The location of stored information and its return to consciousness; the third stage of information processing.

to remember massive quantities of information, or information that is not perfectly understood, retrieval can be tedious and not always successful. It is easiest to retrieve information stored in a computer by using the name of the file. Similarly, retrieval of information from our memories requires knowledge of the proper **retrieval cues**.

If you had encoded THUNSTOFAM as a three-syllable word, your retrieval strategy would involve recollection of the word and rules for decoding. That is, you would say the “word” *thun-sto-fam* and then decode it by spelling it out. You might err in that “thun” sounds like “thumb” and “sto” could also be spelled “stow.” However, using the semantic code, or recognition of the acronym for “The United States of America,” could lead to flawless recollection.

I stuck my neck out by predicting that you would immediately and permanently store the list if you recognized it as an acronym. Here, too, there would be recollection (of the name of our country) and rules for decoding. That is, to “remember” the 10 letters, you would have to envision the phrase (“The United States of America”) and read off the first two letters of each word. Because using this semantic code is more complex than simply seeing the entire list (using a visual code), it may take a while to recall (actually, to reconstruct) the list of 10 letters. But by using the phrase, you are likely to remember the list of letters permanently.

Now, what if you were not able to remember the list of 10 letters? What would have gone wrong? In terms of the three processes of memory, perhaps you had (a) not encoded the list in a useful way, (b) not entered the encoded information into storage, or (c) stored the information but lacked the proper cues for remembering it—such as the phrase “The United States of America” or the rule for decoding the phrase.

By now, you may have noticed that I have discussed three kinds of memory and three processes of memory, but I have not yet *defined* memory. No apologies—we weren’t ready for a definition yet. Now that we have explored some basic concepts, let’s give it a try: **Memory** is the processes by which information is encoded, stored, and retrieved.

Retrieval cue A clue or prompt that can be used to enable or trigger the recovery of a memory in storage.

Memory The processes by which information is encoded, stored, and retrieved.

LearningConnections • PROCESSES OF MEMORY: PROCESSING INFORMATION IN OUR MOST PERSONAL COMPUTERS

ACTIVE REVIEW (4) _____ is the transforming of information so that we can remember it. (5) One way of storing information is by _____ rehearsal, or by mentally repeating it. (6) Another way of storing information is by _____ rehearsal, when we relate new information to things we already know.

REFLECT AND RELATE As you read this page, are you using acoustic coding to transform the sensory stimulation? Are you surprised that you “know” how to do this? How do you remember how to spell the words *receive* and *retrieve*?

CRITICAL THINKING Why would an author—like me—compare the functioning of memory to the functioning of a computer? Do you find the comparison useful, or is it misleading?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

STAGES OF MEMORY: MAKING SENSE OF THE SHORT AND THE LONG OF IT

The world is a continual display of sights, sounds, and other sources of sensory stimulation, but only some of these things are remembered. James was correct in observing (in the quote to the right) that we remember various “elements” of thought for different lengths of time, and many we do not remember at all. Psychologists Richard Atkinson and Richard Shiffrin (1968) suggested a model for how some stimuli are lost immediately, others held briefly, and still others held for a lifetime. **Question 9: What is the Atkinson–Shiffrin model of memory?** Atkinson and Shiffrin proposed that there are three stages of memory and suggested that the progress of information through these stages determines whether (and how long) it is retained (see Figure 7.2 ■). These stages are *sensory memory*, *short-term memory (STM)*, and *long-term memory (LTM)*.

*The stream of thought flows on,
but most of its elements fall into
the bottomless pit of oblivion.
Of some, no element survives
the instant of their passage. Of
others, it is confined to a few
moments, hours, or days. Others,
again, leave vestiges which are
indestructible, and by means of
which they may be recalled as
long as life endures.*

WILLIAM JAMES

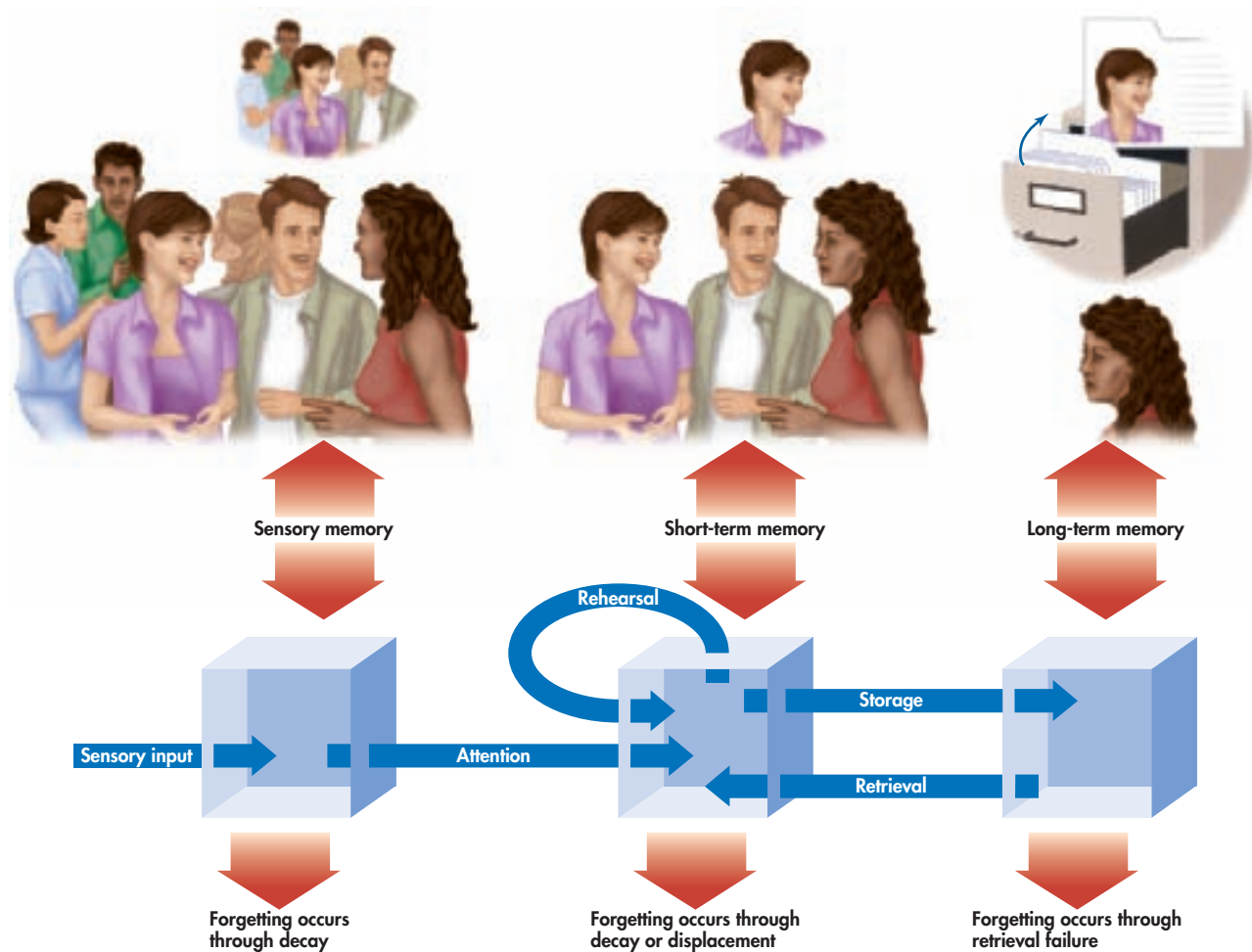


Figure 7.2 ■ Three Stages of Memory The Atkinson–Shiffrin model proposes that there are three distinct stages of memory. Sensory information impacts upon the registers of sensory memory, where memory traces are held briefly before decaying. If we attend to the information, much of it is transferred to short-term memory (STM). Information in STM may decay or be displaced if it is not transferred to long-term memory (LTM). We can use rehearsal or elaborative strategies to transfer memories to LTM. If information in LTM is organized poorly, or if we cannot find cues to retrieve it, it may be lost.

There is a saying that when you cover a topic completely, you are talking about “the long and short of it.” In the case of the stages of memory, we could say that we are trying to “make sense of the *short* and the *long* of it.”

Saccadic eye movement The rapid jumps made by a person’s eyes as they fixate on different points.

Sensory memory The type or stage of memory first encountered by a stimulus. Sensory memory holds impressions briefly, but long enough so that series of perceptions are psychologically continuous.

Memory trace An assumed change in the nervous system that reflects the impression made by a stimulus. Memory traces are said to be “held” in sensory registers.

Sensory register A system of memory that holds information briefly, but long enough so that it can be processed further. There may be a sensory register for every sense.

Sensory Memory: Flashes on the Mental Monitor

When we look at a visual stimulus, our impressions may seem fluid enough. Actually, however, they consist of a series of eye fixations referred to as **saccadic eye movements**. These movements jump from one point to another about four times each second. Yet the visual sensations seem continuous, or streamlike, because of **sensory memory**. Sensory memory is the type or stage of memory that is first encountered by a stimulus. Although sensory memory holds impressions briefly, it is long enough so that a series of perceptions seem connected. **Question 10: How does sensory memory function?**

To explain the functioning of sensory memory, let’s return to our list of letters: THUNSTOFAM. If the list were flashed on a screen for a fraction of a second, the visual impression, or **memory trace**, of the stimulus would also last for only a fraction of a second afterward. Psychologists speak of the memory trace of the list as being held in a visual **sensory register**.

If the letters had been flashed on a screen for, say, 1/10th of a second, your ability to remember them on the basis of sensory memory alone would be limited. Your memory

would be based on a single eye fixation, and the trace of the image would vanish before a single second had passed. A century ago, psychologist William McDougall (1904) engaged in research in which he showed people one to twelve letters arranged in rows—just long enough to allow a single eye fixation. Under these conditions, people could typically remember only four or five letters. Thus, recollection of THUNSTOFAM, a list of ten letters arranged in a single row, would probably depend on whether one had encoded it so that it could be processed further.

George Sperling (1960) modified McDougall's experimental method and showed that there is a difference between what people can see and what they can report. McDougall had used a *whole-report procedure*, in which people were asked to report every letter they saw in the array. Sperling used a modified *partial-report procedure*, in which people were asked to report the contents of one of three rows of letters. In a typical procedure, Sperling flashed three rows of letters like the following on a screen for 50 milliseconds (1/20th of a second):

A G R E
V L S B
N K B T

Using the whole-report procedure, people could report an average of four letters from the entire display (one of three). But if immediately after presenting the display Sperling pointed an arrow at a row he wanted viewers to report, they usually reported most of the letters in the row successfully.

If Sperling presented six letters arrayed in two rows, people could usually report either row without error. If people were flashed three rows of four letters each—a total of twelve—they reported correctly an average of three of four letters in the designated row, suggesting that about nine of the twelve letters had been perceived.

Sperling found that the amount of time that elapsed before indicating the row to be reported was crucial. If he delayed pointing the arrow for a few fractions of a second after presenting the letters, people were much less successful in reporting the letters in the target row. If he allowed a full second to elapse, the arrow did not aid recall at all. From these data, Sperling concluded that the memory trace of visual stimuli *decays* within a second in the visual sensory register (see Figure 7.2). With a single eye fixation, people can *see* most of a display of twelve letters clearly, as shown by their ability to immediately read off most of the letters in a designated row. Yet as the fractions of a single second are elapsing, the memory trace of the letters is fading. By the time a second has elapsed, the trace has vanished.

ICONIC MEMORY

Psychologists believe we possess a sensory register for each one of our senses. The mental representations of visual stimuli are referred to as **icons**. The sensory register that holds icons is labeled **iconic memory**. Iconic memory is one kind of sensory memory. Iconic memories are accurate photographic memories. **Truth or Fiction Revisited:** Those of us who see and mentally represent visual stimuli do have “photographic memories.” However, these memories are brief. What most of us usually think of as a photographic memory—the ability to retain *exact mental* representations of visual stimuli over long periods of time—is technically termed **eidetic imagery**. Although all people who can see have photographic memories (that is, icons), only a few have the capacity for eidetic imagery.

ICONIC MEMORY AND SACCADIC EYE MOVEMENTS

Iconic memory smoothes out the bumps in the visual ride. Saccadic eye movements occur about four times every second. Iconic memory, however, holds icons for up to a second. As a consequence, the flow of visual information seems smooth and continuous. Your impression that the words you are reading flow across the page, rather than jump across in spurts, is a product of your iconic memory. Similarly, motion pictures present 16 to 22 separate frames, or still images, each second. Iconic memory allows you to perceive the imagery in the film as being seamless (Demeyer et al., 2009).

Consciousness . . . does not appear to itself chopped up in bits. A “river” or a “stream” are the metaphors by which it is most naturally described. In talking of it hereafter, let us call it the stream of thought, of consciousness, or of subjective life.

WILLIAM JAMES

Icon A mental representation of a visual stimulus that is held briefly in sensory memory.

Iconic memory The sensory register that briefly holds mental representations of visual stimuli.

Eidetic imagery The maintenance of detailed visual memories over several minutes.



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Memorizing a Script by Rehearsing Echoic Memories As these actors work to memorize their scripts, they first encode visual information (printed words) as echoes (the corresponding sounds within their brains). They then commit the echoes to memory by rehearsing (repeating) them. They refer to the visual information as often as needed.

them out from the background noise. For example, in studies on the development of patterns of processing information, young children have been shown photographs of rooms full of toys and then been asked to recall as many of the toys as they can. One such study found that 2-year-old boys are more likely to attend to and remember toys such as cars, puzzles, and trains; 2-year-old girls are more likely to attend to and remember dolls, dishes, and teddy bears (C. F. Miller et al., 2009; Renninger & Wozniak, 1985). Even by this early age, the things that children attend to frequently fall into stereotypical patterns.

ECHOIC MEMORY

Mental representations of sounds, or auditory stimuli, are called **echoes**. The sensory register that holds echoes is referred to as **echoic memory**.

The memory traces of auditory stimuli (that is, echoes) can last for several seconds, many times longer than the traces of visual stimuli (icons). The difference in the duration of traces is probably based on biological differences between the eye and the ear. This difference is one of the reasons that acoustic codes aid in the retention of information that has been presented visually—or why saying the letters or syllables of THUNSTOFAM makes the list easier to remember.

Yet echoes, like icons, fade with time. If they are to be retained, we must pay attention to them. By selectively attending to certain stimuli, we sort

Short-Term Memory: Keeping Things “in Mind”

Imagine you are completing a writing assignment, and you key or speak words and phrases into your word-processing program. They appear on your monitor as a sign that your computer has them in *memory*. Your word-processing program allows you to add words, delete words, see if they are spelled correctly, add images, and move paragraphs from place to place. So you can manipulate the information in your computer’s memory, but it isn’t saved. It hasn’t been entered into storage. If the program or the computer crashes, the information is gone. The computer’s memory is a short-term affair. To maintain a long-term connection with the information, you need to save it. Saving it means giving it a name—ideally, a name that you will remember so that you can later find and retrieve the information—and instructing your computer to save it (keep it in storage until told otherwise).

If you focus on a stimulus in the sensory register, you will tend to retain it in your own **short-term memory**—also referred to as **working memory**—for a minute or so after the trace of the stimulus decays. **Question 11: How does short-term memory function?** As one researcher describes it, “Working memory is the mental glue that links a thought through time from its beginning to its end” (Goldman-Rakic, 1995). When you are given a phone number by the information operator and write it down or immediately dial the number, you are retaining the number in your short-term memory. When you are told the name of someone at a party and then use that name immediately when addressing that person, you are retaining the name in short-term memory. In short-term memory, the image tends to fade significantly after 10 to 12 seconds if it is not repeated or rehearsed. It is possible to focus on maintaining a visual image in short-term memory, but it is more common to encode visual stimuli as sounds, or auditory stimuli. Then the sounds can be rehearsed, or repeated.

Echo A mental representation of an auditory stimulus (sound) that is held briefly in sensory memory.

Echoic memory The sensory register that briefly holds mental representations of auditory stimuli.

Short-term memory The type or stage of memory that can hold information for up to a minute or so after the trace of the stimulus decays; also called *working memory*.

Working memory Same as *short-term memory*.

Most of us know that one way of retaining information in short-term memory—and possibly storing it permanently—is to rehearse it. When an information operator tells me a phone number, I usually rehearse it continuously while I am dialing it or running around frantically searching for a pencil and a scrap of paper so that I can save it. The more times we rehearse information, the more likely we are to remember it. We have the capacity (if not the will or the time) to rehearse information and thereby keep it in short-term memory indefinitely.

Once information is in our short-term memories, we can work on it. Like the information in the word-processing program, we can manipulate it. But it isn't necessarily saved. If we don't do something to save it (like write down that telephone number on a scrap of paper or enter it into your cell phone), it can be gone forever. We can try to reconstruct it, but it may never be the same. Getting *most* of the digits in someone's phone number right doesn't get you a date for the weekend—at least not with the person you were thinking of!

Truth or Fiction Revisited: It is true that it may be easier for you to recall the name of your first-grade teacher than the name of someone you just met at a party. You need to rehearse new information to save it, but you may only need the proper cue to retrieve information from long-term memory.

KEEPING THUNSTOFAM IN SHORT-TERM MEMORY

Let's now return to the task of remembering the first list of letters in the challenges to memory at the beginning of the chapter. If you had encoded the letters as the three-syllable “word” THUN-STO-FAM, you would probably have recalled them by mentally rehearsing (saying to yourself) the three-syllable word and then spelling it out from the sounds. A few minutes later, if someone asked whether the letters had been uppercase (THUNSTOFAM) or lowercase (thunstofam), you might not have been able to answer with confidence. You used an acoustic code to help recall the list, and uppercase and lowercase letters sound alike.

Because it can be pronounced, THUNSTOFAM is not too difficult to retain in short-term memory. But what if the list of letters had been TBXLFNTSDK? This list of letters cannot be pronounced as it is. You would have to find a complex acronym to code these letters and do so within a fraction of a second—most likely an impossible task. To aid recall, you would probably choose to try to repeat the letters rapidly—to read each one as many times as possible before the memory trace fades. You might visualize each letter as you say it and try to get back to it (that is, to run through the entire list) before it decays.

Let's assume that you encoded the letters as sounds and then rehearsed the sounds. When asked to report the list, you might mistakenly say T-V-X-L-F-N-T-S-T-K. This would be an understandable error because the incorrect V and T sounds are similar to the correct B and D sounds.

THE SERIAL-POSITION EFFECT

If asked to recall the list of letters TBXLFNTSDK, you would also be likely to recall the first and last letters in the series, T and K, more accurately than the others. **Question 12: Why are we most likely to remember the first and last items in a list?** The tendency to recall the first and last items in a series is known as the **serial-position effect**. This effect may occur because we pay more attention to the first and last stimuli in a series. They serve as the visual or auditory boundaries for the other stimuli. In addition, the first items are likely to be rehearsed more frequently (repeated more times) than other items. The last items are likely to have been rehearsed most recently and hence are most likely to be retained in short-term memory.

According to cognitive psychologists, the tendency to recall the initial items in a list is referred to as the **primacy effect**. Social psychologists have also noted a powerful primacy effect in our formation of impressions of other people. That is, first impressions tend to last. The tendency to recall the last items in a list is referred to as the **recency effect**. If we are asked to recall the last items soon after we have been shown the list, they may still be in short-term memory. As a result, they can be “read off.” Earlier items, in contrast, may have to be retrieved from long-term memory.

Serial-position effect The tendency to recall more accurately the first and last items in a series.

Primacy effect The tendency to recall the initial items in a series of items.

Recency effect The tendency to recall the last items in a series of items.

CHUNKING

Rapidly rehearsing 10 meaningless letters is not an easy task. With TBXLFNSTDK, there are 10 discrete elements, or **chunks**, of information that must be kept in short-term memory. When we encode THUNSTOFAM as three syllables, there are only three chunks to swallow at once—a memory task that is much easier on the digestion.

George Miller (1956) wryly noted that the average person is comfortable with digesting about seven integers at a time, the number of integers in a telephone number:

My problem is that I have been persecuted by an integer [the number *seven*]. For seven years this number has followed me around, has intruded in my most private data, and has assaulted me from the pages of our most public journals. . . . The persistence with which this number plagues me is far more than a random accident. There is . . . a design behind it, some pattern governing its appearances. Either there really is something unusual about the number or else I am suffering from delusions of persecution. (p. 81)

Question 13: Is seven a magic number, or did the phone company get lucky?

It may sound as if Miller was being paranoid or magical, but he was actually talking about research findings. Research shows that most people have little trouble recalling five chunks of information, as in a zip code. Some can remember nine, which is, for all but a few, an upper limit. So seven chunks, plus or minus one or two, is a “magic” number in the sense that the typical person can manage to remember that many chunks of information but not a great deal more.

So how, you ask, do we manage to include area codes in our recollections of telephone numbers, hence making them 10 digits long? The truth of the matter is that we usually don’t. We tend to recall the area code as a single chunk of information derived from our general knowledge of where a person lives. So we are more likely to remember (or “know”) the 10-digit numbers of acquaintances who reside in locales with area codes that we use frequently.

Businesses pay the phone company hefty premiums to obtain numbers with two or three zeroes or repeated digits—for example, 592-2000 or 277-3333. These numbers include fewer chunks of information and hence are easier to remember. Customer recollection of business phone numbers increases sales. One financial services company uses the toll-free number CALL-IRA, which reduces the task to two chunks of information that also happen to be meaningfully related (semantically coded) to the nature of the business. Similarly, a clinic that helps people quit smoking arranged for a telephone number that can be reached by dialing the letters NO SMOKE.

Return to the third challenge to memory presented earlier. Were you able to remember the six groups of letters? Would your task have been simpler if you had grouped them differently? How about moving the dashes forward by a letter so that they read GM-CBS-IBM-ATT-CIA-FBI? If we do this, we have the same list of letters, but we also have six chunks of information that can be coded semantically (according to what they mean). You may have also been able to generate the list by remembering a rule, such as “big corporations and government agencies.”

If we can recall seven or perhaps nine chunks of information, how do children remember the alphabet? The alphabet contains 26 discrete pieces of information. How do children learn to encode the letters of the alphabet, which are visual symbols, as spoken sounds? There is nothing about the shape of an A that suggests its sound. Nor does the visual stimulus B sound “B-ish.” Children learn to associate letters with their spoken names by **rote**. It is mechanical associative learning that takes time and repetition. If you think that learning the alphabet by rote is a simple task, try learning the Russian alphabet.

If you had recognized THUNSTOFAM as an acronym for the first two letters of each word in the phrase “THE UNited STates OF AMerica,” you would also have reduced the number of chunks of information that had to be recalled. You could have considered the phrase to be a single chunk of information. The rule that you must use the first two letters of each word of the phrase would be another chunk.

Reconsider the second challenge to memory presented earlier. You were asked to remember nine chunks of visual information. Perhaps you could have used the acoustic

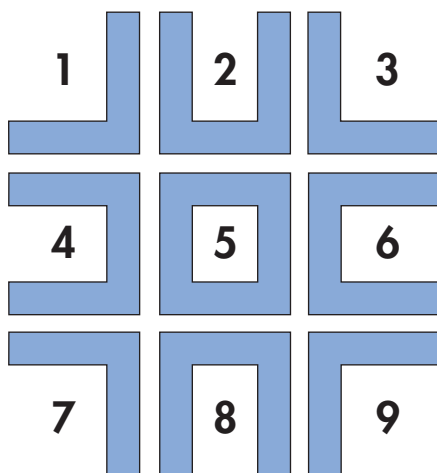


Figure 7.3 ■ A Familiar Grid The nine drawings in the second challenge to memory form this familiar tic-tac-toe grid when the numbers are placed inside them and they are arranged in order. This method for recalling the shapes collapses nine chunks of information into two. One is the tic-tac-toe grid. The second is the rule for decoding the drawings from the grid.

Chunk A stimulus or group of stimuli that is perceived as a discrete piece of information.

Rote Mechanical associative learning that is based on repetition.

codes “L” and “Square” for chunks 3 and 5, but no obvious codes are available for the seven other chunks. Now look at Figure 7.3 ■. If you had recognized that the elements in the challenge could be arranged as the familiar tic-tac-toe grid, remembering the nine elements might have required two chunks of information. The first would have been the mental image of the grid, and the second would have been the rule for decoding: Each element corresponds to the shape of a section of the grid if read like words on a page (from upper left to lower right). The number sequence 1 through 9 would not in itself present a problem because you learned this series by rote many years ago and have rehearsed it in countless calculations since then.

INTERFERENCE IN SHORT-TERM MEMORY

I mentioned that I often find myself running around looking for a pencil and a scrap of paper to write down a telephone number that has been given to me. If I keep on rehearsing the number while I’m looking, I’m okay. But I have also often cursed myself for failing to keep a pad and pencil by the telephone, and sometimes, this has interfered with my recollection of the number. (The moral of the story? Avoid self-reproach.) It has also happened that I have actually looked up a phone number and been about to dial it when someone has asked me for the time or where I said we were going to dinner. Unless I say, “Hold on a minute!” and manage to jot down the number on something, it’s back to the phone book. Attending to distracting information, even briefly, prevents me from rehearsing the number, so it falls through the cracks of my short-term memory.

In an experiment with college students, Lloyd and Margaret Peterson (1959) demonstrated how prevention of rehearsal can wreak havoc with short-term memory. They asked students to remember three-letter combinations such as QZD—normally, three easy chunks of information. They then had the students count backward from an arbitrary number, such as 182, by threes (that is, 182, 179, 176, 173, and so on). The students were told to stop counting and to report the letter sequence after the intervals of time shown in Figure 7.4 ■. The percentage of letter combinations that were recalled correctly fell precipitously within seconds. Counting backward for 18 seconds had dislodged the letter sequences in almost all of these bright students’ memories.

Psychologists say that the appearance of new information in short-term memory **displaces** the old information. Remember: Only a few bits of information can be retained in short-term memory at the same time. (Unfortunately, we cannot upgrade our human memories from, say, 128 megabytes to 512 or 1,024 megabytes.) Think of short-term memory as a shelf or workbench. Once it is full, some things fall off when new items are shoved on. Here we have another possible explanation for the recency effect: The most recently learned bit of information is least likely to be displaced by additional information.

Displacement occurs at cocktail parties, and I’m not referring to jostling by the crowd. The point is this: When you meet Linda or Latrell at the party, you should have little trouble remembering the name. But then you may meet Tamara or Timothy and, still later, Keith or LaToya. By that time, you may have a hard time dredging up Linda or Latrell’s name—unless, of course, you were very, very attracted to one of them. A passionate response would set a person apart and inspire a good deal of selective attention. According to signal-detection theory, if you were enamored enough, you might “detect” the person’s name (sensory signals) with a vengeance, and the other names would dissolve into background noise.

Long-Term Memory: Your Memory’s “Hard Drive”

Long-term memory is the third stage of information processing. Think of your long-term memory as a vast storehouse of information containing names, dates, places, what Johnny did to you in second grade, and what Susan said about you when you were 12.

Question 14: How does long-term memory function?

Some psychologists (Freud was one) believed that nearly all of our perceptions and ideas are stored permanently. We might not be able to retrieve all of them. Some memories might be “lost” because of lack of proper cues, or they might be kept unconscious by the forces of **repression** (which we’ll discuss in more detail in a bit). Adherents to this

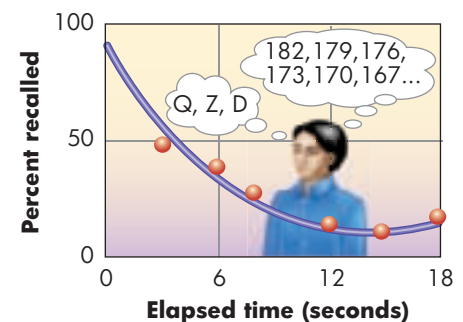


Figure 7.4 ■ The Effect of Interference on Short-Term Memory In this experiment, college students were asked to remember a series of three letters while they counted backward by threes. After just 3 seconds, retention was cut by half. The ability to recall the words was almost completely lost by 15 seconds.

Displace In memory theory, to cause information to be lost from short-term memory by adding new information.

Long-term memory The type or stage of memory capable of relatively permanent storage.

Repression In Freud’s psychodynamic theory, the ejection of anxiety-evoking ideas from conscious awareness.

view often pointed to the work of neurosurgeon Wilder Penfield (1969). When parts of the brains of Penfield’s patients were electrically stimulated, many reported the appearance of images that had something of the feel of memories.

Today, most psychologists view this notion as exaggerated. Memory researcher Elizabeth Loftus, for example, notes that the “memories” stimulated by Penfield’s probes lacked detail and were sometimes incorrect (e.g., Bernstein & Loftus, 2009). **Truth or Fiction Revisited:** Therefore, it has *not* been shown that all of our experiences are permanently imprinted on the brain. Now let’s consider some other questions about long-term memory.

HOW ACCURATE ARE LONG-TERM MEMORIES?

Psychologist Elizabeth Loftus notes that our memories are distorted by our biases and needs—by the ways we conceptualize our worlds. We represent much of our world in the form of **schemas**.

To understand what the term *schema* means, consider the problems of travelers who met Procrustes, the legendary highwayman of ancient Greece. Procrustes had a quirk. He was interested not only in travelers’ pocketbooks but also in their height. He had a concept—a schema—of how tall people should be, and when people did not fit his schema, they were in trouble. You see, Procrustes also had a bed, the famous “Procrustean bed.” He made his victims lie down in the bed, and if they were too short for it, he stretched them to make them fit. If they were too long for the bed, he practiced surgery on their legs.

Although the myth of Procrustes may sound absurd, it reflects a quirky truth about each of us. We all carry our cognitive Procrustean beds around with us—our unique ways of perceiving the world—and we try to make things and people fit them. Let me give you an example. “Retrieve” the fourth sheet of paper you prepared according to the Self-Assessment at the beginning of the chapter. You drew the figures “from memory” according to instructions on page 234. Now look at Figure 7.5 ■. Are your drawings closer in form to those in group 1 or to those in group 2? I wouldn’t be surprised if they were more like those in group 1—if, for example, your first drawing looked more like eyeglasses than a dumbbell. After all, they were labeled like the drawings in group 1. The labels serve as *schemas* for the drawings—ways of organizing your knowledge of them—and these schemas may have influenced your recollections. By the way, take out a penny and look at it. Did you pick the correct penny when you answered the challenges to memory?

Consider another example of the power of schemas in processing information. Loftus and Palmer (1974) showed people a film of a car crash and then asked them to fill out questionnaires that included a question about how fast the cars were going at the time. The language of the question varied in subtle ways, however. Some people

Schema A way of mentally representing the world, such as a belief or an expectation, that can influence perception of persons, objects, and situations.

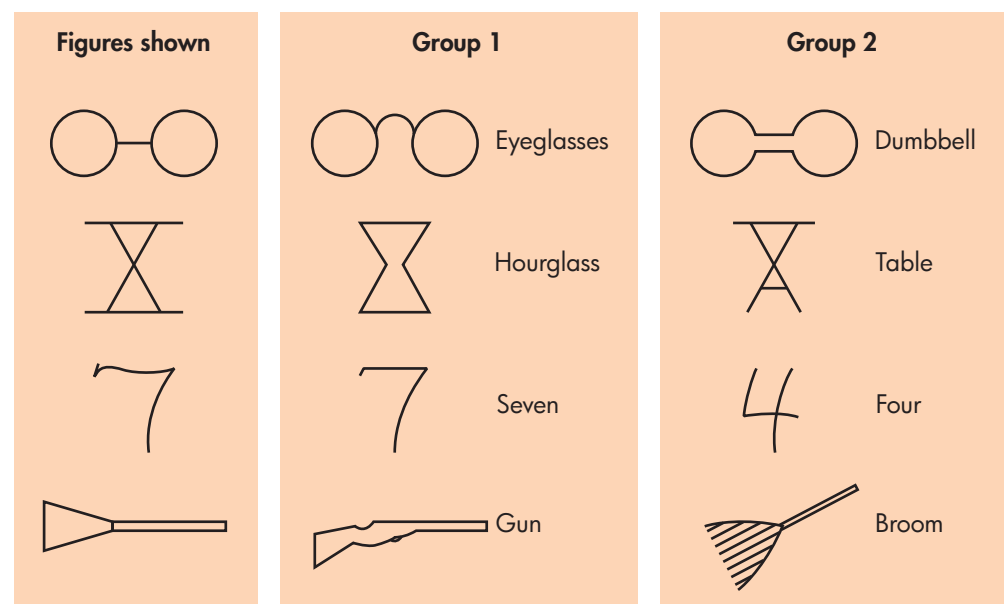


Figure 7.5 ■ Memory as Reconstructive In their classic experiment, Carmichael, Hogan, and Walter (1932) showed people the figures in the left-hand box and made remarks as suggested in the other boxes. For example, the experimenter might say, “This drawing looks like eyeglasses [or a dumbbell].” When people later reconstructed the drawings, they were influenced by the labels. What did your drawings look like?

were asked to estimate how fast the cars were going when they “hit” each other. Others were asked to estimate the cars’ speed when they “smashed into” each other. On average, people who reconstructed the scene on the basis of the cue “hit” estimated a speed of 34 mph. People who watched the same film but reconstructed the scene on the basis of the cue “smashed” estimated a speed of 41 mph! Hence, the use of the word *hit* or *smashed* caused people to organize their knowledge about the crash in different ways. That is, the words served as diverse schemas that fostered the development of very different ways of processing information about the crash.

Subjects in the same study were questioned again a week later: “Did you see any broken glass?” Because there was no broken glass shown in the film, an answer of “yes” would be wrong. Of those who had earlier been encouraged to process information about the accident in terms of one car “hitting” the other, 14% incorrectly answered yes. But 32% of the subjects who had processed information about the crash in terms of one car “smashing into” the other reported, incorrectly, that they had seen broken glass.

Another experiment reported by Elizabeth Loftus (1979) shows that people may reconstruct their experiences according to their prejudices. Subjects in the study were shown a picture that contained an African American man who was holding a hat and a European American man who was holding a razor. Later, when they were asked what they had seen, many subjects erroneously recalled the razor as being in the hands of the African American. The subjects recalled information that was consistent with their schemas, but it was wrong.

HOW MUCH INFORMATION CAN BE STORED IN LONG-TERM MEMORY?

How many terabytes of storage are there in your most personal computer—your brain? Unlike a computer, the human ability to store information is, for all practical purposes, unlimited (Voss, 2009; Y. Wang et al., 2009). Even the largest hard drives fill up quickly when we save web pages, pictures, or videos. Yet how many movies of the past have you saved in your own long-term memory? How many thousands of scenes and stories can you rerun at will? And assuming that you have an intact sensory system, the movies in your personal storage bins not only have color and sound but also aromas, tactile sensations, and much more. *Your long-term memory is a biochemical “hard drive” with no known limits on the terabytes of information it can store.*

Yes, new information may replace older information in short-term memory, but there is no evidence that long-term memories—those in “storage”—are lost by displacement. Long-term memories may endure for a lifetime. Now and then, it may seem that we have forgotten, or “lost,” a long-term memory such as the names of our elementary or high school classmates. Yet possibly, we cannot find the proper cues to help us retrieve them. It is like forgetting a file name when working with a computer. If long-term memories are lost, they may be lost in the same way that a misplaced object or computer file is lost. It is lost, but we sense that it is still somewhere in the room or on the hard drive. For example, you may drive by your elementary school and suddenly recall the long-lost names of elementary schoolteachers and of the streets in your old neighborhood.



How Fast Were These Cars Moving When They Collided? Our schemas influence our processing of information. When shown photos such as these, people who were asked how fast the cars were going when they *smashed* into each other offered higher estimates than people who were asked how fast they were going when they *hit* each other.

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Controversy in Psychology CAN WE TRUST EYEWITNESS TESTIMONY?

Jean Piaget, the investigator of children's cognitive development, distinctly remembered an attempt to kidnap him from his baby carriage as he was being wheeled along the Champs Élysées. He recalled the excited throng, the abrasions on the face of the nurse who rescued him, the police officer's white baton, and the flight of the assailant. Although they were graphic, Piaget's memories were false. Years later, the nurse admitted that she had made up the tale. Piaget had fallen victim to an example of what psychologists term the *misinformation effect*. The false information provided by his nurse became implanted in his own memory.

Can eyewitness testimony be trusted? Is there reason to believe that the statements of eyewitnesses are any more factual than Piaget's? Legal professionals and psychologists are concerned about the accuracy of our long-term memories as reflected in eyewitness testimony (Cutler, 2009; Cutler & Kovera, 2010; Wright & Loftus, 2008). Misidentifications of suspects "create a double horror: The wrong person is devastated by this personal tragedy, and the real criminal is still out on the streets" (Loftus, 1993, p. 550). Let's consider what can go wrong—and what can go right—with eyewitness testimony.

One problem with eyewitness testimony is that the words chosen by an experimenter—and those chosen by a lawyer interrogating a witness—have been shown to influence the reconstruction of memories (Cutler & Kovera, 2010). For example, as in the experiment described earlier, an attorney for the plaintiff might ask the witness, "How fast was the defendant's car going when it *smashed into* the plaintiff's car?" In such a case, the car might be reported as going faster than if the question had been: "How fast was the defendant's car going when the accident occurred?" (Loftus & Palmer, 1974). Could the attorney for the defendant claim that the use of the word *smashed* biased the witness? What about jurors who heard the word *smashed*? Would they be biased toward assuming that the driver had been reckless?

Children tend to be more suggestible witnesses than adults, and preschoolers are more suggestible than older children

(Ceci et al., 2007; Cutler & Kovera, 2010; Krähenbühl et al., 2009). But when questioned properly, even young children may provide accurate and useful testimony (Ceci et al., 2007; Krähenbühl et al., 2009).

There are cases in which the memories of eyewitnesses have been "refreshed" by hypnosis. Sad to say, hypnosis does more than amplify memories; it can also distort them (Lynn Matthews, & Barnes, 2008). One problem is that witnesses may accept and embellish suggestions made by the hypnotist. Another is that hypnotized people may report fantasized events as compellingly as if they were real (Lynn Matthews, & Barnes, 2008).

There are also problems in the identification of criminals by eyewitnesses. For one thing, witnesses may pay more attention to the suspect's clothing than to more meaningful characteristics such as facial features, height, and weight. In one experiment, viewers of a videotaped crime incorrectly identified a man as the criminal because he wore the eyeglasses and T-shirt that had been worn by the perpetrator on the tape. The man who had actually committed the crime was identified less often (Sanders, 1984).

Other problems with eyewitness testimony include the following (Cutler & Kovera, 2010):

- Identification is less accurate when suspects belong to ethnic or racial groups that differ from that of the witness.
- Identification of suspects is compromised when interrogators make misleading suggestions.



Eyewitness Testimony? How trustworthy is eyewitness testimony? Memories are reconstructive rather than photographic. The wording of questions also influences the content of the memory. Attorneys therefore are sometimes instructed not to phrase questions in such a way that they "lead" the witness.

- Witnesses are seen as more credible when they claim to be certain in their testimony, but there is little evidence that claims of certainty are accurate.

Thus, there are many problems with eyewitness testimony. Yet even Elizabeth Loftus (e.g., Wright & Loftus, 2008), who has extensively studied the accuracy of eyewitness testimony, agrees that it is a valuable tool in the courtroom. After all, identifications made by eyewitnesses are frequently correct, and what, Loftus asks, would be the alternative to the use of eyewitnesses? If we were to prevent eyewitnesses from testifying, how many criminals would go free?

TRANSFERRING INFORMATION FROM SHORT-TERM TO LONG-TERM MEMORY: USING THE "SAVE" FUNCTION

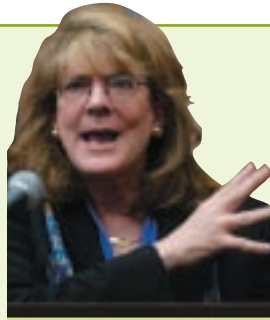
How can you transfer information from short-term to long-term memory? By and large, the more often chunks of information are rehearsed, the more likely they are to be transferred to long-term memory. As noted earlier, repeating information frequently to prevent it from decaying or being displaced is termed *maintenance rehearsal*. But

In Profile

Psychologist Elizabeth Loftus is much in the public eye. Her research on memory is so widely recognized that the April 2002 issue of *Review of General Psychology* ranked her as the first woman on the list of the top 100 psychologists of the 20th century. Loftus has also been embroiled in one controversy after another.

For three decades, Loftus has been demonstrating that memories are not snapshots but instead are changeable and susceptible to bias and suggestion. In her research with people in the laboratory, she has implanted “memories” of seeing barns in barren fields or of being lost in a mall as a child. After the implanting, the people painted in “recalled” details of the events that never happened.

The view of memory as porous and susceptible to distortion has become widely accepted. But Loftus then helped create what *Science News* and *Psychology Today* dubbed “memory wars” over the issue as to whether memories of traumatic childhood events could be repressed and then recovered in therapy in adulthood (see the discussion of repression on p. 249). Loftus argued that such memories can be implanted by therapists, which set her against the more “politically correct” view that such “recovered memories” are accurate. Loftus has provided expert testimony for the defense in more than 250 cases in which



ELIZABETH LOFTUS

parents have been accused of incest on the basis of such recovered memories.

Loftus’s research on the malleability of memory has also brought eyewitness testimony in general into question. She aided in the defense of people ranging from serial killer Ted Bundy, O. J. Simpson, and the Hillside Stranglers to the McMartin Preschool workers (who were accused of sexually abusing children in their care). Because expert witnesses are paid to testify, one prosecutor called Loftus a whore. Would the same epithet have occurred to him if the expert witness had been male?

One case she didn’t take was that of John Demjanjuk. A retired autoworker, Demjanjuk had been accused by survivors of Nazi concentration camps of being the sadistic Butcher of Treblinka, also referred to as Ivan the Terrible. The daughter of Jewish parents, Loftus struggled with her conscience about whether to testify in the Demjanjuk case. She declined. Later, when she was asked whether she personally believed that Demjanjuk was in fact Ivan the Terrible, Loftus replied, “Of course not” (A. Wilson, 2002).

This profile is largely based on Amy Wilson, “War & Remembrance,” *Orange County Register* (Sunday, November 3, 2002).



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Elizabeth Loftus.

maintenance rehearsal does not give meaning to information by linking it to past learning. Thus, it is not considered the best way to permanently store information (Callan & Schweighofer, 2009).

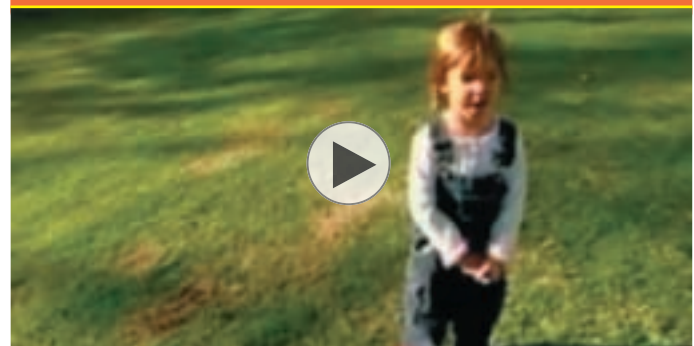
A more effective method is to make information more meaningful—to purposefully relate new information to things that are already well known (Craik & Lockhart, 2008). For example, to better remember the components of levers, physics students might use seesaws, wheelbarrows, and oars as examples. The nine chunks of information in our second challenge to memory were made easier to reconstruct once they were associated with the familiar tic-tac-toe grid in Figure 7.3. As noted earlier, relating new material to well-known material is known as *elaborative rehearsal*. For example, have you seen the following word before?

FUNTHOSTAM

Say it aloud. Do you know it? If you had used an acoustic code alone to memorize THUNSTOFAM, the list of letters you first saw on page 224, it might not have been easy to recognize FUNTHOSTAM as an incorrect spelling. Let’s assume, however, that by now you have used elaborative rehearsal and encoded THUNSTOFAM semantically (according to its “meaning”) as an acronym for “The United States of America.” Then you would have been able to scan the spelling of the words in the phrase “The United States of America” to determine that FUNTHOSTAM is an incorrect spelling.

Rote repetition of a meaningless group of syllables, such as *thun-sto-fam*, relies on maintenance rehearsal for permanent storage. The process might be tedious (continued rehearsal) and unreliable. Elaborative rehearsal—tying THUNSTOFAM to the name of a country—might make storage instantaneous and retrieval practically foolproof.

Video Connections—Reconstructive Memory



How might a false memory of being separated from your parents when you were a child be planted? View the video and learn why reconstructive memory is not like viewing a snapshot of an event.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

LEVELS OF PROCESSING INFORMATION

People who use elaborative rehearsal to remember things are *processing information at a deeper level* than people who use maintenance rehearsal. **Question 15: What is the levels-of-processing model of memory?** Fergus Craik and Robert Lockhart (2008) pioneered the *levels-of-processing model of memory*, which holds that memories tend to endure when information is processed *deeply*—attended to, encoded carefully, pondered, and related to things we already know. Remembering relies on how *deeply* people process information, not on whether memories are transferred from one *stage* of memory to another.

Evidence for the importance of levels of processing information is found in a classic experiment with three groups of college students, all of whom were asked to study a picture of a living room for 1 minute (Bransford et al., 1977). The groups' examination of the picture entailed different approaches. Two groups were informed that small x's were imbedded in the picture. The first of these groups was asked to find the x's by scanning the picture horizontally and vertically. The second group was informed that the x's could be found in the edges of the objects in the room and was asked to look for them there. The third group was asked, instead, to think about how members would use the objects pictured in the room. As a result of the divergent sets of instructions, the first two groups (the x hunters) processed information about the objects in the picture superficially. But the third group rehearsed the objects elaboratively; that is, members of this group thought about the objects in terms of their meanings and uses. It should not be surprising that the third group remembered many more objects than the first two groups.

In another classic experiment, researchers asked subjects to indicate whether they recognized photos of faces they had been shown under one of three conditions: (a) being asked to recall the gender of the person in the photo, (b) being asked to recall the width of the person's nose, or (c) being asked to judge whether the person is honest (Bloom & Mudd, 1991). Subjects asked to form judgments about the persons' honesty recognized more faces. Asking people to judge other people's honesty may stimulate deeper processing of the facial features. That is, subjects may study each face in detail to see if they can relate what they see to their ideas about human nature.

Language arts teachers encourage students to use new vocabulary words in sentences to process the words more deeply. Each new usage is an instance of elaborative rehearsal. Usage helps build semantic codes that make it easier to retrieve the meanings of words in the future. When I was in high school, teachers of foreign languages told us that learning classical languages “exercises the mind” so that we understand English better. Not exactly. The mind is not analogous to a muscle that responds to exercise. However, the meanings of many English words are based on foreign words. A person who recognizes that *retrieve* stems from roots meaning “again” (*re-*) and “find” (*trouver* in French) is less likely to forget that *retrieval* means “finding again” or “bringing back.”

Think, too, of all the algebra and geometry problems we were asked to solve in high school. Each problem is an application of a procedure and, perhaps, of certain formulas and theorems. By repeatedly applying the procedures, formulas, and theorems in different contexts, we rehearse them elaboratively (Callan & Schweighofer, 2009). As a consequence, we are more likely to remember them. Knowledge of the ways a formula or an equation is used helps us remember the formula. Also, by building one geometry theorem on another, we relate new theorems to ones that we already understand. As a result, we process information about them more deeply and remember them better.

There is also a good deal of biologically oriented research that connects deep processing with activity in certain parts of the brain, notably the prefrontal area of the cerebral cortex (Barbey & Barsalou, 2009; Luo & Craik, 2009). One reason that older adults show memory loss is that they tend not to process information quite as deeply as younger people do (Craik & Bialystok, 2006; Schneider-Garces et al., 2010). Deep processing requires sustained attention, and older adults, along with people who have suffered brain injuries and strokes, are apparently not capable of focusing their attention as well as they had previously (Willmott et al., 2009).

Before proceeding to the next section, go back three paragraphs and cover it with your hand. Which of the following words is spelled correctly: *retrieval* or *retreival*? The spellings sound alike, so an acoustic code for reconstructing the correct spelling would fail. Yet a semantic code, such as the spelling rule “i before e except after c,” would allow you to reconstruct the correct spelling: *retrieval*.

The attention which we lend to an experience is proportional to its vivid or interesting character; and it is a notorious fact that what interests us most vividly at the time is, other things equal, what we remember best. An impression may be so exciting emotionally as almost to leave a scar upon the cerebral tissues.

WILLIAM JAMES

FLASHBULB MEMORIES: “TO LEAVE A SCAR UPON THE CEREBRAL TISSUES”

Truth or Fiction Revisited: It is true that many of us will never forget where we were or what we were doing when we learned of the attacks on the World Trade Center and the Pentagon on September 11, 2001 (Jhangiani, 2010). Some of us will similarly recall where we were and what we were doing when we learned that John F. Kennedy Jr.’s airplane had crashed into the ocean in 1999—or that his father had been assassinated in 1963 (Holland & Kensinger, 2010). Others will recall the day in 1997 when Britain’s Princess Diana died in an automobile accident. We may also have a detailed memory of what we were doing when we learned of a loved one’s death.

Question 16: Why can some events, like the attack of September 11, 2001, be etched in memory for a lifetime? It appears that we tend to remember events that are surprising, important, and emotionally stirring more clearly. Such events can create **flashbulb memories**, which preserve experiences in detail (Hirst et al., 2009), even if those details are sometimes reconstructed, as is the case with other memories (Kvavilashvili et al., 2009). Why is the memory etched when the “flashbulb” goes off? One factor is the distinctness of the memory. It is easier to discriminate stimuli that stand out. Such events are striking in themselves. The feelings caused by them are also special. It is thus relatively easy to pick them out from the storehouse of memories. Major events such as the assassination of a president or the loss of a close relative also tend to have important effects on our lives. We are likely to dwell on them and form networks of associations. That is, we are likely to rehearse them elaboratively. Our rehearsal may include great expectations or deep fears for the future.

Biology is intimately connected with psychology. Strong feelings are connected with the secretion of stress hormones, and stress hormones help etch events into our memory—“as almost to leave a scar upon the cerebral tissues,” wrote William James.

ORGANIZATION IN LONG-TERM MEMORY

The storehouse of long-term memory is usually well organized. Items are not just piled on the floor or thrown into closets. **Question 17: How is knowledge organized in long-term memory?** We tend to gather information about rats and cats into a certain section of the storehouse, perhaps the animal or mammal section. We put information about oaks, maples, and eucalyptuses into the tree section. Such categorization of stimuli is a basic cognitive function. It allows us to make predictions about specific instances and to store information efficiently.

We tend to organize information according to a *hierarchical structure*, as shown in Figure 7.6 ■. A *hierarchy* is an arrangement of items (or chunks of information) into groups or classes according to common or distinct features. As we work our way up the hierarchy shown in Figure 7.6, we find more encompassing, or *superordinate*, classes to which the items below them belong. For example, all mammals are animals, but there are many types of animals other than mammals.

When items are correctly organized in long-term memory, you are more likely to recall—or know—accurate information about them. For instance, do you “remember” whether whales breathe underwater? If you did not know that whales are mammals (or in Figure 7.6, *subordinate* to mammals) or if you knew nothing about mammals, a correct answer might depend on some remote instance of rote learning. That is, you might be depending on chancy episodic memory rather than on reliable semantic memory. For example, you might recall some details from a TV documentary on whales. If you *did* know that whales are mammals, however, you would also know—or remember—that whales do not breathe underwater. Why? You would reconstruct information about whales from knowledge about mammals, the group to which whales are subordinate. Similarly, you would know, or remember, that because they are mammals, whales are warm-blooded, nurse their young, and are a good deal more intelligent than, say, tunas and sharks, which are fish. Had you incorrectly classified whales as fish, you might have searched your memory and constructed the incorrect answer that they do breathe underwater.



© AP Photo/Carmen Taylor

Flashbulb Memories Where were you and what were you doing on the morning of September 11, 2001? Many older Americans never forgot where they were and what they were doing when they learned about the attack on Pearl Harbor on December 7, 1941. Major events can illuminate everything that occurred so that we recall everything that was happening at the time.

Flashbulb memory A memory that is highly detailed and strongly emotionally elaborated because of its great and unusual significance.

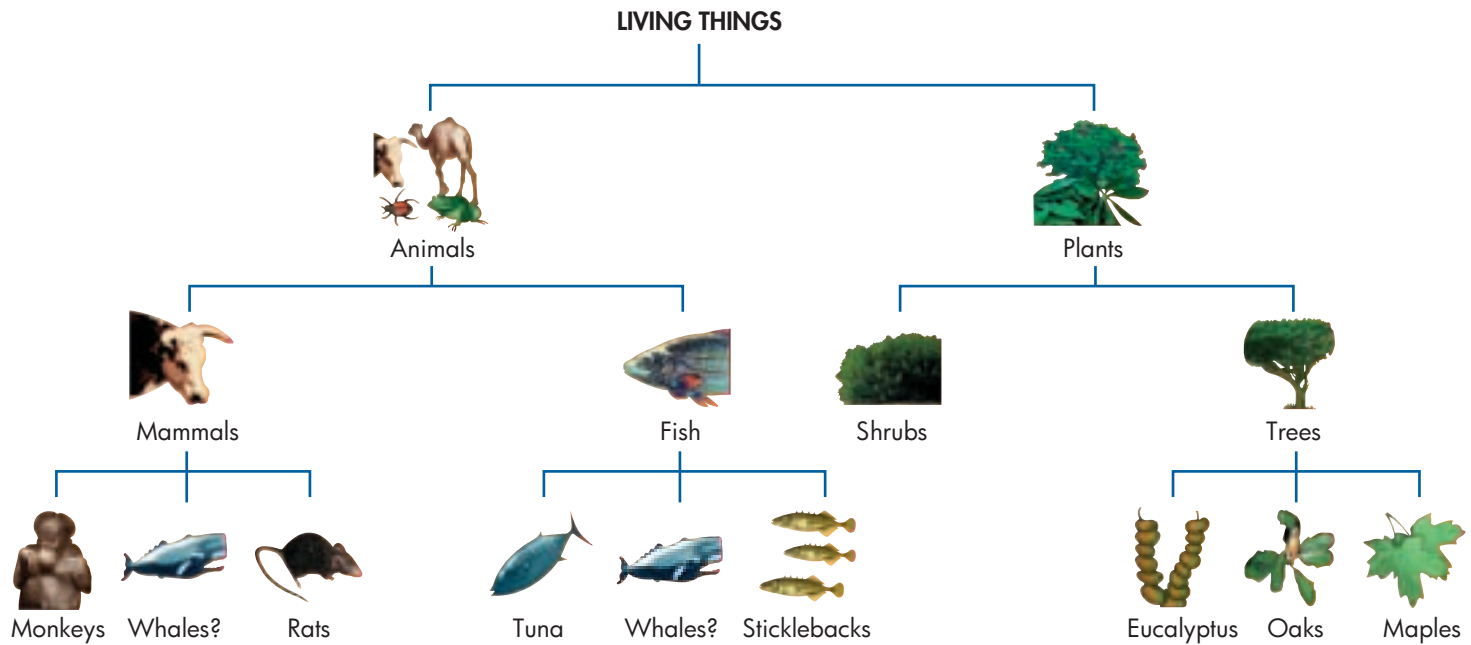


Figure 7.6 ■ The Hierarchical Structure of Long-Term Memory Where are whales filed in the hierarchical cabinets of your memory? Your classification of whales may influence your answers to these questions: Do whales breathe underwater? Are they warm-blooded? Do they nurse their young? A note to biological purists: This figure is not intended to represent phyla, classes, orders, and so on accurately. Rather, it shows how an individual's classification scheme might be organized.

Your memory is thus organized according to a remarkably complex filing system that has a certain internal logic. If you place a piece of information into the wrong file, it is probably not the fault of the filing system itself. Nevertheless, you may “lose” the information in the sense of not being able to find the best cues to retrieve it.

THE TIP-OF-THE-TONGUE PHENOMENON

Having something on the tip of your tongue can be a frustrating experience. It is like reeling in a fish but having it drop off the line just before it breaks the surface of the water. Psychologists term this experience the **tip-of-the-tongue (TOT) phenomenon**, also called the **feeling-of-knowing experience**. **Question 18: Why do we sometimes feel that the answer to a question is on the tip of our tongue?**

Research provides insight into the TOT phenomenon (R. Brown & McNeill, 1966; Galdo-Alvarez et al., 2009; B. L. Schwartz, 2008). In classic research, Brown and McNeill (1966) defined some rather unusual words for students, such as *sampan*, a small riverboat used in China and Japan. The students were then asked to recall the words they had learned. Some of the students often had the right word “on the tip of their tongue” but reported words with similar meanings such as *junk*, *barge*, or *houseboat*. Still other students reported words that sounded similar, such as *Saipan*, *Siam*, *sarong*, and *sanching*. Why?

To begin with, the words were unfamiliar, so elaborative rehearsal did not take place. The students did not have an opportunity to relate the words to other things they knew. Brown and McNeill also suggested that our storage systems are indexed according to cues that include both the sounds and the meanings of words—that is, according to both acoustic and semantic codes. By scanning words similar in sound and meaning to the word on the tip of the tongue, we sometimes find a useful cue and retrieve the word for which we are searching.

The feeling-of-knowing experience also seems to reflect incomplete or imperfect learning. In such cases, our answers may be “in the ballpark” if not on the mark. In some feeling-of-knowing experiments, people are often asked trivia questions. When they do not recall an answer, they are then asked to guess how likely it is that they will recognize the right answer if it is among a group of possibilities. People turn out to be very accurate in their estimations about whether or not they will recognize the answer. Similarly, Brown and McNeill found that the students in their TOT experiment proved

Tip-of-the-tongue (TOT)

phenomenon The feeling that information is stored in memory although it cannot be readily retrieved; also called the *feeling-of-knowing experience*.

Feeling-of-knowing experience Same as *tip-of-the-tongue phenomenon*.

to be very good at estimating the number of syllables in words they could not recall. The students often correctly guessed the initial sounds of the words. They occasionally recognized words that rhymed with them.

Sometimes, an answer seems to be on the tip of our tongue because our learning of the topic is incomplete. We may not know the exact answer, but we know something. (As a matter of fact, if we have good writing skills, we may present our incomplete knowledge so forcefully that we earn a good grade on an essay question on the topic!) At such times, the problem lies not in retrieval but in the original processes of learning and memory—that is, encoding and storage.

CONTEXT-DEPENDENT MEMORY: BEEN THERE, DONE THAT?

The context in which we acquire information can also play a role in retrieval. I remember walking down the halls of the apartment building where I had lived as a child. Cooking odors triggered a sudden assault of images of playing under the staircase, of falling against a radiator, of the shrill voice of a former neighbor calling for her child at dinnertime. Have you ever walked the halls of an old school building and been assaulted by memories of faces and names that you had thought would be lost forever? Odors, it turns out, are particularly likely to trigger related memories (D. J. Lee et al., 2009).

My experience was an example of a **context-dependent memory**. My memories were particularly clear in the context in which they were formed. **Question 19: Why may it be useful to study in the room in which we will be tested?** One answer is that being in the proper context—for example, studying in the exam room or under the same conditions, either in silence or with the stereo on—can dramatically enhance recall (Isarida & Isarida, 2006). **Truth or Fiction Revisited:** Therefore, if you study with the stereo on, you would probably do better to take the test with the stereo on. One classic experiment in context-dependent memory included a number of people who were “all wet.” Members of a university swimming club were asked to learn lists of words either while they were submerged or while they were literally high and dry (Godden & Baddeley, 1975). Students who learned the list underwater showed superior recall of the list when immersed. Similarly, those who had rehearsed the list ashore showed better retrieval on terra firma.

According to a study with 20 bilingual Cornell students, the “context” for memory extends to language (Marian & Neisser, 2000). The students emigrated from Russia at an average age of 14 and were an average of about 22 years old at the time of the experiment. They were asked to recall the details of experiences in Russia and the United States. When they were interviewed in Russian, they were better able to retrieve experiences from their lives in Russia. Similarly, when they were interviewed in English, they were better able to recall events that had happened in the United States.

When police are interviewing witnesses to crimes, they ask the witnesses to paint the scene verbally as vividly as possible, or they visit the scene of the crime with the witnesses. People who mentally place themselves in the context in which they encoded and stored information frequently retrieve it more accurately.

One of the eerier psychological experiences is *déjà vu* (French for “already seen”). Sometimes, we meet someone new or find ourselves in a strange place, yet we have the feeling that we know this person or have been there before (Kovacs et al., 2009). All in all, about 60% of us believe we have had a *déjà vu* experience (A. S. Brown, 2003). The *déjà vu* experience seems to occur when we are in a context similar to one we have been in before—or when we meet someone who has a way of talking or moving similar to that of someone we know or once knew. Yet we do not recall the specific place or person. Nevertheless, familiarity with the context leads us to think, “I’ve been here before.” Other explanations for the *déjà vu* experience run from the neurological (for example, a disruption in normal neural transmission) to the cognitive (for example, dual cognitive processes that are temporarily out of synchrony) (A. S. Brown, 2003). In any event, the sense that one has been there before, or done this before, can be so strong that one just stands back and wonders.

It’s *déjà vu* all over again.

YOGI BERRA



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Should This Student Bring the TV to Class to Take the Test?

Research on context-dependent memory suggests that we remember information better when we attempt to recall it in the context in which we learned it. If we study with the TV or stereo on, should we also take the test within the “context” of the TV or stereo?

Context-dependent memory Information that is better retrieved in the context in which it was encoded and stored, or learned.

I've learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel.

MAYA ANGELOU

STATE-DEPENDENT MEMORY

State-dependent memory is an extension of context-dependent memory. Sometimes, we retrieve information better when we are in a physiological or emotional state that is similar to the one in which we encoded and stored the information. Feeling the rush of love may trigger images of other times we fell in love. The grip of anger may prompt memories of incidents of frustration and rage. The research in this area even extends to states in which we are sober or inebriated!

Gordon Bower (Bower et al., 2007) ran experiments in which happy or sad moods were induced by hypnotic suggestion. The subjects then learned lists of words. People who learned a list while in a happy mood showed better recall when a happy state was induced again. But people who learned the list while in a sad mood showed superior recall when they were saddened again.

Studies of this kind are usually run with normal subjects. However, one study was carried out with people with bipolar disorder (also known as manic-depressive disorder). In this psychological disorder, moods swing from the heights of elation to the depths of depression and back with no apparent external cause. The researchers found that the participants in the study had better recall of events that occurred while they were “up” or “down” when they were again in the same mood (Eich et al., 1997).

Psychologists suggest that in day-to-day life, a happy mood influences us to focus on positive events (Koo & Oishi, 2009). As a result, we have better recall of these events in the future. A sad mood, unfortunately, leads us to focus on and recall the negative. Happiness may feed on happiness, but under extreme circumstances, sadness can develop into a vicious cycle and lead to depression.

LearningConnections • STAGES OF MEMORY: MAKING SENSE OF THE SHORT AND THE LONG OF IT

ACTIVE REVIEW (7) The Atkinson–Shiffrin model hypothesizes three stages of memory: _____, _____, and _____. (8) The mental representations of visual stimuli are referred to as _____. (9) _____ imagery is the ability to retain exact mental representations of visual stimuli over long amounts of time. (10) According to the _____-position effect, we are most likely to recall the first and last items in a series. (11) The Petersons showed that information can be displaced from short-term memory by means of _____. (12) Loftus and other psychologists have shown that we _____ our memories according to our schemas. (13) Detailed memories of surprising, important, and emotional events are termed _____ memories. (14) The _____-of-the-tongue phenomenon is most likely due to incomplete learning. (15) _____-dependent memory refers to information

that is better retrieved under the circumstances in which it was encoded and stored.

REFLECT AND RELATE Pause the next time you experience the tip-of-the-tongue phenomenon. Note the words or ideas that come to mind as you try to recall the information. What do they have in common? If you eventually recall the missing information, consider how the words and ideas that came to mind relate to it.

CRITICAL THINKING Were you ever convinced that you were remembering something accurately, only to discover later that your memory was incorrect? Can we know whether our own memories are accurate?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

State-dependent memory Information that is better retrieved in the physiological or emotional state in which it was encoded and stored, or learned.

Nonsense syllables Meaningless sets of two consonants, with a vowel sandwiched between, that are used to study memory.

FORGETTING: WILL YOU REMEMBER HOW WE FORGET?

What do DAL, RIK, BOF, and ZEX have in common? They are all **nonsense syllables**. Nonsense syllables are meaningless sets of two consonants with a vowel sandwiched between. They were first used by Hermann Ebbinghaus to study memory and forgetting (see the nearby In Profile feature on Hermann Ebbinghaus). Because nonsense syllables are intended to be meaningless, remembering them should depend on simple acoustic coding and maintenance rehearsal rather than on elaborative rehearsal, semantic

In Profile

Wilhelm Wundt claimed that higher mental functions such as memory could not be studied scientifically. Hermann Ebbinghaus (1850–1909) took Wundt's argument as a challenge, not as a statement of fact.

Ebbinghaus earned degrees in history and philosophy at the University of Bonn. Then he fought in the Franco-Prussian War. He spent the next 7 years in independent study, traveling and tutoring to earn his keep. He was deeply affected by Fechner's *Elements of Psychophysics*, which he picked up secondhand in a London bookshop. Fechner's book showed how it was possible to study sensation and perception scientifically. Ebbinghaus was convinced that he could accomplish the same thing for his own pet topic—memory.

While teaching at the University of Berlin, Ebbinghaus constructed some 2,300 nonsense syllables for use as tools in studying memory. He used himself as his main subject and read



HERMANN EBBINGHAUS

© Bettmann/Corbis

through lists of 12 to 16 nonsense syllables repeatedly until he had memorized them. Then he would test himself. He noted that his memory deteriorated as time passed. He would have to reread the lists to memorize them again, but the second time around it might take 14 minutes to memorize a list that had initially taken 21 minutes. There was thus a savings of one third. Ebbinghaus also discovered that he did most of his forgetting immediately after he learned a list. That is, there was a quick initial drop-off in his forgetting curve. Then the curve tapered off.

Ebbinghaus was so dedicated to his research that on one occasion he rehearsed 420 lists of 16 nonsense syllables 34 times each. His immense labors led to the commonly used concepts of savings and the forgetting curve and also demonstrated that it is possible to study memory scientifically.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Hermann Ebbinghaus.

coding, or other ways of making learning meaningful. They are thus well suited for use in the measurement of forgetting. **Question 20: What types of memory tasks are used in measuring forgetting?**

Memory Tasks Used in Measuring Forgetting

Three basic memory tasks have been used by psychologists to measure forgetting: recognition, recall, and relearning. Nonsense syllables have been used in studying each of them. The study of these memory tasks has led to several conclusions about the nature of forgetting.

RECOGNITION

One aspect of forgetting is failure to recognize something we have experienced. There are many ways of measuring **recognition**. In numerous studies, psychologists ask subjects to read a list of nonsense syllables. The subjects then read a second list of nonsense syllables and indicate whether they recognize any of the syllables as having appeared on the first list. Forgetting is defined as failure to recognize a syllable that has been read before.

In another kind of recognition study, Harry Bahrick and his colleagues (1975) studied high school graduates who had been out of school for various lengths of time. They interspersed photos of the graduates' classmates with four times as many photos of strangers. Recent graduates correctly recognized former classmates 90% of the time. Those who had been out of school for 40 years recognized former classmates 75% of the time. A chance level of recognition would have been only 20% (one photo in five was of an actual classmate). Thus, even older people showed rather solid long-term recognition ability.

Recognition is the easiest type of memory task. This is why multiple-choice tests are easier than fill-in-the-blank or essay tests. We can recognize correct answers more easily than we can recall them unaided.

RECALL

In his studies of **recall**, another kind of memory task, Ebbinghaus would read lists of nonsense syllables aloud to the beat of a metronome and then see how many he could produce from memory. After reading through a list once, he usually would be able to recall seven syllables—the typical limit for short-term memory.



© CW Image/Alamy

Recognition Versus Recall In going through a photo album or a yearbook, it is easier to recognize people from years past than it is to recall what one did with whom in a given year—or to recall people's names.

Recognition In information processing, the easiest memory task, involving identification of objects or events encountered before.

Recall Retrieval or reconstruction of learned material.



Figure 7.7 ■ Paired Associates

Psychologists often use paired associates to measure recall. Retrieving CEG in response to the cue WOM is made easier by an image of a WOMan smoking a “CEG-arette.”

Paired associates Nonsense syllables presented in pairs in experiments that measure recall.

Relearning A measure of retention. Material is usually relearned more quickly than it is learned initially.

Method of savings A measure of retention in which the difference between the number of repetitions originally required to learn a list and the number of repetitions required to relearn the list after a certain amount of time has elapsed is calculated.

Savings The difference between the number of repetitions originally required to learn a list and the number of repetitions required to relearn the list after a certain amount of time has elapsed.

Figure 7.8 ■ Ebbinghaus’s Classic Curve of Forgetting Recollection of lists of words drops by half during the first hour after learning. Losses of learning then become more gradual. It takes a month (31 days) for retention to be cut in half again.

Psychologists also often use lists of pairs of nonsense syllables, called **paired associates**, to measure recall. A list of paired associates is shown in Figure 7.7 ■. Subjects read through the lists pair by pair. Later, they are shown the first member of each pair and asked to recall the second. Recall is more difficult than recognition. In a recognition task, one simply indicates whether an item has been seen before or which of a number of items is paired with a stimulus (as in a multiple-choice test). In a recall task, the person must retrieve a syllable with another syllable serving as a cue.

Retrieval is made easier if the two syllables can be meaningfully linked—that is, encoded semantically—even if the “meaning” is stretched a bit. Consider the first pair of nonsense syllables in Figure 7.7. The image of a WOMan smoking a CEG-arette may make CEG easier to retrieve when the person is presented with the cue WOM.

It is easier to recall vocabulary words from foreign languages if you can construct a meaningful link between the foreign and English words (Atkinson, 1975). The *peso*, pronounced *pay-so*, is a unit of Mexican money. A link can be formed by finding a part of the foreign word, such as the *pe-* (pronounced *pay*), and constructing a phrase such as “You pay with money.” When you read or hear the word *peso* in the future, you recognize the *pe-* and retrieve the link or phrase. From the phrase, you then reconstruct the translation, “a unit of money.”

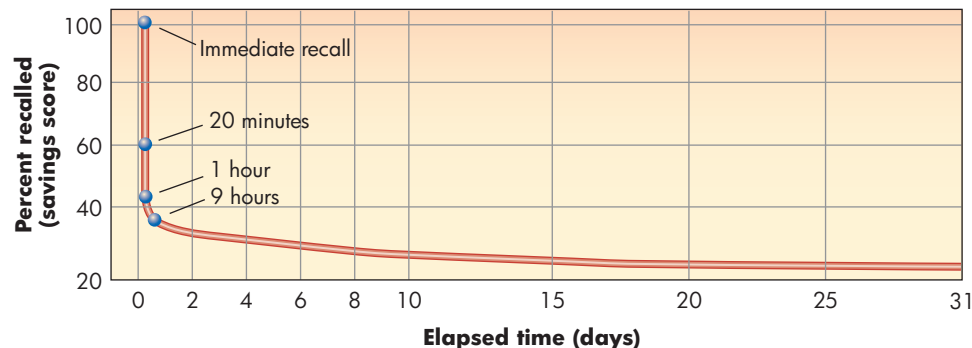
RELEARNING: IS LEARNING EASIER THE SECOND TIME AROUND?

Relearning is a third method of measuring retention. Do you remember having to learn all of the state capitals in grade school? What are the capitals of Wyoming and Delaware? Even when we cannot recall or recognize material that had once been learned, such as Cheyenne for Wyoming and Dover for Delaware, we can relearn it more rapidly the second time. Similarly, as we go through our 30s and 40s, we may forget a good deal of our high school French or geometry. Yet the second time around, we could learn what previously took months or years much more rapidly.

To study the efficiency of relearning, Ebbinghaus (1885/1913) devised the **method of savings**. First he recorded the number of repetitions required to learn a list of nonsense syllables or words. Then he recorded the number of repetitions required to relearn the list after a certain amount of time had elapsed. Next he computed the difference in the number of repetitions to determine the **savings**. If a list had to be repeated 20 times before it was learned and 20 times again after a year had passed, there were no savings. Relearning, that is, was as tedious as the initial learning. However, if the list could be learned with only 10 repetitions after a year had elapsed, half the number of repetitions required for learning had been saved.

Figure 7.8 ■ shows Ebbinghaus’s classic curve of forgetting. As you can see, there was no loss of memory as measured by savings immediately after a list had been learned. However, recollection dropped quite a bit, by half, during the first hour after learning a list. Losses of learning then became more gradual. It took a month (31 days) for retention to be cut in half again. In other words, forgetting occurred most rapidly right after material was learned. We continue to forget material as time elapses but at a slower pace.

Before leaving this section, I have one question for you: What are the capitals of Wyoming and Delaware?



Interference Theory

When we do not attend to, encode, and rehearse sensory input, we may forget it through decay of the trace of the image. Material in short-term memory, like material in sensory memory, can be lost through decay. It can also be lost through displacement, as may happen when we try to remember several new names at a party.

Question 21: Why can learning Spanish make it harder to remember French?

The answer may be found in **interference theory**. According to this view, we also forget material in short-term and long-term memory because newly learned material interferes with it. The two basic types of interference are retroactive interference (also called *retroactive inhibition*) and proactive interference (also called *proactive inhibition*).



© Image Source/Getty Images

RETROACTIVE INTERFERENCE

In **retroactive interference**, new learning interferes with the retrieval of old learning. For example, a medical student may memorize the names of the bones in the leg through rote repetition. Later, he or she may find that learning the names of the bones in the arm makes it more difficult to retrieve the names of the leg bones, especially if the names are similar in sound or in relative location on each limb.

PROACTIVE INTERFERENCE

In **proactive interference**, older learning interferes with the capacity to retrieve more recently learned material. High school Spanish may pop in when you are trying to retrieve college French or Italian words. All three are Romance languages with similar roots and spellings. Previously learned Japanese words probably would not interfere with your ability to retrieve more recently learned French or Italian because the roots and sounds of Japanese differ considerably from those of the Romance languages. **Truth or Fiction Revisited:** It is therefore true that learning Spanish can make it harder to remember French—and vice versa.

Consider motor skills. You may learn to drive a standard shift on a car with three forward speeds and a clutch that must be let up slowly after shifting. Later, you may learn to drive a car with five forward speeds and a clutch that must be released rapidly. For a while, you may make errors on the five-speed car because of proactive interference. (Old learning interferes with new learning.) If you return to the three-speed car after driving the five-speed car has become natural, you may stall it a few times. This is because of retroactive interference. (New learning interferes with the old.)

Interference In retroactive interference, new learning interferes with the retrieval of old learning. In proactive interferences, older learning interferes with the capacity to retrieve more recently learned material. For example, high school French may “pop in” when you are trying to retrieve Spanish words learned in college.

Repression: Ejecting the Unwanted from Consciousness

According to Freud, we are motivated to forget painful memories and unacceptable ideas because they produce anxiety, guilt, and shame. **Question 22: What is the Freudian concept of repression?** Repression, according to Freud, is the automatic ejection of painful memories and unacceptable urges from conscious awareness. It is motivated by the desire to avoid facing painful memories and emotions. Psychoanalysts suggest that repression is at the heart of disorders such as **dissociative amnesia** (see Chapter 15). There is a current controversy in psychology as to whether repression (motivated forgetting) exists and, if it does, how it works. One interesting finding is that stress hormones—the kind we secrete when we experience extremes of anxiety, guilt, and shame—*heighten* memory formation (E. C. Clayton & Williams, 2000; McGaugh et al., 2002). But supporters of the concept of repression do not claim that repressed memories were ill-formed; they say, rather, that we do not focus on them.

Interference theory The view that we may forget stored material because other learning interferes with it.

Retroactive interference The interference of new learning with the ability to retrieve material learned previously.

Proactive interference The interference of old learning with the ability to retrieve material learned recently.

Dissociative amnesia Amnesia thought to stem from psychological conflict or trauma.

Controversy in Psychology DO PEOPLE REALLY RECOVER REPRESSED MEMORIES OF CHILDHOOD SEXUAL ABUSE, OR ARE THESE “MEMORIES” IMPLANTED BY INTERVIEWERS?

There is apparently little doubt that the memory of traumatic events can be repressed. But as we see in this section, there is also little doubt that many so-called recovered memories, particularly memories of childhood sexual abuse, are sometimes induced by a therapist.

A young woman in psychotherapy recovered the memory that at age 13 she was raped by her teacher, became pregnant, and underwent an abortion. No corroborating evidence for this event existed. In fact, the woman had not reached menarche until 15, so the pregnancy was medically impossible. Still, she filed criminal charges against the teacher, who had to spend his life savings to defend himself against the false accusation. Eventually, the court ruled that recovery of a repressed memory lacked sufficient scientific foundation to be admissible evidence.

There is apparently little question that the memory of traumatic events is sometimes repressed. For example, an otherwise law-abiding man who in a fit of rage committed a heinous crime might report it to police as if someone else had done it and make no attempt to escape or to defend himself when he is accused of the crime. Or a woman who was violently raped may afterward be unable to explain her bruises or shock until perhaps she returns to the crime scene.

But there is also little question that many so-called recovered memories, particularly those involving allegations of childhood sexual abuse by a parent or other close relative, teacher, or friend, are sometimes fictions induced by the concerted efforts of a therapist

who fosters a belief that becomes so deeply held it seems like a real memory. This *false memory syndrome* has resulted in many family tragedies: alienation of children from their parents, loss of jobs, ostracism, and divorces.

“We don’t know what percent of these recovered memories are real and what percent are pseudomemories,” said psychiatrist Harold Lief, who was one of the first to question these induced memories. “But we do know there are hundreds, maybe thousands of cases of pseudomemories and that many families have been destroyed by them. We also know that many therapists who track down these memories and focus on them fail to deal with the patient’s real problems.” Indeed, many adults who had in treatment recovered a memory of childhood sexual abuse and accused the supposed perpetrator later retracted the claim.

For example, Gail Macdonald, the author of *Making of an Illness*, had seen a social worker who used hypnosis and guided imagery to convince her that prior sexual abuse by her father was the cause of her current emotional problems. The social worker said she had dissociative identity disorder, a diagnosis he inflicted, she said, on “120 people in my little community.”

As a result of the false memory, Ms. Macdonald said she divorced herself from her family, suffered horrible nightmares, and wrote compulsively in journals about the abuses her father had supposedly committed. She lost so much weight she was described as corpselike. A psychiatrist said she had

developed “post-traumatic stress disorder as a direct result of therapy” and helped her realize that her recovered memory was false.

How can someone tell if a recovered memory is false? Serious questions should be raised when corroborating evidence is lacking, when the so-called memory occurs before a child is able to remember, and when details of the memory are preposterous (like a rape by aliens), said psychiatrist Paul McHugh. McHugh also questioned the reliability of methods typically used to elicit these “memories.” Among the most common are hypnosis and guided imagery, during which a therapist may introduce the notion that sexual abuse had occurred and ask the patient to try to remember the circumstances and who the perpetrator might have been. Sometimes, patients participate in a recovered memory group where other members pressure the newcomer to recall prior sexual abuse and even suggest how it may have occurred.

Psychologist Elizabeth Loftus (Loftus & Davis, 2006) cited numerous studies that demonstrated how easy it was to implant a false memory. By asking a series of leading questions and by having a supposed “witness” talk about the made-up experience, it is often possible to convince someone that the event actually happened. In one study, researchers easily convinced half the adult participants that they had been hospitalized in severe pain as children or that they had been lost in a shopping mall at age 5. Several people with these false memories provided detailed embellishments.

This is especially true for young children. In a study conducted by psychologist Stephen J. Ceci, preschool children were asked weekly about whether a fictitious event had ever happened to them. By the 10th week, more than half reported that it had happened and provided cogent details about it.

In one experiment, interviewers told the children: “Think real hard. Did you get your hand caught in a mousetrap and go to the hospital to get it off?” Ceci reported: “So compelling did the children’s narrative appear that we suspected that some of the children had come to truly believe they had experienced the fictitious events. Neither parents nor researchers were able to convince 27% of the children that the events never happened.”

Based on his research, Ceci concluded, “It is exceedingly, devilishly difficult for professionals to tell fact from fiction when a child has been repeatedly suggestively interviewed over a long period of time. They look and act the way children do when they are trying to be accurate and honest.”



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Recovered Memories People may see a therapist because of distress, the origins of which are not completely clear. Some people have apparently been encouraged in therapy to recover memories of traumatic experiences, often of childhood sexual abuse, that may never have happened.

There is much research on repression, often in the form of case studies in psychoanalytic journals (e.g., Eagle, 2000). Much has been made of case studies in which veterans have supposedly forgotten traumatic battlefield experiences, developed posttraumatic stress disorder (once called “battlefield neurosis”), and then “felt better” once they recalled and discussed the traumatic events. Critics argue that the evidence for such repression and recovery of memories is weak and that this kind of “memory” can be implanted by the suggestions of interviewers (Loftus & Davis, 2006; A. K. Thomas & Loftus, 2002; van de Wetering et al., 2002). The issue remains controversial, as we see next.

Infantile Amnesia: Why Can’t Johnny Remember?

Question 23: Can children remember events from the first couple years of life?

When he interviewed people about their early experiences, Freud discovered that they could not recall episodes that had happened prior to the age of 3 or so and that recall was cloudy through the age of 5. This phenomenon is referred to as **infantile amnesia**.

Infantile amnesia has little to do with the fact that the episodes occurred in the distant past. Middle-aged and older people have vivid memories from the ages of 6 and 10, yet the events happened many decades ago. But 18-year-olds show steep declines in memory when they try to recall episodes that occurred earlier than the age of 6, even though they happened fewer than 18 years earlier (Wetzler & Sweeney, 1986).

Freud believed that young children have aggressive impulses and perverse lusts toward their parents. He attributed infantile amnesia to repression of these impulses. However, the episodes lost to infantile amnesia are not weighted in the direction of such “primitive” impulses. In fact, infantile amnesia probably reflects the interaction of physiological and cognitive factors. For example, a structure of the limbic system (the **hippocampus**) that is involved in the storage of memories does not become mature until we are about 2 years old (Shrager et al., 2008; Wais et al., 2006). In addition, myelination of brain pathways is incomplete for the first few years, contributing to the inefficiency of information processing and memory formation.

There are also cognitive explanations for infantile amnesia (Piolino et al., 2009; Q. Wang, 2008):

- Infants are not particularly interested in remembering the past.
- Infants, in contrast to older children, tend not to weave episodes together into meaningful stories of their own lives. Information about specific episodes thus tends to be lost. Research shows that when parents reminisce about the past with children, infants memories are strengthened. (Of course, one could question the accuracy of some of these reminiscences.)
- Infants do not make reliable use of language to symbolize or classify events. Their ability to *encode* sensory input—that is, to apply the auditory and semantic codes that facilitate memory formation—is therefore limited. Yet research shows that young infants can recall events throughout the period when infantile amnesia is presumed to occur if they are now and then exposed to objects they played with or photos of events.

In sum, we are unlikely to remember episodes from the first 2 years of life unless we are reminded of them from time to time as we develop. Many of the early childhood memories that seem clear today are likely to be reconstructed, and they may hold many inaccuracies. They might also be memories of events that occurred later than the period to which we attribute them. Yet there is no evidence that such early memories are systematically repressed.

Adults also experience amnesia, although usually for biological reasons, as in the cases of anterograde and retrograde amnesia (Kikuchi et al., 2010).

Anterograde and Retrograde Amnesia

Question 24: Why do people frequently have trouble recalling being in accidents? In so-called **anterograde amnesia**, there are memory lapses for the period following a trauma such as a blow to the head, an electric shock, or an operation. In some cases, the trauma seems to interfere with all the processes of memory. The ability to pay attention, the encoding of sensory input, and rehearsal are all impaired. A number of investigators have linked

Infantile amnesia Inability to recall events that occurred prior to the age of 3 or so; also termed *childhood amnesia*.

Hippocampus A structure in the limbic system that plays an important role in the formation of new memories.

Anterograde amnesia Failure to remember events that occurred after physical trauma because of the effects of the trauma.

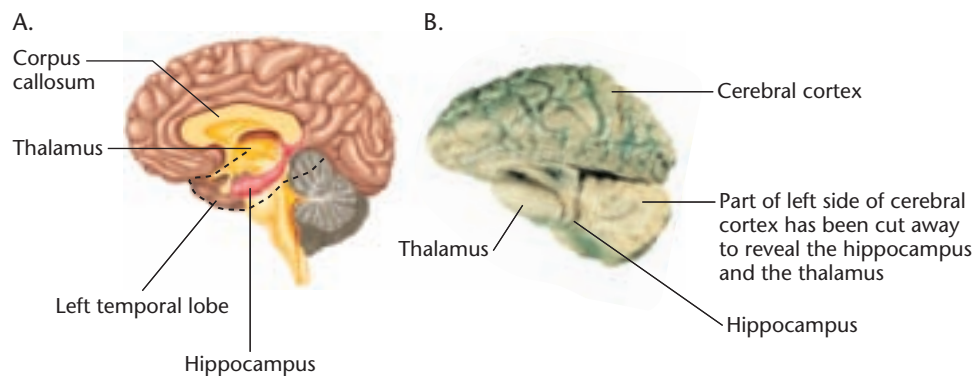


Figure 7.9 ■ The Hippocampus The hippocampus is essential to the formation of new memories. Part A shows the location of the hippocampus in the brain. In Part B, the upper part of the left side of the cerebral cortex has been cut away, revealing the hippocampus. The hippocampus loops over the thalamus, runs behind it, and then underneath it.

certain kinds of brain damage—such as damage to the hippocampus—to amnesia (Epp et al., 2008; Travis et al., 2010).

Consider the classic case of a man with the initials H. M. Parts of the brain are sometimes lesioned to help people with epilepsy. In H. M.'s case, a section of the hippocampus was removed (Squire, 2009). Right after the operation, H. M.'s mental functioning appeared normal. As time went on, however, it became clear that he had problems processing new information.

For example, 2 years after the operation, H. M. believed he was 27—his age at the time of the operation. When his family moved to a new address, H. M. could not find his new home or remember the new address. He responded with appropriate grief to the death of his uncle, yet he then began to ask about his uncle and why he did not visit. **Truth or Fiction Revisited:** It is true that a man could not form new memories after part of his hippocampus was surgically removed (see Figure 7.9 ■). Each time he was reminded of his uncle's passing, he grieved as if he were hearing it for the first time. H. M.'s operation apparently prevented him from transferring information from short-term to long-term memory.

In **retrograde amnesia**, the source of trauma prevents people from remembering events that took place before the accident (M. A. Wheeler & McMillan, 2001). A football player who is knocked unconscious or a person in an auto accident may be unable to recall events that occurred for several minutes prior to the trauma. The football player may not recall taking the field. The person in the accident may not recall entering the car. It also sometimes happens that the individual cannot remember events that occurred for several years prior to the trauma.

In one well-known case of retrograde amnesia, a man received a head injury in a motorcycle accident (Baddeley, 1982). When he regained consciousness, he had lost memory for all events that had occurred after the age of 11. In fact, he appeared to believe that he was still 11 years old. During the next few months, he gradually recovered more knowledge of his past. He moved toward the present year by year, up until the critical motorcycle ride. But he never did recover the events just prior to the accident. The accident had apparently prevented the information that was rapidly unfolding before him from being transferred to long-term memory. In terms of stages of memory, perhaps our perceptions and ideas need to consolidate, or rest undisturbed for a while, if they are to be transferred to long-term memory (Nader et al., 2000).

Retrograde amnesia Failure to remember events that occurred prior to physical trauma because of the effects of the trauma.

LearningConnections • FORGETTING: WILL YOU REMEMBER HOW WE FORGET?

ACTIVE REVIEW (16) Ebbinghaus originated the use of _____ syllables in the study of memory and forgetting. (17) According to Ebbinghaus's classic curve of forgetting, recollection drops (gradually or sharply?) during the first hour after learning a list. (18) In _____ interference, new learning interferes with the retrieval of old learning. (19) In _____ interference, older learning interferes with the capacity to retrieve more recently learned material. (20) Infantile amnesia probably reflects lack of language and immaturity of the brain structure called the _____. (21) In _____ amnesia, there are memory lapses for the period following a traumatic event. (22) In _____ amnesia, the source of trauma prevents people from remembering events that took place beforehand.

REFLECT AND RELATE Are multiple-choice test questions easier for you than fill-in-the-blanks? If so, why? Why does

this text use Active Reviews rather than multiple-choice items to help students master the material?

CRITICAL THINKING Critical thinkers avoid overgeneralizing. According to the concept of infantile amnesia, children remember little or nothing from the first 2 years of life. But is this view of children's memory an overgeneralization? Don't children remember (recognize) their caregivers? Don't they acquire and remember language? Don't they remember how to crawl and sit up and walk? To what kinds of memories, then, does the concept of infantile amnesia apply?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

THE BIOLOGY OF MEMORY: THE BRAIN AS A LIVING TIME MACHINE

Joel and Clementine didn't meet on Match.com. In fact, they are anything but well matched. In the film *Eternal Sunshine of the Spotless Mind*, Joel (Jim Carrey) is a sort of cautious, depressed male who runs into Clementine (Kate Winslet), a volatile and offbeat book clerk. Clementine divides her time between dyeing her hair blue and blood orange. When the relationship fails, Clementine is miserable. She visits a doctor who erases all memory of Joel from her mind—making it “spotless”—so that she will feel the warmth of the sun once more rather than the lonely dread of darkness. Joel is dumbfounded by Clementine's failure to recognize him. He learns of the process she underwent and decides to have Clementine erased from his mind as well.

The main part of the film follows the erasing process that takes place inside Joel's mind. One image of Clementine after another dissolves as the world around them dissolves as well. Erasure is possible because the doctor has “mapped” Joel's memories of Clementine. They are all interconnected, and he can follow their paths through the brain and sort of zap them.

Are memories in fact interconnected in the brain? Psychologists know that mental processes such as the encoding, storage, and retrieval of information—that is, memory—are accompanied by changes in the brain (Kandel, 2006). Early in the 20th century, many psychologists used the concept of the **engram** in their study of memory. Engrams were viewed as electrical circuits in the brain that corresponded to memory traces—neurological processes that paralleled experiences. Yet biological psychologists such as Karl Lashley (1950) spent many fruitless years searching for such circuits or the structures of the brain in which they might be housed. Much current research on the biology of memory focuses on the roles of stimulants, neurons, neurotransmitters, hormones, and structures in the brain.

Neural Activity and Memory: “Better Living Through Chemistry”

Question 25: What neural events are connected with memory? The story of Joel and Clementine is fictional but may hold a kernel of truth. Rats that are reared in stimulating environments provide some answers. The animals develop more dendrites and synapses in the cerebral cortex than rats reared in impoverished environments (Kolb et al., 2009). Moreover, visually stimulating rats increases the number of synapses in their visual cortex (Inaba et al., 2009). Therefore, the storage of experience does involve avenues of communication among brain cells.

Information received through other senses is just as likely to lead to corresponding changes in the cortical regions that represent them. For example, sounds may similarly cause changes in the auditory cortex. Experiences perceived by several senses are apparently stored in numerous parts of the cortex. The recall of sensory experiences evidently involves neural activity in related regions of the brain.

Research with sea snails such as *Aplysia* and *Hermisenda* offers more insight into the biology of memory. *Aplysia* has only some 20,000 neurons compared with

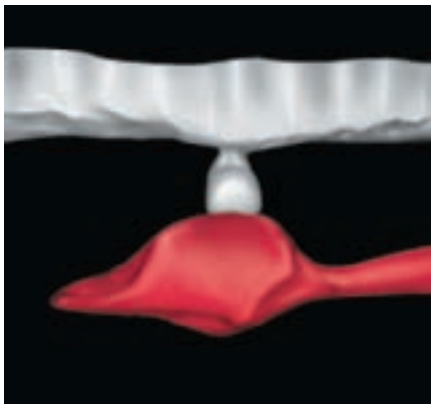


© Focus Films/Courtesy Everett Collection

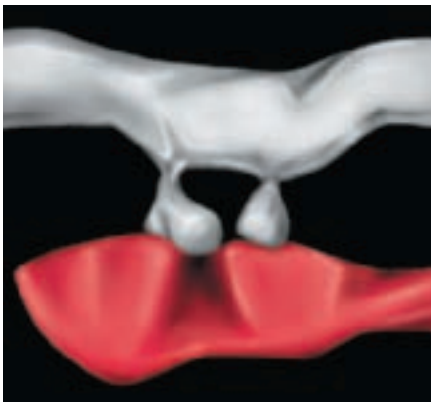
Would You Want to Erase Troublesome

Memories? Kate Winslet and Jim Carrey play a pair of mismatched lovers in *Eternal Sunshine of the Spotless Mind*. When the relationship doesn't work out, Winslet has memories of Carrey mapped that she erases from her brain. Carrey follows suit. Can memories be mapped? Can they be erased?

Engram An assumed electrical circuit in the brain that corresponded to a memory trace.



A.



B.

Figure 7.10 ■ One Avenue to Long-Term Potentiation (LTP) LTP can occur via the action of neurotransmitters such as serotonin and glutamate at synapses. Structurally, LTP can also occur as shown in Parts A and B, when dendrites sprout new branches that connect with transmitting axons, increasing the amount of stimulation they receive.

humans' *billions*. As a result, researchers have been able to study how experience is reflected at the synapses of specific neurons. The sea snail will reflexively withdraw its gills when it receives electric shock in the way a person will reflexively withdraw a hand from a hot stove or a thorn. In one kind of experiment, researchers precede the shock with a squirt of water. After a few repetitions, the sea snail becomes conditioned to withdraw its gills when squirted with the water. When sea snails are conditioned, they release more serotonin at certain synapses. As a consequence, transmission at these synapses becomes more efficient as trials (learning) progress (Mechner, 2009; Squire & Kandel, 2008). This greater efficiency is termed **long-term potentiation (LTP)**. As shown in Figure 7.10 ■, dendrites can also participate in LTP by sprouting new branches that attach to the transmitting axon. Rats that are given substances that enhance LTP learn mazes with fewer errors; that is, they are less likely to turn down the wrong alley (A. L. Adams et al., 2009; Uzakov et al., 2005).

Serotonin and many other naturally occurring chemical substances—including adrenaline, noradrenaline, acetylcholine, glutamate, antidiuretic hormone, and even the sex hormone estrogen—have been shown to play roles in memory:

- **Serotonin.** This neurotransmitter increases the efficiency of conditioning in sea snails (Rajasethupathy et al., 2009; Squire & Kandel, 2008). It is released when stimuli are paired repeatedly, increasing the efficiency of neural transmission (LTP) at certain synapses and creating neural circuits that contain the information.
- **Acetylcholine (ACh).** This neurotransmitter is vital in memory formation; low levels of ACh are connected with Alzheimer's disease. Increased levels of ACh promote conditioning in mice and rats (Gulledge et al., 2009; Valenzuela et al., 2010).
- **Glutamate.** Glutamate, like serotonin, increases the efficiency of conditioning. Agents that increase the action of glutamate promote conditioning in mice and chicks (T. A. Barber et al., 2010; Goddyn et al., 2008).
- **Adrenaline and noradrenaline (also called epinephrine and norepinephrine).** The hormone adrenaline and the related hormone and neurotransmitter noradrenaline both strengthen memory when they are released into the bloodstream following learning. Stressful events stimulate release of stress hormones from the adrenal glands—adrenaline and steroids—which, in turn, stimulate a structure in the limbic system (the amygdala) to release noradrenaline. The hormones and neurotransmitter, acting together, heighten memory for stressful events (Ferry & McGaugh, 2008).
- **Vasopressin.** Also known as *antidiuretic hormone*, vasopressin affects fluid retention. Like many other chemical substances in the body, it has multiple tasks, one of which is facilitating memory functioning, particularly working memory (Caldwell et al., 2008). **Truth or Fiction Revisited:** Sniffing vasopressin in the form of a nasal spray generally benefits memory functioning (Born et al., 2002).
- **Estrogen and testosterone.** The sex hormones estrogen and testosterone boost working memory in females and males, respectively (Shansky et al., 2009; Spritzer et al., 2008). Estrogen replacement may help older, postmenopausal women retain cognitive functioning.

Brain Structures and Memory

Question 26: What structures in the brain are connected with memory? There is no single storage cabinet in the brain. As suggested in *Eternal Sunshine of the Spotless Mind*, memory relies on complex neural networks that draw on various parts of the brain.

But some parts of the brain play more specific roles in memory. The hippocampus is vital for storing new information even if we can retrieve old information without it (Squire, 2009). But the hippocampus is not a storage bin. Rather, it is involved in relaying sensory information to parts of the cortex.

Where are the storage bins? The brain stores parts of memories in the appropriate areas of the sensory cortex. Sights are stored in the visual cortex, sounds in the auditory

Long-term potentiation (LTP)

Enhanced efficiency in synaptic transmission that follows brief, rapid stimulation.

cortex, and so on. The limbic system is largely responsible for integrating these pieces of information when we recall an event. However, the frontal lobes apparently store information about where and when events occur (Chafee & Goldman-Rakic, 2000; C. R. E. Wilson et al., 2008).

But what of the decision to try to recall something? What of the spark of consciousness that drives us to move backward in time or to strive to remember to do something in the future? The prefrontal cortex is the executive center in memory (Christ et al., 2009; M. E. Wheeler & Treisman, 2002). It appears to empower people with consciousness—the ability to mentally represent and become aware of experiences that occur in the past, present, and future. It enables people to mentally travel back in time to reexperience the personal, autobiographical past. It enables people to focus on the things they intend to do in the future, such as mail a letter on the way to class or brush their teeth before going to bed.

The hippocampus is also involved in the where and when of things (Eichenbaum & Fortin, 2003). The hippocampus does not become mature until we are about 2 years old. Immaturity may be connected with infantile amnesia. Adults with hippocampal damage may be able to form new procedural memories, even though they cannot form new episodic (“where and when”) memories. They can develop new skills even though they cannot recall the practice sessions (Squire & Kandel, 2008).

The thalamus (see Figure 7.9) is involved in the formation of verbal memories. Part of the thalamus of an Air Force cadet known as N. A. was damaged in a fencing accident. Afterward, N. A. could no longer form verbal memories, but he could form visual memories (Squire, 2004). (One might measure visual memory by showing people pictures, allowing time to pass, and then asking them to point out those they have been shown.)

The encoding, storage, and retrieval of information thus involve biological activity. As we learn, new synapses are developed, and changes occur at existing synapses. Parts of the brain are also involved in the formation of memories. In the next chapter, we see how people manipulate information they have stored to adapt to the environment or create new environments.

LearningConnections • THE BIOLOGY OF MEMORY: THE BRAIN AS A LIVING TIME MACHINE

ACTIVE REVIEW (23) Experience enhances the avenues of communication among brain cells by development of dendrites and _____. (24) Conditioning of sea snails causes more of the neurotransmitter _____ to be released at certain synapses, making transmission at these synapses more efficient. (25) The hippocampus appears vital to the storage of (new or old?) information. (26) The _____ seems to be involved in the formation of verbal memories.

REFLECT AND RELATE How would you design an experiment to explore whether a chemical had an effect on memory

functioning? How would you determine a safe dose of the chemical? How would you measure memory functioning? How might your research differ if you were using people or other animals?

CRITICAL THINKING This is a *psychology* course. Why do you think we discuss the *biology* of memory?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections USING THE PSYCHOLOGY OF MEMORY TO ENHANCE YOUR MEMORY

Humans have survived the Ice Age, the Stone Age, the Iron Age, and a bit more recently, the Industrial Revolution. Now we are trying to cope with the so-called Information Age and its explosion of information. Computers have been developed to process it. Humans, too, process information, and there is more of it to process than ever before. We can always add more memory to our computers, but how can people improve their memory? Fortunately, psychologists have helped devise methods for improving memory. Let's consider some of them.

Drill and Practice: “A, B, C, D...”

Repetition (rote maintenance rehearsal) helps transfer information from short-term to long-term memory. Does maintenance rehearsal seem too mechanical for you as a college student? If so, don't forget that this is how you learned the alphabet and how to count! Schoolchildren write spelling words over and over to remember them. Athletes repeat motions so that they will become an implicit memory. When you have memorized formulas, you can use your time to think about when to apply them during a test rather than use up valuable time trying to recall them.

Some students use flash cards to help them remember facts. For example, they might write “The originator of modern behaviorism is _____” on one side of the card and “John Broadus Watson” on the flip side.

In his book *Super Memory*, Douglas Herrmann (1991) recommends the following methods for remembering a person's name:

1. Say the name out loud.
2. Ask the person a question, using her or his name.
3. Use the person's name as many times as you can during your conversation.

4. Write down the name when the conversation has ended.

Relate New Information to What Is Already Known

Relating new information to what is already known is a form of elaborative rehearsal. You can better remember the name of a new acquaintance by thinking of a rhyme for it. Now you have done some thinking about the name, and you also have two tags for the person, not one. If you are trying to retrieve the spelling of the word *retrieve*, do so by retrieving the rule “i before e except after c.” There are exceptions, of course: Remember that *weird* doesn't follow the rule because it's a “weird” word.

We normally expand our knowledge base by relating new items to things already known. Children learn

that a cello is like a violin, only bigger. A bass fiddle is also like a violin, but bigger yet. We remember information about whales by relating whales to other mammals. Similarly, we are better able to recall information about porpoises and dolphins if we think of them as small whales (and not as big or smart fish).

The media are filled with stories about people who exhibit psychological disorders of one kind or another. To help remember the disorders discussed in Chapter 15, think of film or TV characters with those disorders. How were the characters' behaviors consistent (or inconsistent) with the descriptions in the text (and those offered by your professor)? You will remember the subject matter better *and* become a good critic of media portrayals of psychological problems if you use this technique.



Memory Tricks How do (many) waiters remember complicated orders without writing them down? What are the tricks of the trade?

Form Unusual, Exaggerated Associations

Psychologist Charles L. Brewer uses an interesting method to teach psychology students the fundamentals of shaping:

Dr. Brewer first danced on his desk, then bleated like a sheep and finally got down on “all fours and oinked like a pig,” he said. His antics were in response to a session he teaches on “successive approximation”—shaping behavior into a desired response.

To get students to “shape” him, he told them he would try to figure out what they wanted him to do. If he guessed wrong, they’d “boo and hiss,” while if he did what they wanted, they’d applaud him—which is why he eventually acted like a pig. “I’ll do anything to get them to learn,” he said. (DeAngelis, 1994a, p. 40)

It is easier to recall stimuli that stand out from the crowd. We pay more attention to them. Sometimes, therefore, we are better able to remember information when we create unusual, exaggerated associations.

Assume that you are trying to remember the geography of the cerebral cortex, as shown in Figure 3.13 on page 89. Why not think of what you look like in right profile? (Use your left profile if it is better.) Then imagine a new imaging technique in which we can see through your skull and find four brightly colored lobes in the right hemisphere of your cerebral cortex. Not only that, but there are little people (let’s call them “homunculi”) who are flapping about in the sensory and motor areas (see Figure 3.13 again). In fact, imagine that you’re in a crowded line and someone steps on your toe. As a result, the homunculus (a “homunculus” is a single member of the homunculi clan) in the sensory cortex has a throbbing toe. This is communicated to the association areas of the cortex, where you decide that you are annoyed.

The language areas of the cortex think up some choice words that are relayed to the throat and mouth of the homunculus in the motor cortex. Then they are sent into your throat and mouth. You also send some messages through the motor cortex that ready your muscles to attack.

Then you see that the perpetrator of the crime is a very attractive and apologetic stranger! What part of the occipital lobe is flashing the wonderful images?

Use the Method of Loci: Meat Loaf in the Pocket

Another way to form unusual associations is the *method of loci* (pronounced LOW-sigh). Select a series of related images such as the parts of your body or the furniture in your home. Then imagine an item from your shopping list, or another list you want to remember, as being attached to each image. Consider this meaty application: Remember your shopping list by imagining meat loaf in your jacket pocket and balancing a breakfast plate on your head.

By placing meat loaf or a favorite complete dinner in your pocket rather than a single item such as ground beef, you can combine several items into one chunk of information (see Figure 7.11 ■). At the supermarket, you recall the ingredients for meat loaf and consider whether you need each one. The breakfast plate can remind you whether you need juice, bread for toast, eggs, cereals, fruit for the cereals, coffee or tea, milk for the coffee or lemons for the tea, and so on.

Use Mediation: Build a Conceptual Bridge

The method of mediation also relies on forming associations: You link two items with a third one that ties them together. What if you are having difficulty remembering that John’s wife’s name is Tillie? You can mediate between John and Tillie as follows.



Figure 7.11 ■ The Method of Loci By imagining meat loaf in your jacket pocket, you can combine several items into a single chunk of information. Once at the supermarket, recall the ingredients for meat loaf and ask yourself which ones you need to buy.

Reflect that *john* is a slang term for bathroom. Bathrooms often have ceramic *tiles*. *Tiles*, of course, sounds like *Tillie*. So it goes: John → bathroom tiles → Tillie.

I used a combination of mediation and formation of unusual associations to help me remember foreign vocabulary words in high school. For example, the Spanish word *mujer* (pronounced moo-hair [almost]), means “woman” in English. Women have mo’ hair than I do. Woman → mo’ hair → *mujer*. This particular example would no longer work for me because now most men also have more hair than I, but the association was so outlandish that it stuck with me.

Use Mnemonic Devices: “Soak Her Toe”

Broadly speaking, methods for jogging memory can all be termed *mnemonics*, or systems for remembering information.

Table 7.1 ■ Mnemonic Devices

Mnemonic Device	Encoded Information
HOMES	The names of the Great Lakes: Huron, Ontario, Michigan, Erie, and Superior
No Plan Like Yours to Study History Wisely	The royal houses of England: Norman, Plantagenet, Lancaster, York, Tudor, Stuart, Hanover, and Windsor
X shall stand for playmates Ten. V for Five stalwart men. I for One, D for Five. M for a Thousand soldiers true. And L for Fifty, I'll tell you.	The value of the Roman numerals. "D for Five" means D = 500.
Mary Eats Peanut Butter.	The first four hydrocarbons of the alkane class: methane, ethane, propane, and butane, in ascending order of the number of carbon atoms in their chains
These Ten Valuable Amino acids Have Long Preserved Life In Man.	Ten vital amino acids: threonine, tryptophan, valine, arginine, histidine, lysine, phenylalanine, leucine, isoleucine, methionine
All Hairy Men Will Buy Razors.	Constituents of soil: air, humus, mineral salts, water, bacteria, rock particles
Soak Her Toe.	Translates into SOHCAHTOA, or: Sine = Opposite/Hypotenuse Cosine = Adjacent/Hypotenuse Tangent = Opposite/Adjacent
Krakatoa Positively Casts Off Fumes; Generally Sulfurous Vapors.	Biological classifications in descending order: kingdom, phylum, class, order, family, genus, species, variety
Never Lower Tillie's Pants; Mother Might Come Home.	The eight bones of the wrist: navicular, lunate, triangular, pisiform, multangular greater, multangular lesser, capitate, hamate
Roy G. Biv	The colors of the spectrum: red, orange, yellow, green, blue, indigo, violet
Lazy French Tarts Sit Naked In Anticipation.	The nerves that pass through the superior orbital fissure of the skull: lachrymal, frontal, trochlear, superior, nasal, inferior, abducent

But so-called *mnemonic devices* usually combine chunks of information into a format such as an acronym, jingle, or phrase. (By the way, the word *mnemonic* is derived from Mnemosyne, the Greek goddess of memory. Her name is pronounced *nee-MOS-uh-nee*. How can you remember the pronunciation? Why not think of the goddess getting down on her two knees [*nee-nee*] to worship? End of commercial for mnemonic devices.) For example, recalling the phrase "Every Good Boy Does Fine" has helped many people remember the lines in the musical staff: E, G, B, D, F. In Chapter 3, we saw that the acronym *SAME* serves as a mnemonic device for distinguishing between afferent

and efferent neurons. In Chapter 5, we noted that most psychology students use the acronym *Roy G. Biv* to remember the colors of the rainbow.

Acronyms have found applications in many disciplines. Consider geography. The acronym *HOMES* stands for the Great Lakes: *Huron, Ontario, Michigan, Erie, and Superior*. In astronomy, the phrase "*Mercury's very eager mother just served us nine potatoes*" helps students recall the order of the planets Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. What about biology? You can remember that Dromedary camels have one hump while Bactrian camels have two by turn-

ing the letters D and B on their sides. Table 7.1 ■ lists some of my favorite mnemonic devices.

And how can you math students ever be expected to remember the reciprocal of pi (that is, 1 divided by 3.14)? Simple: Just remember the question "Can I remember the reciprocal?" and count the number of letters in each word. The reciprocal of pi, it turns out, is 0.318310. (Remember the last two digits as 10, not as 1 and 0.)

Finally, how can you remember how to spell *mnemonics*? Easy—be willing to grant "aMNesty" to those who cannot.

Kinds of Memory: Pressing the “Rewind” and “Fast-Forward” Buttons

1. What is explicit memory?

An explicit memory contains specific information—information that can be clearly stated or declared. The information can be autobiographical or general.

2. What is episodic memory?

An episodic memory is a memory of a specific event that one has observed or participated in.

3. What is semantic memory?

Semantic memory is general knowledge, as in remembering that the United States has 50 states or that Shakespeare wrote *Hamlet*.

4. What is implicit memory?

Implicit or procedural memory means knowing how to do things like write with a pencil or ride a bicycle.

5. What is the difference between retrospective memory and prospective memory?

A retrospective memory concerns events in the past that can be explicit or implicit. A prospective memory involves remembering to do things in the future. Prospective memory is affected by factors such as distraction, mood, and age.

Processes of Memory: Processing Information in Our Most Personal Computers

6. What is the role of encoding in memory?

Encoding information means transforming it so that we can place it in memory. We commonly use visual, auditory, and semantic codes to convert physical and chemical stimulation into psychological formats that can be remembered.

7. What is the role of storage in memory?

Storage means the maintenance of information over time. The main methods of storing information are maintenance rehearsal (rote repetition) and elaborative rehearsal (relating it to things we already know).

8. What is the role of retrieval in memory?

Retrieval means locating stored information and bringing it back into consciousness. Retrieval requires the use of the proper cues (just as we need to know the file name to retrieve information stored on a hard drive). Memory is defined as the processes by which information is encoded, stored, and retrieved.

Stages of Memory: Making Sense of the Short and the Long of It

9. What is the Atkinson–Shiffrin model of memory?

Atkinson and Shiffrin propose that there are three stages of memory—sensory memory, short-term memory, and

long-term memory—and that the progress of information through these stages determines whether it is remembered and for how long.

10. How does sensory memory function?

Each sense is believed to have a sensory register that briefly holds the *memory traces* of stimuli in sensory memory. The traces then *decay*. Visual sensory memory makes discrete visual sensations—produced by saccadic eye movements—seem continuous. McDougall used the whole-report procedure to demonstrate that visual stimuli are maintained in sensory memory for only a fraction of a second. Sperling used the partial-report procedure to show that we can see more objects than we can report afterward. Icons are mental representations of visual stimuli. Some people, usually children, can maintain icons over long periods of time and are said to have eidetic imagery. Echoes are representations of auditory stimuli (sounds). Echoes can be held in sensory memory for several seconds.

11. How does short-term memory function?

Focusing on a stimulus allows us to maintain it in short-term memory—also called *working memory*—for a minute or so after the trace decays. Rehearsal allows us to maintain information indefinitely. The appearance of new information in short-term memory *displaces* the old information.

12. Why are we most likely to remember the first and last items in a list?

This phenomenon is referred to as the serial-position effect. We tend to remember the initial items in a list because they are rehearsed most often (the primacy effect). We tend to remember the final items in a list because they are least likely to have been displaced by new information (the recency effect).

13. Is seven a magic number, or did the phone company get lucky?

Seven may not be a magic number, but it seems that the typical person can remember about seven chunks of information (juggle that many pieces of information in short-term memory).

14. How does long-term memory function?

There is no known limit to the amount of information that can be stored in long-term memory, and memories can be stored for a lifetime. However, long-term memories have not been shown to be perfectly accurate. They are frequently biased because they are reconstructed according to our schemas—that is, our ways of mentally organizing our experiences. The memories of eyewitnesses can also be distorted by leading questions. Information is usually transferred from short-term to long-term memory by maintenance rehearsal (rote repetition) and elaborative rehearsal (relating information to things that are already known).

15. What is the levels-of-processing model of memory?

This model views memory in terms of a single dimension—not three stages. It is hypothesized that we encode, store, and retrieve information more efficiently when we have processed it more deeply.

16. Why can some events, like the attack of September 11, 2001, be etched in memory for a lifetime?

So-called *flashbulb memories*, as of the terrorist attack of September 11, 2001, or the death of a public figure like Princess Diana or JFK Jr., tend to occur within a web of unusual and emotionally arousing circumstances. We may elaborate them extensively—that is, relate them to many things.

17. How is knowledge organized in long-term memory?

We tend to organize information according to a hierarchical structure. That is, we classify or arrange chunks of information into groups or classes according to common features.

18. Why do we sometimes feel that the answer to a question is on the tip of our tongue?

Research suggests that the tip-of-the-tongue phenomenon often reflects incomplete learning.

19. Why may it be useful to study in the room in which we will be tested?

This is because memories are frequently dependent on the context in which they were formed. That is, context dependence refers to the finding that we often retrieve information more efficiently when we are in the same context as when we acquired it. State dependence refers to the finding that we often retrieve information better when we are in the same state of consciousness or mood as when we learned it.

Forgetting: Will You Remember How We Forget?

20. What types of memory tasks are used in measuring forgetting?

Nonsense syllables were developed by Ebbinghaus in the 19th century as a way of measuring the functions of memory. Retention is often tested through three types of memory tasks: recognition, recall, and relearning.

21. Why can learning Spanish make it harder to remember French?

This is an example of retroactive interference, in which new learning interferes with old learning. In proactive interference, on the other hand, old learning interferes with new learning. According to interference theory, people can

forget because learning can cause cues (such as English words) to be connected with the wrong information (perhaps a Spanish word when a French word is sought).

22. What is the Freudian concept of repression?

Repression refers to Freud's concept of motivated forgetting. Freud suggested that we are motivated to forget painful memories or unacceptable ideas. Research on the recovery of repressed memories is quite controversial.

23. Can children remember events from the first couple years of life?

Probably not. This phenomenon is referred to as infantile amnesia. Freud believed that infantile amnesia is due to repression, but modern psychologists believe that it reflects factors such as immaturity of the hippocampus and failure to use acoustic and semantic codes to help remember information.

24. Why do people frequently have trouble recalling being in accidents?

Physical trauma can interfere with memory formation. Two kinds of amnesia are caused by physical trauma. In anterograde amnesia, a traumatic event such as damage to the hippocampus prevents the formation of new memories. In retrograde amnesia, shock or other trauma prevents previously known information from being retrieved.

The Biology of Memory: The Brain as a Living Time Machine

25. What neural events are connected with memory?

Learning is apparently connected with the proliferation of dendrites and synapses in the brain. Learning and memory are also connected with the release of the neurotransmitters serotonin and acetylcholine and the hormones adrenaline and vasopressin.

26. What structures in the brain are connected with memory?

The hippocampus relays sensory information to the cortex and is therefore vital in the formation of new memories. Visual memories appear to be stored in the visual cortex, auditory memories in the auditory cortex, and so on. The thalamus is connected with the formation of visual memories.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of this feature.

KEY TERMS

Acoustic code (p. 230)	Interference theory (p. 249)	Retrieval cue (p. 231)
Anterograde amnesia (p. 251)	Long-term memory (p. 237)	Retroactive interference (p. 249)
Chunk (p. 236)	Long-term potentiation (LTP) (p. 254)	Retrograde amnesia (p. 252)
Context-dependent memory (p. 245)	Maintenance rehearsal (p. 230)	Retrospective memory (p. 226)
Displace (p. 237)	Memory (p. 231)	Rote (p. 236)
Dissociative amnesia (p. 249)	Memory trace (p. 232)	Saccadic eye movement (p. 232)
Echo (p. 234)	Metamemory (p. 230)	Savings (p. 248)
Echoic memory (p. 234)	Method of savings (p. 248)	Schema (p. 238)
Eidetic imagery (p. 233)	Misinformation effect (p. 240)	Semantic code (p. 230)
Elaborative rehearsal (p. 230)	Nonsense syllables (p. 246)	Semantic memory (p. 225)
Encoding (p. 230)	Paired associates (p. 248)	Sensory memory (p. 232)
Engram (p. 253)	Primacy effect (p. 235)	Sensory register (p. 232)
Episodic memory (p. 225)	Priming (p. 226)	Serial-position effect (p. 235)
Explicit memory (p. 225)	Proactive interference (p. 249)	Short-term memory (p. 234)
Feeling-of-knowing experience (p. 244)	Prospective memory (p. 226)	State-dependent memory (p. 246)
Flashbulb memory (p. 243)	Recall (p. 247)	Storage (p. 230)
Hippocampus (p. 251)	Recency effect (p. 235)	Tip-of-the-tongue (TOT) phenomenon (p. 244)
Icon (p. 233)	Recognition (p. 247)	Visual code (p. 230)
Iconic memory (p. 233)	Relearning (p. 248)	Working memory (p. 234)
Implicit memory (p. 225)	Repression (p. 237)	
Infantile amnesia (p. 251)	Retrieval (p. 230)	

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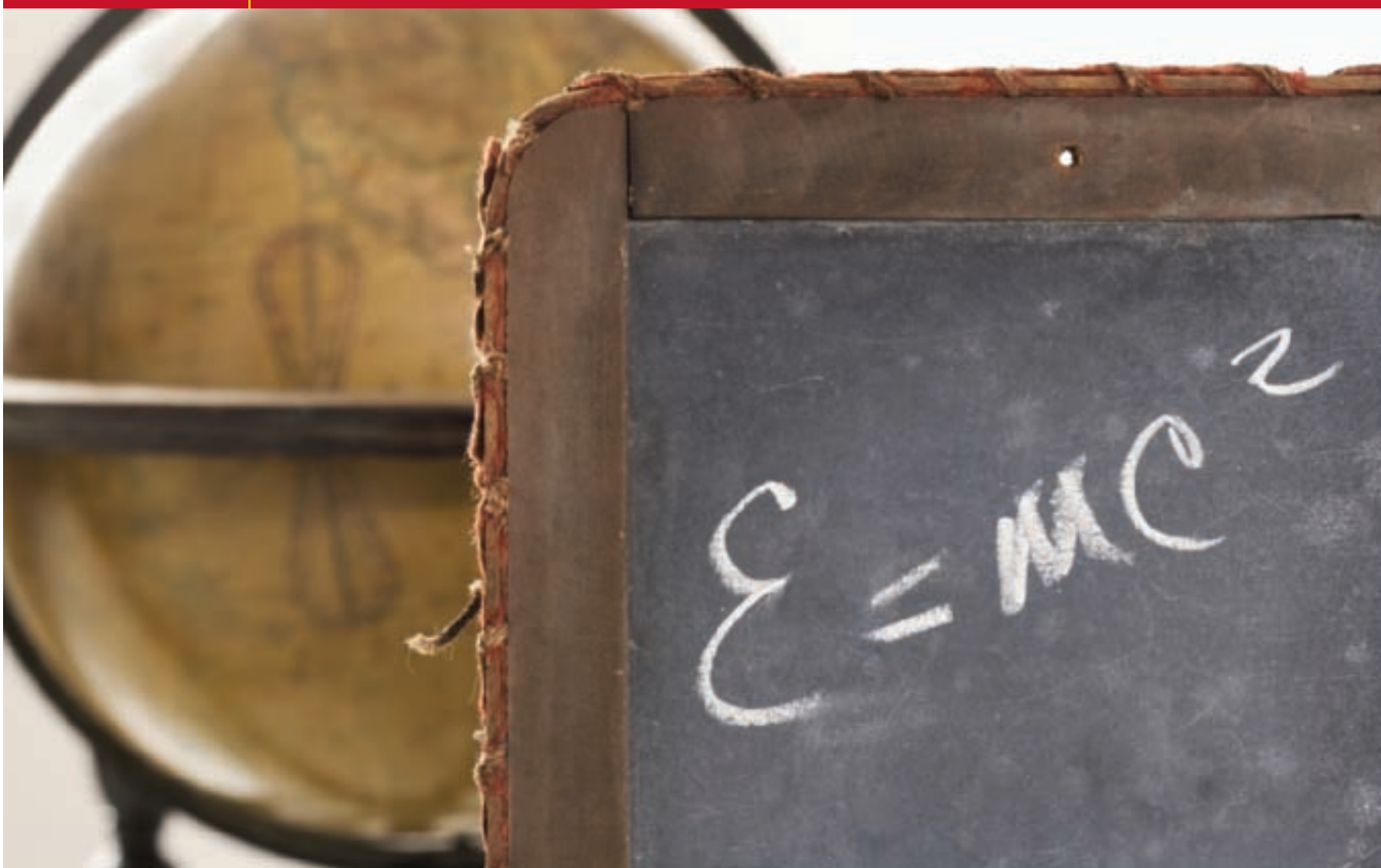


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8

Thinking, Language, and Intelligence



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MAJOR TOPICS

Thinking
Language
Intelligence

FEATURES

Self-Assessment: Puzzles, Problems, and Just Plain Fun
A Closer Look—Research: “Motherese”—Of “Yummy Yummy” and “Kitty Cats”
In Profile: Noam Chomsky
A Closer Look—Research: Emotional Intelligence and Social Intelligence
Concept Review: Theories of Intelligence
Self-Assessment: The Remote Associates Test
In Profile: Alfred Binet
In Profile: Claude Steele
Life Connections: Enhancing Intellectual Functioning

TRUTH OR FICTION?

- T F** Only humans can use insight to solve problems.
- T F** You are most likely to find the answer to a frustrating problem by continuing to plug away at it.
- T F** If a couple has five sons, the sixth child is likely to be a daughter.
- T F** People change their opinions when they are shown to be wrong.
- T F** Crying is a child's first use of language.
- T F** Young children say things like “Daddy goed away” and “Mommy sitted down” because they do understand rules of grammar.
- T F** “Street smarts” are a sign of intelligence.
- T F** Creative people are highly intelligent.
- T F** Highly intelligent people are creative.
- T F** Two children can answer exactly the same items on an intelligence test correctly, yet one child can be above average in IQ, and the other can be below average.
- T F** Intellectually gifted children tend to be physically and socially awkward.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

What form of life is so adaptive that it can survive in desert temperatures of 120°F or Arctic climes of -40°F? What form of life can run, walk, climb, swim, live underwater for months on end, and fly to the moon and back? I won't keep you in suspense any longer. We are that form of life. Yet our unclad bodies do not allow us to adapt to these extremes of temperature. Brute strength does not allow us to live underwater or travel to the moon. Rather, it is our cognitive processes of thinking, language, and intelligence that permit us to adapt to these conditions and to challenge our physical limitations.

Our cognitive processes are the key assets that have enabled humans to survive and prosper. Other species may be stronger, run faster, smell more keenly, even live longer, but only humans have produced literature, music, mathematics, and science. Our cognitive processes have made these achievements possible. In this chapter, we look at these three related areas of **cognition**: thinking, language, and intelligence.

THINKING

The Greek philosopher Aristotle pointed out that people differ from lower organisms in their capacity for rational thinking. Thinking enables us to build skyscrapers, create computers, and scan the interior of the body without surgery. Some people even manage to keep track of their children and balance their checkbooks.

Question 1: What is thinking? **Thinking** means attending to information, representing it mentally, reasoning about it, and making judgments and decisions about it. It refers to conscious, *planned* attempts to make sense of the world and change it. Mental processes such as dreaming and daydreaming may be unplanned and seem to proceed more or less on their own.

In this chapter, we explore thinking and the related topics of language and intelligence. Humans tend to use language not only in communicating but also in thinking. Intelligence provides the foundation for our capacity to think and solve problems. We begin with concepts, which provide many of the building blocks for thinking.



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Out for a Walk It is not our brawn that boosts us into outer space and enables us to withstand its cold and lack of oxygen. It is rather our capacities for thought and language—our intelligence—that makes possible those achievements that are particularly human.

Cognition Mental activity involved in understanding, processing, and communicating information.

Thinking Paying attention to information, mentally representing it, reasoning about it, and making decisions about it.

Words don't just point to things but are saturated with feelings, which can endow the words with a sense of magic, taboo, sin.

STEVEN PINKER

Concept A mental category that is used to class together objects, relations, events, abstractions, ideas, or qualities that have common properties.

Prototype A concept of a category of objects or events that serves as a good example of the category.

Words and Concepts, Concepts and Words

Circles, squares, and triangles are found only rarely in nature and not among the Himba of northern Namibia. It is not surprising, then, that they have no words for these concepts.

Concepts: Building Blocks of Thinking

Here's a riddle from my childhood: "What's black and white and read all over?" Because this riddle was spoken, not written, and involved the colors black and white, you would probably assume that "read" meant "red." Thus, in seeking an answer, you might scan your memory for an object that was red although it also somehow managed to be black and white. The answer to the riddle, "newspaper," was usually met with a groan.

The word *newspaper* is a concept. *Red*, *black*, and *white* are also concepts—color concepts. **Question 2: What are concepts?** Concepts are mental categories used to group together objects, relations, events, abstractions, ideas, or qualities that have common properties. Concepts are crucial to cognition. They can represent objects, events, and activities—and visions of things that never were or cannot be measured, such as Middle Earth in Tolkien's *Lord of the Rings* novels or the land of Oz in *The Wizard of Oz*.

Labels for objects depend on experience with them and on one's cultural setting (Slo-man et al., 2002). Concepts such as *square*, *circle*, and *triangle* are not all that common in nature, and some peoples who do not construct houses with these shapes, such as the Himba of northern Namibia, have no words for them (Davidoff et al., 2008; Roberson et al., 2002). But these concepts are basic to geometry. Much thinking has to do with categorizing new concepts and manipulating relationships among concepts, as in geometric proofs.

We tend to organize concepts in *hierarchies* (see Figure 8.1) ■. The newspaper category includes objects such as your school paper and the *Los Angeles Times*. Newspapers, college textbooks, novels, and merchandise catalogs can be combined into higher order categories such as *printed matter* or *printed devices that store information*. If you add iPods and DVDs, you can create a still higher category, *objects that store information*. Now consider a question that requires categorical thinking: How are a newspaper and a DVD alike? Answers to such questions entail supplying the category that includes both objects. In this case, we can say that both objects store information. Their functions are alike, even if their technology differs.

Prototypes are examples that best match the key features of categories (Machery, 2009). Which animal seems more birdlike to you: a robin or an ostrich? Why? Which better fits the prototype of a fish: a seahorse or a tuna? Why?



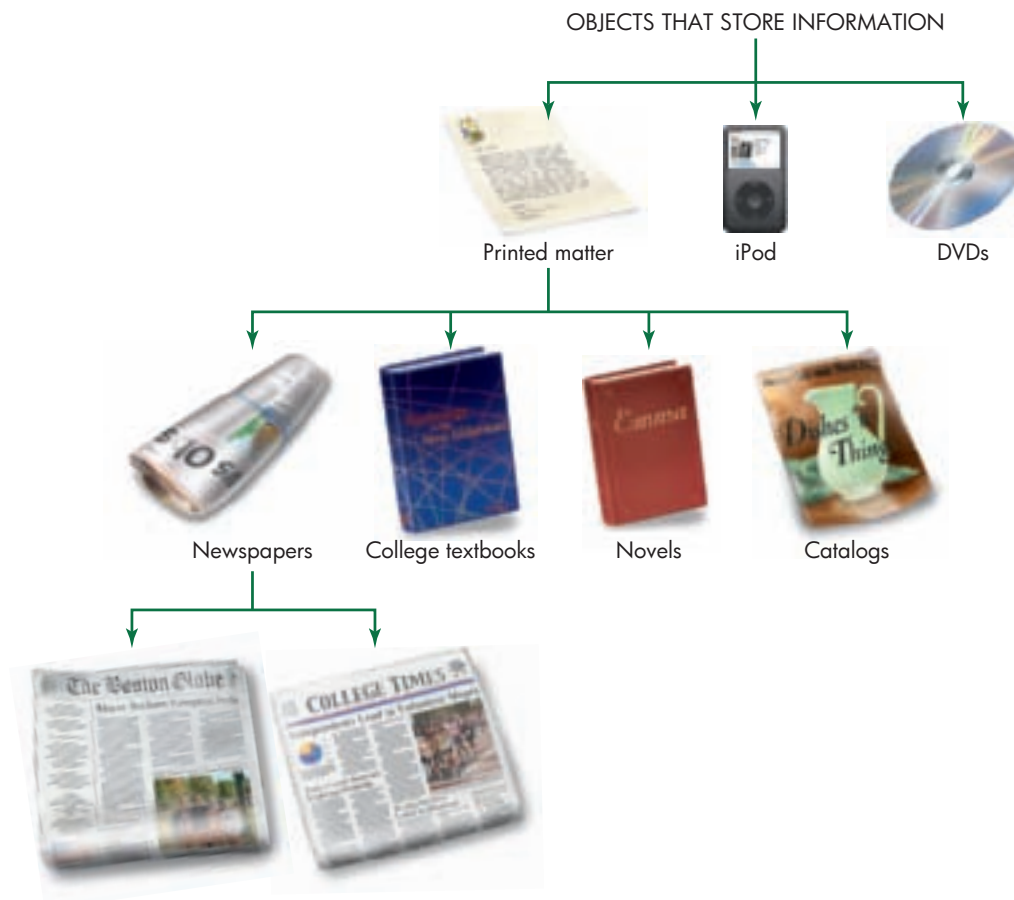


Figure 8.1 ■ Organization of Concepts into Hierarchies People may have a concept “objects that store information.” This concept may include concepts such as iPod, DVD, and printed matter. Within the concept of printed matter, people may include newspapers, college textbooks (certainly the most important object that stores information!), novels, and catalogs. The concept of newspaper may include one’s school newspaper and various commercial newspapers.

Many simple prototypes, such as *dog* and *red*, are taught by means of specific examples, or **exemplars**. Research suggests that it is more efficient for most of us to learn what *fruits* and *vegetables* are from experience with exemplars of each rather than by working from definitions of them (Freund, 2009; Voorspoels et al., 2008). We point to a dog and tell a child “dog” or “This is a dog.” Dogs are *positive instances* of the dog concept. We then show the child *negative instances*—things that are *not* dogs—and say, “This is *not* a dog.” Negative instances of one concept may be positive instances of another. So in teaching a child, we may be more likely to say, “This is not a dog—it’s a cat” than simply, “This is not a dog.”

Children may at first include horses and other four-legged animals within the dog concept until the differences between dogs and horses are pointed out. In language development, such overinclusion of instances in a category (reference to horses as dogs) is labeled *overextension*. Children’s prototypes become refined after they are shown positive and negative instances and given explanations. Abstract concepts such as *bachelor* or *square root* tend to be formed through explanations that involve more basic concepts.

Problem Solving: Getting from Here to There

Problem solving is an important aspect of thinking. Here’s a problem for you to solve. What are the next two letters in this series?

O T T F F S S E _ _ ?

How did you try to find the answer? Did you search your personal memory banks and ask yourself what *O* can stand for, then *T*, and so on? Did you try to think of some phrase the letters might represent? Perhaps the first letters of the stars in a constellation? (You can check the Appendix for the answer.)

This section is about the ways in which we solve problems, but first, I would like to share something personal with you. One of the pleasures I derived from my own introductory psychology course lay in showing friends the textbook and getting them

— ■ —
*I think and think for months
and years. Ninety-nine times the
conclusion is false. The hundredth
time I am right.*

ALBERT EINSTEIN
— ■ —

Exemplar A specific example.



A Goat or a Dog? Yes, you know the answer, but at first, young children may include goats, horses, and other four-legged animals within the dog concept. Later, they come to understand the differences between the animals.

I think; therefore I am.
(*Cogito ergo sum.*)

RENÉ DESCARTES

involved in the problems in the section on problem solving. First, of course, I struggled with them myself. Now it's your turn. Get some scrap paper, take a breath, and have a go at the problems in the nearby Self-Assessment. The answers will be discussed in the following pages, but don't peek. *Try* the problems first.

Question 3: What tools do people use to solve problems?

To answer this question, begin by considering the steps you used to try to solve parts a and b of problem 1 in the Self-Assessment. Did you first make sure you understood the problem by rereading the instructions? Or did you dive in as soon as you saw them on the page? Perhaps the solutions to 1a and 1b came easily, but I'm sure you studied 1c very carefully. Let's review what you may have been thinking when you attempted to solve these problems and how your cognitive processes might have led you to or away from solutions.

After you believed you understood what was required in each problem, you probably tried to discover the structure of the cycles in each series. Series 1a has repeated cycles of two letters: *AB, AB*, and so on. Series 1b may be seen as having four cycles of two consecutive letters: *AB, DE, BC*, and so on.

Again, did you solve 1a and 1b in a flash of insight, or did you try to find rules that govern each series? In series 1a, the rule is simply to repeat the cycle. Series 1b is more complicated, and different sets of rules can be used to describe it. One correct set of rules is that odd-numbered cycles (1 and 3, or *AB* and *BC*) simply repeat the last letter of the previous cycle (in this case *B*) and then advance by one letter in the alphabet. The same rule applies to even-numbered cycles (2 and 4, or *DE* and *EF*).

If you found rules for problems 1a and 1b, you used them to produce the next letters in the series: *AB* in series 1a and *CD* in series 1b. Perhaps you then evaluated the effectiveness of your rules by checking your answers against the solutions in the preceding paragraphs.

Now, the question is whether your solutions to problems 1a and 1b helped you to understand 1c or whether they interfered with your ability to solve 1c. Let's consider what psychologists mean by "understanding" a problem. Then let's see whether you applied an *algorithm* to solve 1a and 1b. As we read on, we'll also consider the roles of *heuristics*, *insight*, and *mental sets*, among other cognitive processes. You'll see that solving 1a and 1b might have made it more difficult rather than less difficult to solve 1c.

UNDERSTANDING THE PROBLEM

Let's begin our discussion of understanding problems by considering a bus driver problem my 9-year-old daughter Jordan asked me to solve. Because I believe in exposing students to the tortures I have endured, see what you can do with it:

You're driving a bus that's leaving from Pennsylvania. To start off with, there were 32 people on the bus. At the next bus stop, 11 people got off, and 9 people got on. At the next bus stop, 2 people got off, and 2 people got on. At the next bus stop, 12 people got on, and 16 people got off. At the next bus stop, 5 people got on, and 3 people got off. What color are the bus driver's eyes?

I was not about to be fooled when I was listening to this problem. Although it seemed that I should be tracking the number of people on the bus, I sensed there was a trick. Therefore, I told myself to remember that the bus was leaving from Pennsylvania. Being clever, I also kept track of the number of stops rather than the number of people getting on and off. When I was finally hit with the question about the bus driver's eyes, I was at a loss. I protested that Jordan had said nothing about the bus driver's eyes, but she insisted that she had given me enough information to answer the question.

One of the requirements of problem solving is attending to relevant information. To do that, you need some familiarity with the type of problem. I classified the bus driver

SELF ASSESSMENT

Puzzles, Problems, and Just Plain Fun

Are you ready for some mind benders? Following are a number of problems I came across in my own psychology courses. They were challenging and mostly enjoyable, except that I think I scratched my head a bit too hard over a couple of them. (The hair still hasn't grown back, although people unfamiliar with my past attribute it to male-pattern baldness.)

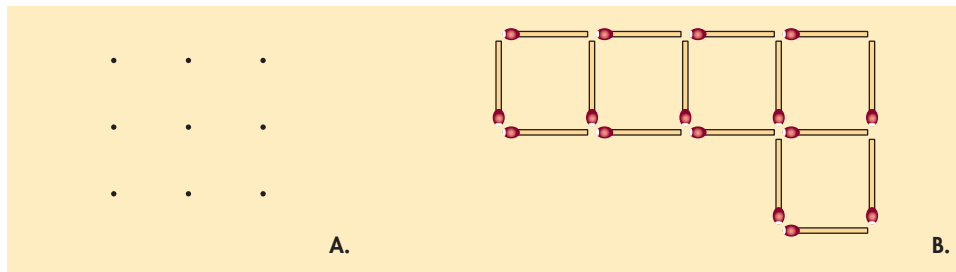
Have some fun with them. If the answer doesn't come immediately, why not stand back from the problem for a while

and see if the answer comes to you in a "flash of insight." (I confess that I was suffering from a deficiency of insight when I tried to solve them.)

You will find the answers to Problems 1a and 1b as you read along in the text. You will find the answers to the others, including 1c, on page A-2.

1. Provide the next two letters in the series for each of the following:
 - a. ABABABAB??
 - b. ABDEBCEF??
 - c. OTTFFSSE??
2. Draw straight lines through all the points in Part A of Figure 8.2 using only *four* lines. Do not lift your pencil from the paper or retrace your steps. (See the Appendix, p. A-2 for the answer.)
3. Move three matches in Part B of Figure 8.2 to make four squares of the same size. You must use *all* the matches. (See p. A-2 for the answer.)

Figure 8.2 ■ Two Problems Draw straight lines through all the points in part A using only four lines. Do not lift your pencil or retrace your steps. Move three matches in part B to make four squares equal in size. Use all the matches. See page A-2 for the answers.



4. You have three jars—A, B, and C—which hold the amounts of water, in ounces, shown in the following table. For each of the seven problems, use the jars in any way you wish to arrive at the indicated amount of water. Fill or empty any jar as often as you wish. How do you obtain the desired amount of water in each problem? (The solutions are discussed on p. 271.)

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How Do You Go about Understanding a Problem? This student is apparently seeking to boost her storehouse of background knowledge. Will doing so help her focus on the answer efficiently?

problem as a trick question and paid attention to silly details, but I wasn't remotely on target.

How about you? What color were the bus driver's eyes?

If we assume it is crucial to keep track of the number of people getting on and off the bus, we focus on information that turns out to be unessential. In fact, it distracts us from the key information.

When we are faced with a novel problem, how can we know which information is relevant and which is not? Background knowledge helps. If you are given a chemistry problem, it helps if you have taken courses in chemistry. If Jordan gives you a problem, it is helpful to expect the unexpected. (In case you still haven't gotten it, the critical information you need to solve the bus driver problem is provided in the first sentence.)

Successfully understanding a problem generally requires three features:

1. *The parts or elements of our mental representation of the problem relate to one another in a meaningful way.* If we are trying to solve a problem in geometry, our mental triangles, like actual triangles, should have angles that total 180 degrees.
2. *The elements of our mental representation of the problem correspond to the elements of the problem in the outer world.* If we are meeting a patient in the emergency room of a hospital, we want to arrive at a diagnosis of what might be wrong before we make a treatment plan. To do so, we take the patient's vital signs, including heart rate, temperature, and blood pressure, so that our mental picture of the patient conforms to what is going on in his or her body.
3. *We have a storehouse of background knowledge that we can apply to the problem.* We have the necessary experience or course work to solve the problem.

THE USE OF ALGORITHMS: FINDING THE RIGHT FORMULA

An **algorithm** is a specific procedure for solving a type of problem. An algorithm invariably leads to the solution—if it is used properly, that is. Mathematical formulas like the Pythagorean theorem are examples of algorithms. They yield correct answers to problems *as long as the right formula is used*. Finding the right formula to solve a problem may require scanning one's memory for all formulas that contain variables that represent one or more of the elements in the problem. The Pythagorean theorem concerns right triangles. Therefore, it is appropriate to consider using this formula for problems concerning right triangles but not others.

If you are going to be meeting someone for the first time and want to make a good impression, you consider the nature of the encounter (for example, a job interview or a blind date) and then consider how to dress and behave for the encounter. If it's a job interview, the algorithm may be to dress neatly, to be well groomed, and not to wear too much cologne or perfume. If it's a date, you may ditch the suit but hike up the cologne or perfume a notch. In either case, smile and make eye contact—it's all part of the formula.

Anagrams are words with scrambled letters. *Korc* is an anagram for *rock* or *cork*. The task in anagram problems is to try to reorganize jumbles or groups of letters into words. Some anagram problems require us to use every letter from the pool of letters; others allow us to use only some of the letters. How many words can you make from the pool of letters *DWARG*? If you were to use the **systematic random search** algorithm, you would list every possible letter combination, using from one to all five letters. You could use a dictionary or a spell-checking program to see whether each result is, in fact, a word. The method might take a while, but it would work.

Algorithm A systematic procedure for solving a problem that works invariably when it is correctly applied.

Systematic random search An algorithm for solving problems in which each possible solution is tested according to a particular set of rules.

Heuristics Rules of thumb that help us simplify and solve problems.

THE USE OF HEURISTIC DEVICES: IF IT WORKS, JUST DO IT?

Question 4: Is it best to use a tried-and-true formula to solve a problem? Sometimes, people use shortcuts to “jump to conclusions,” and these are often correct conclusions. The shortcuts are called **heuristics**, or heuristic devices—rules of thumb that help us simplify and solve problems and make decisions. Heuristics are often based on strategies that worked in the past for similar kinds of problems (Mair et al., 2009).

In contrast to algorithms, heuristics do not guarantee a correct solution. But when they work, they permit more rapid solutions. A heuristic device for solving the anagram problem would be to look for familiar letter combinations and then check the remaining letters for words that include these combinations. In *DWARG*, for example, we find some familiar combinations: *dr* and *gr*. We may then quickly find *draw*, *drag*, and *grad*. The drawback to this method is that we might miss some words.

One type of heuristic device is the **means–end analysis**. In using this heuristic device, we assess the difference between our current situation and our goals and do what we can to reduce this difference. Let’s say that you are in your car and have gotten lost. One heuristic device based on analysis of what you need to do to reach your destination might be to ask for directions. This approach requires no “sense of direction.” An algorithm might be more complicated and require some geographical knowledge. For example, let’s say that you know your destination is west of your current location and on the other side of the railroad tracks. You might therefore drive toward the setting sun (west) and, at the same time, watch for railroad tracks. If the road comes to an end and you must turn left or right, you can scan in both directions for tracks. If you don’t see any, turn right or left, but at the next major intersection, turn toward the setting sun. Eventually, you should get there. If not, you can ask for directions.

THE USE OF ANALOGIES: THIS IS JUST LIKE ...?

An *analogy* is a partial similarity among things that are different in other ways. The analogy heuristic applies the solution of an earlier problem to the solution of a new one. We use the analogy heuristic whenever we try to solve a new problem by referring to a previous problem (Mair et al., 2009; Y. Wang & Chiew, 2010). Consider the water jar problems on page 267. Problem 2 is analogous to problem 1. Therefore, the approach to solving problem 1 works with problem 2. (Later, we consider what happens when the analogy heuristic fails.)

Let’s see whether you can use the analogy heuristic to your advantage in the following number series problem: To solve letter problems 1a, 1b, and 1c of the Self-Assessment on page 267, you had to figure out the rules that govern the order of the letters. Scan the following series of numbers and find the rule that governs their order:

8, 5, 4, 9, 1, 7, 6, 3, 2, 0

This is rather abstract and mathematical. Actually, you use the analogy heuristic regularly. For example, when you begin a new term with a new instructor, you probably consider whom the instructor reminds you of. Then, perhaps, you recall the things that helped you get along with the analogous instructor and try them on the new one. We tend to look for things that helped us in the past in similar situations.

FACTORS THAT AFFECT PROBLEM SOLVING: MAKING RUTS, CLIMBING OUT

The way you approach a problem is central to how effective you are at solving it. Other factors also influence your effectiveness. **Question 5: What factors make it easier or harder to solve problems?** These factors include level of expertise, mental sets, insight, incubation, and functional fixedness.

EXPERTISE To appreciate the role of expertise in problem solving, unscramble the following anagrams taken from Novick and Coté (1992). In each case, use all of the letters to form an actual English word:

DNSUO
RCWDO
IASYD

Video Connections—Problem Solving



Can you solve these riddles and explain the psychological processes behind them? Watch the video to see the riddles and the role of insight in problem solving.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

— ■ —
Those who know how to think need no teachers.

MOHANDAS GANDHI

— ■ —

Means–end analysis A heuristic device in which we try to solve a problem by evaluating the difference between the current situation and the goal.

— ■ —
*You can only understand
 something when you know
 what it is not.*

STEVEN PINKER
 — ■ —

How long did it take you to unscramble each anagram (*sound*, *crowd*, and *daisy*)? Would a person whose native language is English—that is, an “expert”—unscramble each anagram more efficiently than a bilingual person who spoke another language in the home? Why or why not?

Experts solve problems more efficiently and rapidly than novices do. Generally speaking, people who are experts at solving a certain kind of problem share the following characteristics:

- They know the particular subject area well (Mair et al., 2009).
- They have a good memory for the elements in the problems (Mair et al., 2009).
- They form **mental images** or representations that facilitate problem solving (Szala, 2002).
- They relate the problem to similar problems (Gorodetsky & Klavir, 2003; Nokes & VanLehn, 2008).
- They are more goal directed and have efficient methods for problem solving (Gorodetsky & Klavir, 2003).

These factors are interrelated. Art historians, for example, acquire a database that permits them to understand the intricacies of artworks. As a result, their memory for details of artworks expands.

Novick and Coté (1992) found that the solutions to the anagram problems seemed to “pop out” in less than 2 seconds among experts. The experts apparently used more efficient methods than the novices. Experts seemed to use *parallel processing*. That is, they dealt simultaneously with two or more elements of the problems. In the case of DNSUO, for example, they may have played with the order of the vowels (*UO* or *OU*) at the same time that they tested which consonant (D, N, or S) was likely to precede them, arriving quickly at *sou* and *sound*. Novices were more likely to engage in *serial processing*—that is, to handle one element of the problem at a time.

MENTAL SETS Jordan hit me with another question: “A farmer had 17 sheep. All but 9 died. How many sheep did he have left?” Being a victim of a mental set, I assumed that this was a subtraction problem and gave the answer 8. She gleefully informed me that she hadn’t said “9 died.” She had said “*all but 9* died.” Therefore, the correct answer was 9. (Get it?) Put another way: I had not *understood* the problem. My mental representation of the problem did not correspond to the actual elements of the problem.

Return to problem 1, part c in the Self-Assessment (p. 267). To try to solve this problem, did you seek a pattern of letters that involved cycles and the alphabet? If so, it may be because this approach worked in solving parts a and b.

The tendency to respond to a new problem with the same approach that helped solve similar problems is termed a **mental set**. Mental sets usually make our work easier, but they can mislead us when the similarity between problems is illusory, as in part c of problem 1. Here is a clue: Part c is not an alphabet series. Each letter in the series *stands for* something. If you can discover what each stands for (that is, if you can discover the rule), you will be able to generate the 9th and 10th letters. (See p. A-2 for the answer.)

INSIGHT: AHA! To gain **insight** into the role of insight in problem solving, consider the following problem posed by Metcalfe (1986):

A stranger approached a museum curator and offered him an ancient bronze coin. The coin had an authentic appearance and was marked with the date 544 BCE. The curator had happily made acquisitions from suspicious sources before, but this time he promptly called the police and had the stranger arrested. Why?

I’m not going to give you the answer to this problem just yet. (You’ll find it in the Appendix on p. A-2 under Puzzles, Problems, and Just Plain Fun.) But I’ll make a guarantee. When you arrive at the solution, it will hit you all at once. You’ll think “Of course!” (or something less polite). It will seem as though the pieces of information in the problem have suddenly been reorganized so that the solution leaps out—in a flash.

Mental image An internal image or visual representation that is used in thinking and memory.

Mental set The tendency to respond to a new problem with an approach that was successfully used with similar problems.

Insight In Gestalt psychology, a sudden perception of relationships among elements of the mentally represented elements of a problem that permits its solution.

Bismarck, one of psychologist N. R. F. Maier's rats, provided evidence of insight in his species (Maier & Schneirla, 1935). Bismarck had been trained to climb a ladder to a tabletop where food was placed. On one occasion, Maier used a mesh barrier to prevent the rat from reaching his goal. But as shown in Figure 8.3 ■, a second ladder was provided and was visible to the animal. At first, Bismarck sniffed and scratched and tried to find a path through the mesh. Then he spent some time washing his face, an activity that may signal frustration in rats. Suddenly, he jumped into the air, turned, ran down the familiar ladder and around to the new ladder, ran up the new ladder, and claimed his just desserts. Did Bismarck suddenly perceive the relationships between the elements of the problem so that the solution occurred by insight? He seems to have had what Gestalt psychologists have termed an "Aha! experience." **Truth or Fiction Revisited:** It thus appears that not only humans use insight to solve problems.

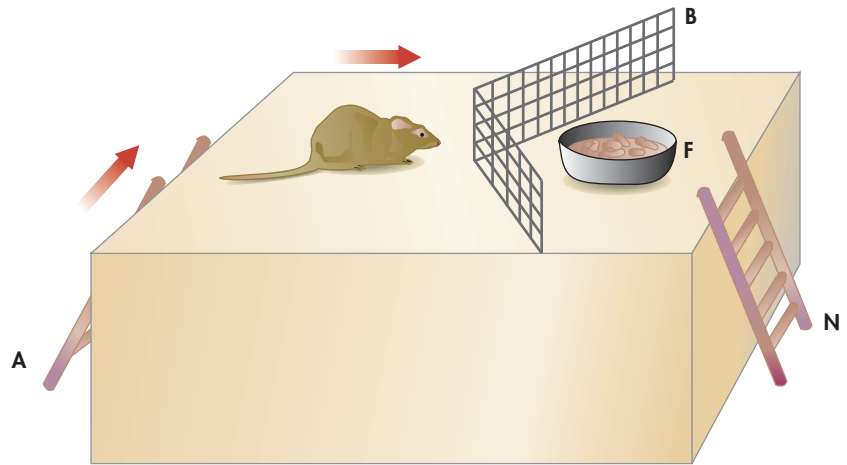


Figure 8.3 ■ Bismarck Uses a Cognitive Map to Claim His Just Desserts Bismarck has learned to reach dinner by climbing ladder A. But now the food goal (F) is blocked by a wire mesh barrier B. Bismarck washes his face for a while, but then, in an apparent flash of insight, he runs back down ladder A and up new ladder N to reach the goal.

INCUBATION Let's return to the problems in the Self-Assessment. How did you do with problem 1, part c, and problems 2 and 3? Students tend to fiddle around with them for a while. The solutions, when they come, appear to arrive in a flash. Students set the stage for the flash of insight by studying the elements in the problems carefully, repeating the rules to themselves, and trying to imagine what a solution might look like. If you tried solutions that did not meet the goals, you may have become frustrated and thought, "The heck with it! I'll come back to it later." **Truth or Fiction Revisited:** Standing back from the problem, rather than continuing to plug away at it, may allow for the **incubation** of insight. An incubator warms chicken eggs so that they will hatch. Incubation in problem solving refers to standing back from the problem for a while as some process within may continue to work on it. Later, the answer may come in a flash of insight. Standing back from the problem may help by distancing us from unprofitable but persistent mental sets (Kohn & Smith, 2009; Sio & Ormerod, 2009).

Have another look at the role of incubation in helping us overcome mental sets. Consider the seventh water jar problem on page 267. What if we had tried several solutions involving the three water jars and none had worked? We could distance ourselves from the problem for a day or two. At some point, we might recall a 10, a 7, and a 3—three elements of the problem—and suddenly realize that we can arrive at the correct answer by using only two water jars!

FUNCTIONAL FIXEDNESS **Functional fixedness** may hinder problem solving. For example, first ask yourself what a pair of pliers is. Is it a tool for grasping, a paperweight, or a weapon? A pair of pliers could function as any of these, but your tendency to think of it as a grasping tool is fostered by your experience with it. You have probably used pliers only for grasping things. Functional fixedness is the tendency to think of an object in terms of its name or its familiar function. It can be similar to a mental set because it makes it difficult to use familiar objects to solve problems in novel ways.

Now that you know what functional fixedness is, try to overcome it by solving the Duncker candle problem. You find these objects on a table: a candle, a box of matches, and a thumbtack (see Figure 8.4) ■. How do you use the objects on the table to attach the candle to the wall of the room so that it will burn properly? (See the answer on p. A-2.)

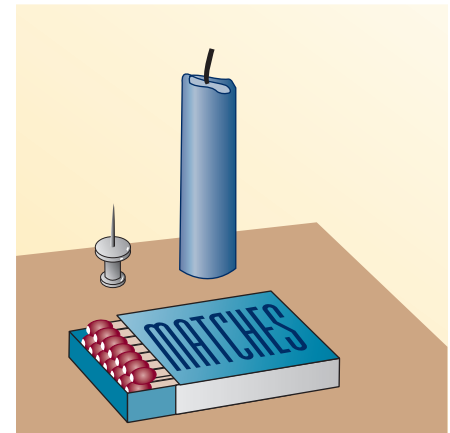


Figure 8.4 ■ The Duncker Candle Problem Can you use the objects shown on the table to attach the candle to the wall of the room so that it will burn properly?

Judgment and Decision Making

Decisions, decisions. Should you go to breakfast before classes begin or catch a few extra winks? Should you rent or buy? For whom should you vote? What should you eat? Should you take a job or go on for advanced training when you complete your

Incubation In problem solving, a process that may sometimes occur when we stand back from a frustrating problem for a while and the solution "suddenly" appears.

Functional fixedness The tendency to view an object in terms of its name or familiar usage.

Many people think they are thinking when they are merely rearranging their prejudices.

WILLIAM JAMES

college program? If you opt for the job, cash will soon be jingling in your pockets. Yet later, you may wonder if you have enough education to reach your full potential. By furthering your education, you may have to delay independence and gratification, but you may find a more fulfilling position later on. Decisions, decisions.

Question 6: How do people make judgments and decisions? You might like to think that people are so rational that they carefully weigh the pros and cons when they make judgments or decisions. Or you might think that they insist on finding and examining all the relevant information. Actually, people make most of their decisions on the basis of limited information. They take shortcuts. They use heuristic devices—rules of thumb—in judgments and decision making just as they do in problem solving (Gigerenzer et al., 2008). For example, they may let a financial advisor select stocks for them rather than research the companies themselves. Or they may see a doctor recommended by a friend rather than look at the doctor's credentials. In this section, we consider various factors in judgment and decision making.

HEURISTICS IN DECISION MAKING: IF IT WORKS, MUST IT BE LOGICAL?

Imagine that you flip a coin six times. In the following three possible outcomes, H stands for heads and T for tails. Circle the most likely sequence of six tosses:

H H H H H H
H H H T T T
T H H T H T

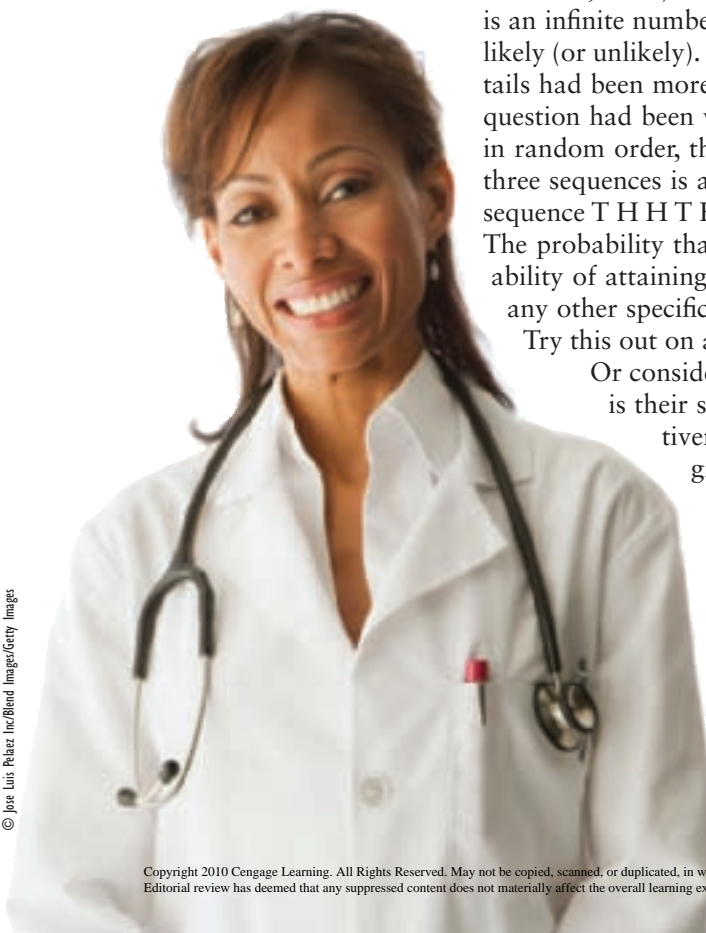
Did you select T H H T H T as the most likely sequence of events? Most people do. Why? There are two reasons. First, people recognize that the sequence of six heads in a row is unlikely. (The probability of achieving it is $2 \times 2 \times 2 \times 2 \times 2 \times 2$, or $1/64$ th.) Three heads and three tails are more likely than six heads (or six tails). Second, people recognize that the sequence of heads and tails ought to appear random. T H H T H T has a random look to it, whereas H H H T T T does not.

People tend to select T H H T H T because of the **representativeness heuristic**. According to this decision-making heuristic, people make judgments about events (samples) according to the populations of events that they appear to represent (Nilsson et al., 2008). In this case, the sample of events is six coin tosses. The “population” is an infinite number of random coin tosses. But guess what? *Each* sequence is equally likely (or unlikely). If the question had been whether six heads or three heads and three tails had been more likely, the correct answer would have been three and three. If the question had been whether heads and tails would be more likely to be consecutive or in random order, the correct answer would have been random order. But each of the three sequences is a *specific* sequence. What is the probability of attaining the specific sequence T H H T H T? The probability that the first coin toss will result in a tail is $1/2$. The probability that the second will result in a head is $1/2$ and so on. Thus, the probability of attaining the exact sequence T H H T H T is identical to that of achieving any other specific sequence: $2 \times 2 \times 2 \times 2 \times 2 \times 2 = 1/64$ th. (Don't just sit there. Try this out on a friend.)

Or consider this question: If a couple has five children, all of whom are boys, is their sixth child more likely to be a boy or a girl? Use of the representativeness heuristic might lead us to imagine that the couple is due for a girl. That is, five boys and one girl are closer to the assumed random distribution that accounts for roughly equal numbers of boys and girls in the world. But people with some knowledge of reproductive biology might predict that another boy is actually more likely because five boys in a row may be too many to be a random biological event. **Truth or Fiction Revisited:** Therefore, it is not true that the sixth child of a couple with five sons is likely to be a daughter. If the couple's conception of a boy or girl were random, however, what would be the probability of conceiving another boy? Answer: $1/2$.

Another heuristic device used in decision making is the **availability heuristic**. According to this heuristic, our estimates of

How Do You Choose a Doctor? Do you go by reputation or the advice of a friend or family member? Do you check out his or her credentials online? Or is the choice foreclosed because you are on campus or in a particular health insurance plan?



frequency or probability are based on how easy it is to find examples of relevant events. Let me ask you whether there are more art majors or sociology majors at your college. Unless you are familiar with the enrollment statistics, you will probably answer on the basis of the numbers of art majors and sociology majors that you know.

The **anchoring and adjustment heuristic** suggests that there can be a good deal of inertia in our judgments. In forming opinions or making estimates, we have an initial view, or presumption. This is the anchor. As we receive additional information, we make adjustments, sometimes grudgingly. That is, if you grow up believing that one religion or one political party is the “right” one, that belief serves as a cognitive anchor. When inconsistencies show up in your religion or political party, you may adjust your views of them but perhaps not very willingly.

Let’s illustrate further by means of a math problem. Write each of the following multiplication problems on a separate piece of paper:

A. $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$

B. $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8$

Show problem A to a few friends. Give them each 5 seconds to estimate the answer. Show problem B to some other friends and give them 5 seconds to estimate the answer.

The answers to the multiplication problems are the same because the order of quantities being multiplied does not change the outcome. However, when Amos Tversky and Daniel Kahneman (1982, 2003) showed these problems to high school students, the average estimate given by students who were shown version A was significantly higher than that given by students shown version B. Students who saw 8 in the first position offered an average estimate of 2,250. Students who saw 1 in the first position gave an average estimate of 512. That is, the estimate was larger when 8 served as the anchor. By the way, what is the correct answer to the multiplication problems? Can you use the anchoring and adjustment heuristic to explain why both groups were so far off?

THE FRAMING EFFECT: SAY THAT AGAIN?

If you were on a low-fat diet, would you be more likely to choose an ice cream that is 97% fat free or one whose fat content makes up 10% of its calorie content? On one shopping excursion, I was impressed with an ice cream package’s claims that the product was 97% fat free. Yet when I read the label closely, I noticed that a 4-ounce serving had 160 calories, 27 of which were contributed by fat. Fat, then, accounted for 27/160ths, or about 17%, of the ice cream’s calorie content. But fat accounted only for 3% of the ice cream’s *weight*. The packagers of the ice cream knew all about the *framing effect*. They understood that labeling the ice cream as “97% fat free” would make it sound more healthful than “Only 17% of calories from fat.” This is an example of the framing effect.

Question 7: What is the framing effect? The **framing effect** refers to the way in which wording, or the context in which information is presented, affects decision making (M. Li & Chapman, 2009; Tetlock & McGraw, 2005). Political groups, like advertisers, are aware of the framing effect and choose their words accordingly. For example, proponents of legalized abortion refer to themselves as “pro-choice,” and opponents refer to themselves as “pro-life.” Each group frames itself in a positive way (“pro” something) and refers to a popular value (choice or life).



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Practicing His Faith—Early The child will probably grow up believing that his religion is the right one. His religion’s tenets may serve as cognitive anchors from which he judges other points of view for a lifetime.

Representativeness heuristic A decision-making heuristic in which people make judgments about samples according to the populations they appear to represent.

Availability heuristic A decision-making heuristic in which our estimates of frequency or probability of events are based on how easy it is to find examples.

Anchoring and adjustment heuristic A decision-making heuristic in which a presumption or first estimate serves as a cognitive anchor. As we receive additional information, we make adjustments but tend to remain in the proximity of the anchor.

Framing effect The influence of wording, or the context in which information is presented, on decision making.

Doctors will opt for a cautious public-health program . . . when it is framed as saving the lives of 200 people out of 600 who are vulnerable, but will eschew the same program when it is framed as resulting in the deaths of 400 people out of the 600.

STEVEN PINKER

Parents also use the framing effect. My preschooler, Taylor, was invited to a play date at Abigail's house. I asked Taylor, "Would you like to play with Abigail at her house?" The question met with a resounding no. I thought things over and reframed the question: "Would you like to play at Abigail's house and have a real fun time? She has lots of toys and games, and I'll pick you up really soon." This time Taylor said yes.

OVERCONFIDENCE: IS YOUR HINDSIGHT 20-20?

Whether our decisions are correct or incorrect, most of us tend to be overconfident about them. Overconfidence applies to judgments as wide ranging as whether one will be infected by the virus that causes AIDS, predicting the outcome of elections, boasting that one's answers on a test are correct, and selecting stocks (Blavatsky, 2009). **Truth or Fiction Revisited:** It is not true that people change their opinions when they are shown to be wrong. (Have you ever known someone to maintain unrealistic confidence in a candidate who was far behind in the polls?)

We also tend to view our situations with 20-20 hindsight. When we are proven wrong, we frequently find a way to show that we "knew it all along." We also become overconfident that we would have known the actual outcome if we had access to the information that became available after the event. For example, if we had known that a key player would pull a hamstring muscle, we would have predicted a different outcome for the football game. If we had known that it would be blustery on Election Day, we would have predicted a smaller voter turnout and a different outcome.

Question 8: Why do people tend to be convinced that they are right, even when they are clearly wrong? There are several reasons for overconfidence, even when our judgments are wrong. Here are some of them:

- We tend to be unaware of how flimsy our assumptions may be.
- We tend to focus on examples that confirm our judgments and ignore those that do not.
- Because our working memories have limited space, we tend to forget information that runs counter to our judgments.
- We work to bring about the events we believe in, so they sometimes become self-fulfilling prophecies.

Before leaving the section on thinking, I have a final problem for you:

You're driving a bus that's leaving from Pennsylvania. To start off with, there were 32 people on the bus. At the next bus stop, 11 people got off, and 9 people got on. At the next bus stop, 2 people got off, and 2 people got on. At the next bus stop, 12 people got on, and 16 people got off. At the next bus stop, 5 people got on, and 3 people got off. How many people are now on the bus?

LearningConnections • THINKING

ACTIVE REVIEW (1) _____ are mental categories used to class objects, relations, or events with common properties. (2) A(n) _____ is an example that best matches the essential features of a category. (3) Simple concepts are frequently taught by presenting positive and negative _____. (4) A(n) _____ is a specific procedure for solving a type of problem. (5) _____ devices are rules of thumb that serve as shortcuts to rapid solutions. (6) We use the _____ heuristic when we solve a new problem by referring to a previous problem. (7) A _____ set is the tendency to respond to a new problem with the same approach that helped solve similar problems. (8) Some problems are solved by rapid "perception of relationships" among the elements of the problem, which is called _____. (9) According to the _____ heuristic,

people make judgments about events according to the populations of events that they appear to represent.

REFLECT AND RELATE Have you or anyone you know used the framing effect in an argument? Which term is more appealing, "pro-life" or "anti-choice"? Why?

CRITICAL THINKING Research suggests that people are reluctant to change their views, even when they are shown to be incorrect. What are the implications of these research findings for professors who desire to encourage their students to become critical thinkers? How does this color your perception of your own attitudes?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

LANGUAGE

“The time has come,” the Walrus said, “To talk of many things: Of shoes—and ships—and sealing wax—Of cabbages—and kings—And why the sea is boiling hot—And whether pigs have wings.”

—Lewis Carroll, *Through the Looking-Glass*

Lewis Carroll wasn't quite telling the truth. The sea is not boiling hot. At the risk of alienating walrus fans across the land, let me boldly assert that walruses neither speak nor use other forms of language to communicate. On the other hand, the time has come indeed to talk of how talking—of how language—permits us to communicate about shoes and ships and . . . you get the idea.

Going Ape Over Language?

In recent years, our exclusive claim to language has been questioned because apes have been taught to use symbols to communicate. (*Symbols* such as words stand for or represent other objects, events, or ideas.) Chimpanzees and gorillas have been taught to communicate by making signs with their hands.

Chimpanzees are our closest genetic relatives, sharing an estimated 98.42% of their genetic code with humans (Zimmer, 2002–2003). Magnetic resonance imaging (MRI) studies with chimpanzees and gorillas reveal that most of them, like humans, show enlargement in the left hemisphere of the cerebral cortex in part of Broca's area (Cantalupo & Hopkins, 2001; S. S. Keller et al., 2009; see Figure 8.5) ■. The differences that remain between humans and chimps are at least in part associated with capabilities such as fine control of the mouth and larynx that are not found in apes (Sherwood et al., 2008). The genetic differences between chimps and humans probably explain why chimps cannot articulate speech but also apparently give chimps and other apes some meaningful ability to use language (Sherwood et al., 2008).

Question 9: Do apes really use language? Although apes do not speak, they have been taught to use American Sign Language and other symbol systems. For example, a chimpanzee named Washoe, who was a pioneer in the effort to teach apes to use language, was using 181 signs by the age of 32 (King, 2008). A baby chimp adopted by Washoe, Loulis, gained the ability to use signs just by observing Washoe and some other chimps who had been trained in sign language. Other chimps have used plastic symbols or pressed keys on a computer keyboard to communicate.

Sue Savage-Rumbaugh and her colleagues (Segerdahl et al., 2006; Washburn et al., 2007) believe that pygmy chimpanzees can understand some of the **semantic** subtleties of language. She claims that one chimp, Kanzi, picked up language from observing another chimp being trained and has the grammatical abilities of a $2\frac{1}{2}$ year-old child. Kanzi also understands several spoken words (spoken by humans, that is). Kanzi held a toy snake to a toy dog's mouth when asked to make the dog bite the snake.

*Man invented language to satisfy
his deep need to complain.*

LILY TOMLIN

Language is the dress of thought.

DR. SAMUEL JOHNSON

Image not available due to copyright restrictions

Semantic Having to do with the meanings of words and symbols.

Figure 8.5 ■ MRI Results of the Left and Right Hemispheres of the Cerebral Cortexes of a Great Ape In their MRI study of the brains of 25 chimpanzees and 2 gorillas, Cantalupo and Hopkins found that the great majority, 20, showed larger areas similar to Broca's area in the left hemisphere. So do most humans. Six apes showed larger areas in the right hemisphere. Only one showed no difference. It would thus appear that chimpanzees and gorillas have some rudimentary language structures in their brains, even if they are not prewired for speech.



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A Chimpanzee Uses Signs to Communicate

We share more than 98% of our genetic codes with chimpanzees and apparently also some ability to communicate using symbols. Although chimpanzees and other apes cannot articulate speech, they have enlarged areas on the left side of the brain that correspond to Broca's area in humans. There is no question that chimpanzees learn signs for objects and actions; however, many psychologists and linguists question whether they share the inborn human ability to order them according to rules of grammar.

Scientists will continue to debate how well chimpanzees and gorillas understand and produce language, but there is little doubt that they have learned to use symbols to communicate (Segerdahl et al., 2006). Moreover, it is clear that chimps understand many of the subtleties of communication. For example, when they are behind a human, they make noises to get the person's attention. As soon as the person turns to them, they begin to sign (Bodamer & Gardner, 2002). Yet most researchers continue to consider that language emerges spontaneously only in people (Dominguez & Rakic, 2009).

Critics of the view that apes can learn to produce language, such as Herbert Terrace (Terrace & Metcalfe, 2005) and Steven Pinker (1994b), note that:

- Apes can string together signs in a given sequence to earn rewards, but animals lower on the evolutionary ladder, such as pigeons, can also peck buttons in a certain sequence to obtain a reward.
- It takes apes longer to learn new signs than it takes children to learn new words.
- Apes are unreliable in their sequencing of signs, suggesting that by and large they do not comprehend rules of grammar.
- People observing apes sign may be subject to *observer bias* or *experimenter bias*—that is, they may be seeing what they want to see.

What Is Language?

As you can see from the discussion of apes and language, the way one defines language is no small matter. **Question 10: Just how do we define language?** If we simply define language as a system of communication, many animals have language, including the birds and the bees. Dogs may communicate their possession of a territory by barking at an intruder, but they are not saying “Excuse me—you are too close for comfort.” Birds warn other birds of predators. And through particular chirps and shrieks, they may communicate that they have taken possession of a tree or bush. The waggle dances of bees inform other bees of the location of a food source or a predator. Vervet monkeys make sounds that signal the distance and species of predators. All of these are instinctive communication patterns but not what we mean by language.

With language, sounds or signs are symbols for objects and actions. There is apparently no doubt that apes have learned to use symbols to communicate. But is the use of symbols to communicate an adequate definition of language? Many language experts require one more piece. They define **language** as the communication of thoughts and feelings by means of symbols *that are arranged according to rules of grammar*. Instinctive waggle dances and barks have no symbols and no grammar, even though, in the case of a dog that needs to go for a walk, they may carry hints of desperation. By this rigorous definition, only humans clearly use language. Whether or not apes can handle rules of grammar is under debate.

Language makes it possible for one person to communicate knowledge to another and for one generation to communicate to another. It creates a vehicle for recording experiences. It allows us to put ourselves in the shoes of other people, to learn more than we could learn from direct experience. Language also provides many units of thinking.

Question 11: What are the properties of a “true” language? True language is distinguished from the communication systems of lower animals by properties such as semanticity, infinite creativity, and displacement (Hoff, 2005).

- **Semanticity:** The sounds (or signs) of a language have meaning. Words serve as symbols for actions, objects, relational concepts (*over, in, more*, and so on), and other ideas. The communications systems of the birds and the bees do not use words and symbols. Therefore, they lack semanticity.
- **Infinite creativity:** The capacity to create rather than imitate sentences.

Semantics is about the relation of words to thoughts, but it is also about . . . the relation of words to reality, . . . about the relation of words to a community—how a new word, which arises in an act of creation by a single speaker, comes to evoke the same idea in the rest of a population.

STEVEN PINKER

Language The communication of information by means of symbols arranged according to rules of grammar.

Semanticity Meaning. The quality of language in which words are used as symbols for objects, events, or ideas.

Infinite creativity The capacity to combine words into original sentences.

- **Displacement:** The capacity to communicate information about events and objects in another time or place. Language makes it possible to transmit knowledge from one person to another and from one generation to another, furthering human adaptation.

Language and Cognition: Do We Need Words to Think?

Let's discuss language in terms of the broader picture: **Question 12: What are the relationships between language and thinking?** The relationships between language and thinking are complex and not always obvious. For example, can you think *without* using language? (The answer seems to be yes, but of course, you would not be able to use thoughts that entail symbols that are arranged according to rules of grammar.) Would you be able to solve problems without using words or sentences? (That depends on the problem.)

Jean Piaget (Inhelder & Piaget, 1958) believed that language reflects knowledge of the world but that much knowledge can be acquired without language. For example, it is possible to understand the concepts of roundness or redness even when we do not know or use the words *round* or *red*.

— ■ —
Language shapes the way we think, and determines what we can think about.

BENJAMIN LEE WHORF

— ■ —

Language and Culture

Different languages have different words for the same concepts, and concepts do not necessarily overlap. As noted earlier, concepts expressed in our own language (such as *square* and *triangle*) may not exist in the language of another culture—and vice versa. **Question 13: Is it possible for English speakers to share all the thoughts experienced by people who speak other languages?** The answer is probably yes in many or most cases, but in some cases, no. In any event, the question brings us to the linguistic-relativity hypothesis.

THE LINGUISTIC-RELATIVITY HYPOTHESIS

The **linguistic-relativity hypothesis** was proposed by Benjamin Lee Whorf (1956). Whorf believed that language structures the way we perceive the world. That is, the categories and relationships we use to understand the world are derived from our language. Therefore, speakers of various languages conceptualize the world in different ways.

Thus, most English speakers' ability to think about snow may be limited compared with that of the Inuit (Eskimos). We have only a few words for snow, whereas the Inuit have many. The Inuit's words differ according to whether the snow is hard packed, falling, melting, covered by ice, and so on. When we think about snow, we have fewer words to choose from and have to search for descriptive adjectives. The Inuit, however, can readily find a single word that describes a complex weather condition. Is it therefore easier for them to think about this variety of snow? Similarly, the Hanunoo people of the Philippines use 92 words for rice depending on whether the rice is husked or unhusked and on how it is prepared. And whereas we have one word for camel, Arabs have more than 250.

In English, we have hundreds of words to describe colors. There is about a 95% overlap in perception and labeling of colors among English speakers and Chinese people (Moore et al., 2002). It has been pointed out, however, that Shona-speaking people use only three words for colors, and Bassa speakers use only two corresponding to light and dark. Nevertheless, studies of languages spoken in nonindustrialized societies find overlaps for white, black, red, green, yellow, and blue (Regier, 2005; Tohidian, 2009). Moreover, people who use only a few words to distinguish among colors seem to perceive the same color variations as people with more words. For example, the Dani of New Guinea have just two words for colors: one that refers to

Displacement The quality of language that permits one to communicate information about objects and events in another time and place.

Linguistic-relativity hypothesis The view that language structures the way we view the world.

How Many Words Do You Know for Snow? The extent of your vocabulary to some degree reflects the demands of your situation. Does having more words for various kinds of snow enable you to think more complexly about snow?

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Change your language and you
change your thoughts.

KARL ALBRECHT



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Crying: A Prelinguistic Event Although crying can effectively communicate discomfort and the desire to have a caregiver present—now—cries do not possess symbols and are thus not an example of true language.

Holophrase A single word used to express complex meanings.

yellows and reds and one that refers to greens and blues. Yet performance on matching and memory tasks shows that the Dani can discriminate the many colors of the spectrum.

The Hopi Indians had two words for flying objects, one for birds and an all-inclusive word for anything else that might be found traveling through the air. Does this mean that the Hopi were limited in their ability to think about bumblebees and airplanes? Are English speakers limited in their ability to think about skiing conditions? Probably not. English-speaking skiers who are concerned about different skiing conditions have developed a comprehensive vocabulary about snow, including the terms *powder*, *slush*, *ice*, *hard packed*, and *corn snow*. This allows them to communicate and think about snow with the facility of the Inuit. When a need to expand a language's vocabulary arises, the speakers of that language apparently have little trouble meeting the need.

Most cognitive scientists no longer accept the linguistic-relativity hypothesis (Pinker, 2007). For one thing, adults use images and abstract logical propositions, as well as words, as units of thought. Infants, moreover, display considerable intelligence before they have learned to speak. Another criticism is that a language's vocabulary suggests the range of concepts that the speakers of the language have traditionally found important, not their cognitive limits. For example, if people were magically lifted from the 19th century and placed inside an airplane, they probably would not think they were flying inside a bird or a large insect, even if their language lacked a word for airplane.

Language Development: The 2-Year Explosion

Question 14: How does language develop? Languages around the world develop in a specific sequence of steps beginning with the *prelinguistic* vocalizations of crying, cooing, and babbling. These sounds are not symbols. That is, they do not represent objects or events. Therefore, they are *prelinguistic*, not linguistic.

PRELINGUISTIC VOCALIZATIONS: THE MEANING OF AN ABSENCE OF MEANING

As parents are well aware, newborn children have one inborn, highly effective form of verbal expression: crying—and more crying. **Truth or Fiction Revisited:** But crying does not represent language; it is a prelinguistic event. During the 2nd month, babies begin *cooing*, another form of prelinguistic expression, which appears to be linked to feelings of pleasure. By the 5th or 6th month, children begin to *babble*. Children babble sounds that occur in many languages, including the throaty German *ch*, the clicks of certain African languages, and rolling *r*'s. Babies' babbling frequently combines consonants and vowels, as in “ba,” “ga,” and sometimes, the much-valued “dada” (McCardle et al., 2009). “Dada” at first is purely coincidental (sorry, dads) despite the family's delight over its appearance.

Babbling, like crying and cooing, is inborn and prelinguistic. Deaf children babble, and children from cultures whose languages sound very different all seem to babble the same sounds (Hoff, 2005). But children single out the sounds used in the home within a few months. By the age of 9 or 10 months, they are repeating them regularly, and foreign sounds are dropping out. In fact, early experience in acquiring the phonemes (that is, meaningful units of sound) native to one's own language can make it difficult to pronounce and even discriminate the phonemes used in other languages later in life (Iverson et al., 2003).

The first word—which represents *linguistic* speech—is typically spoken between 11 and 13 months, but a range of 8 to 18 months is normal (McCardle et al., 2009; Tamis-LeMonda et al., 2006). Parents often miss the first word because it is not pronounced clearly or because pronunciation varies from one usage to the next. The growth of vocabulary is slow at first. It may take children 3 to 4 months to achieve a 10-word vocabulary after they have spoken their first word. By about 18 months, children are producing a couple of dozen words.

DEVELOPMENT OF GRAMMAR

The first linguistic utterances of children around the globe are single words that can express complex meanings. These initial utterances of children are called **holophrases**. For example, *mama* may be used by the child to signify meanings as varied as “There goes Mama,” “Come here, Mama,” and “You are my Mama.” Similarly, *cat* can signify “There is a cat,” “That stuffed animal looks just like my cat,” or “I want you to give me my cat

right now!” Most children readily teach their parents what they intend by augmenting their holophrases with gestures, intonations, and reinforcers. That is, they act delighted when parents do as requested and howl when they do not.

Toward the end of the 2nd year, children begin to speak two-word sentences. These sentences are termed *telegraphic speech* because they resemble telegrams. Telegrams cut out the “unnecessary” words. “Home Tuesday” might stand for “I expect to be home on Tuesday.” Two-word utterances seem to appear at about the same time in the development of all languages (Saffran, 2009; Slobin, 1983). Two-word utterances are brief but grammatically correct. The child says, “Sit chair” to tell a parent to sit in a chair, not “Chair sit.” The child says, “My shoe,” not “Shoe my,” to show possession. “Mommy go” means Mommy is leaving. “Go Mommy” expresses the wish for Mommy to go away.

There are different kinds of two-word utterances. Some, for example, contain nouns or pronouns and verbs (“Daddy sit”). Others contain verbs and objects (“Hit ball”). The sequence of emergence of the various kinds of two-word utterances is also apparently the same in all languages—languages as diverse as English, Luo (an African tongue), German, Russian, and Turkish (Slobin, 1983). The invariance of this sequence has implications for theories of language development, as we will see.

Syntax The rules for forming grammatical phrases and sentences in a language.

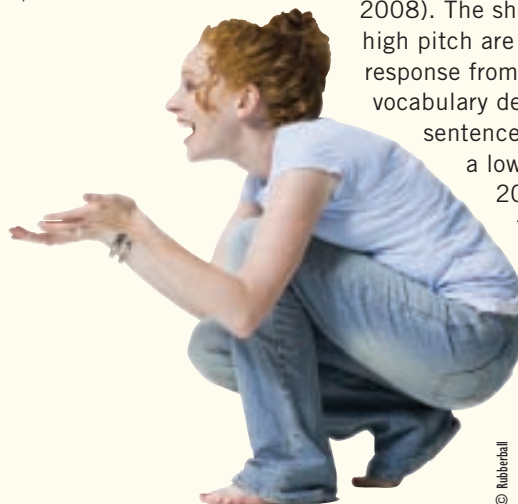
A CLOSER LOOK • RESEARCH

“MOTHERESE”—OF “YUMMY YUMMY” AND “KITTY CATS”

One fascinating way that adults attempt to prompt the language development of young children is through the use of baby talk, or “motherese,” which is referred to more technically as *infant-directed speech (IDS)* (Meltzoff & Brooks, 2009; Singh et al., 2009). Motherese is a limiting term because grandparents, fathers, siblings, and unrelated people, including older children, have also been observed using IDS (Braarud & Stormark, 2008). Moreover, women (but not men) often talk to their pets as if they were infants (Prato-Previde et al., 2006). Infant-directed speech is used in languages as diverse as Arabic, English, Comanche, Italian, French, German, Xhosa (an African tongue), Japanese, Mandarin Chinese, and even a Thai sign language (S. J. Lee et al., 2009; Nonaka, 2004).

Researchers have found that IDS has the following characteristics (Braarud & Stormark, 2008; Meltzoff & Brooks, 2009):

- It is spoken more slowly and at a higher pitch than speech addressed to adults. There are distinct pauses between ideas.
- Sentences are brief, and adults try to speak in a grammatically correct manner.
- Sentences are simple in **syntax**. The focus is on nouns, verbs, and just a few modifiers.
- Key words are placed at the ends of sentences and spoken in a higher and louder voice.
- The diminutive morpheme *y* is frequently added to nouns. *Dad* becomes *Daddy*, and *horse* becomes *horsey*.
- Adults repeat sentences several times, sometimes using minor variations, as in “Show me your nose.” “Where is your nose?” “Can you touch your nose?” Adults also rephrase children’s



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utterances to expand children’s awareness of their expressive opportunities. If the child says, “Baby shoe,” the mother may reply, “Yes, that’s your shoe. Shall Mommy put the shoe on baby’s foot?”

- It includes duplication. *Yummy* becomes *yummy-yummy*. *Daddy* may alternate with *Da-da*.
- Much IDS focuses on naming objects (Meltzoff & Brooks, 2009). Vocabulary is concrete and refers to the child’s environment. For example, stuffed lions may be called “kitties.”
- Objects may be overdescribed with compound labels. Rabbits may become “bunny rabbits,” and cats may become “kitty cats.” Users of IDS try to ensure that they are using at least one label that the child will recognize.
- Parents speak for the children, as in “Is baby tired?” “Oh, we’re so tired.” “We want to take our nap now, don’t we?” Parents seem to be helping children express themselves by offering them models of sentences they can use.

Does IDS work? Does it encourage communication and foster language development? Research supports its use. Infants as young as 2 days old prefer baby talk or infant-directed speech to adult talk (N. A. Smith & Trainor, 2008). The short, simple sentences and high pitch are more likely to produce a response from the child and enhance vocabulary development than complex sentences and those spoken in a lower pitch (Singh et al., 2009). Children who hear their utterances repeated and recast seem to learn from adults who are modeling the new expressions (Singh et al., 2009; N. A. Smith & Trainor, 2008). Repetition of children’s vocalizations appears to encourage vocalizing.

OVERREGULARIZATION: ON FOLLOWING THE (APPARENT) RULES

Overregularization is an important development for understanding the roles of nature and nurture in language development (E. V. Clark & Nikitina, 2009). In English, we add *d* or *ed* to make the past tense of regular verbs and *s* or *z* sounds to make regular nouns plural. Thus, *walk* becomes *walked*, and *look* becomes *looked*. *Cat* becomes *cats*, and *doggy* becomes *doggies*. There are also irregular verbs and nouns. For example, *see* becomes *saw*, *sit* becomes *sat*, and *go* becomes *went*. *Sheep* remains *sheep* (plural), and *child* becomes *children*.

At first, children learn irregular verbs and nouns by imitating older people. Two-year-olds tend to form them correctly—at first! Then they become aware of the grammatical rules for forming the past tense and plurals. As a result, they tend to make charming errors (Pinker, 1997). A 3- to 5-year-old, for example, may be more likely to say “I seed it” than “I saw it,” and more likely to say “Mommy sitted down” than “Mommy sat down.” They are likely to talk about the “gooses” and “sheeps” they “seed” on the farm and about all the “childs” they ran into at the playground. This tendency to regularize the irregular is what is meant by overregularization. **Truth or Fiction Revisited:** Young children *do* say things like “Daddy goed away” and “Mommy sitted down” because they understand rules of grammar.

Should parents be concerned about overregularization? Not at all. Overregularization reflects knowledge of grammar, not faulty language development. In another year or two, *mouses* will be boringly transformed into *mice*, and Mommy will no longer have *sitted* down. Parents might as well enjoy overregularization while they can.

OTHER DEVELOPMENTS

By the age of 6, children’s vocabularies have expanded to 10,000 words, give or take a few thousand. (Vocabulary can grow for a lifetime.) By 7 to 9, most children realize that words can have more than one meaning, and they are entertained by riddles and jokes that require some sophistication with language (“What’s black and white and read all over?”).

**Nature and Nurture in Language Development:
Why Houseplants Don’t Talk**

Billions of children have acquired the languages spoken by their parents and passed them down, with minor changes, from generation to generation. Language development, like many other areas of development, apparently reflects the interactions between nature and nurture. **Question 15: What are the roles of nature and nurture in language development?**

**LEARNING THEORY AND LANGUAGE DEVELOPMENT:
INFANT HEAR, INFANT SAY?**

Learning theorists see language as developing according to laws of learning (Hoff, 2005). They usually refer to the concepts of imitation and reinforcement. From a social-cognitive perspective, parents serve as *models*. Children learn language, at least in part, through observation and imitation. Many words, especially nouns and verbs (including irregular verbs), are apparently learned by imitation.

At first, children accurately repeat the irregular verb forms they observe. This repetition can probably be explained by modeling, but modeling does not explain all the events involved in learning. Children later begin to overregularize irregular verb forms *because of* knowledge of rules of grammar and not imitation. Nor does imitative learning explain how children come to utter phrases and sentences they have *not* observed. Parents, for example, are unlikely to model utterances such as “Bye-bye sock” and “All gone Daddy,” but children say them.

Learning theory cannot account for the unchanging sequence of language development and the spurts in children’s language acquisition. Even the types of two-word utterances emerge in a consistent pattern in diverse cultures. Although timing differs from one child to another, the types of questions used, passive versus active sentences, and so on all emerge in the same order.

■

Since all normal humans talk but no house pets or house plants do, no matter how pampered, heredity must be involved in language. But since a child growing up in Japan speaks Japanese whereas the same child brought up in California would speak English, the environment is also crucial.

STEVEN PINKER

Overregularization The application of regular grammatical rules for forming inflections (e.g., past tense and plurals) to irregular verbs and nouns.

Psycholinguistic theory The view that language learning involves an interaction between environmental factors and an inborn tendency to acquire language.

Language acquisition device (LAD) In psycholinguistic theory, neural “prewiring” that facilitates the child’s learning of grammar.

In Profile

If you were casting a film about an intellectual, you might choose Noam Chomsky for the role. He is your stereotypical “shaggy-haired, bespectacled, rumped genius” (M. Hunt, 1993). Chomsky grew up in New York during the Great Depression and was influenced by liberal politics. He planned to leave the University of Pennsylvania after 2 years of undergraduate study to join a leftist group in the newly born nation of Israel when a professor—Zellig Harris—got him more excited about linguistics.

Now, the liberal view of language would be that environmental factors have the greatest influence on language learning. (Similarly, the liberal view of the determinants of intelligence would be that early exposure to a rich learning environment is more



NOAM CHOMSKY

© Courtesy of Dr. Noam Chomsky, Massachusetts Institute of Technology

important than genetic factors.) Chomsky worked diligently, in fact, trying to find evidence for precisely this point of view. But he could not satisfy himself. Instead, he came to believe that the key to language ability is inborn—an innate language acquisition device. This device allows children to perceive deep grammatical relationships in sentences and to produce original sentences as a result.

Chomsky illustrates his idea, tongue in cheek, by noting that the following sentence makes sense (sort of): “Colorless green ideas sleep furiously.” It

is surely nonsensical but seems much more correct to an English speaker than, say, “Sleep green colorless furiously ideas.” Why is the first sentence more familiar and comfortable?



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Noam Chomsky.

THE NATIVIST APPROACH TO LANGUAGE DEVELOPMENT: SPEAKING FROM THE GENES?

The nativist theory of language development holds that the innate factors—which make up children’s *nature*—cause children to attend to and acquire language in certain ways. From this perspective, children bring neurological “prewiring” to language learning (A. Clark & Misyak, 2009; Pinker, 2007).

According to **psycholinguistic theory**, language acquisition involves the interaction of environmental influences—such as exposure to parental speech and reinforcement—and the inborn tendency to acquire language. Noam Chomsky (see Cherniak, 2009) refers to the inborn tendency as a **language acquisition device (LAD)**. Evidence for an LAD is found in the universality of human language abilities and in the specific sequence of language development (Cherniak, 2009; A. Clark & Misyak, 2009).

The LAD prepares the nervous system to learn grammar. On the surface, languages differ a great deal. However, the LAD serves children all over the world because languages share what Chomsky refers to as a “universal grammar”—an underlying set of rules for turning ideas into sentences (Pinker, 2007). Consider an analogy with computers: According to psycholinguistic theory, the universal grammar that resides in

— ■ —
“Colorless green ideas sleep furiously.”

NOAM CHOMSKY (Demonstrating that familiar syntax can make even nonsensical statements sound as if they are laden with meaning)

— ■ —

LearningConnections • LANGUAGE

ACTIVE REVIEW (10) Apes (have or have not?) been taught to use symbols to communicate. (11) Language is the communication of thoughts and feelings by means of symbols that are arranged according to rules of _____. (12) According to the _____-relativity hypothesis, language structures (and limits) the way we perceive the world. (13) Children babble sounds heard (only in their own languages or in all languages?). (14) _____ are one-word utterances that have the meanings of sentences. (15) Children’s use of sentences such as “I standed up” and “Mommy sitted down” are examples of _____. (16) According to _____ theory, language acquisition involves the interaction of environmental influences and an inborn tendency to acquire language. (17) Chomsky refers to the inborn tendency to develop language as a language _____ device (LAD). (18) The LAD prepares the nervous system to learn _____.

REFLECT AND RELATE Have you ever known someone to claim that a pet could “speak” or “understand” English or another language? Did the pet really speak? Did the pet understand language? What was the nature of the evidence? What is your conclusion?

CRITICAL THINKING Critical thinkers pay close attention to the definitions of terms: How do scientists distinguish true language from the communication systems of lower animals? What are the key issues in deciding whether apes can be taught to use language?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

the LAD is the same as a computer's basic operating system (M. C. Baker, 2001). The particular language that a child learns to use is the same as a word-processing program.

In the following section, we see that some aspects of language development—particularly vocabulary development—are strongly related to intelligence.

INTELLIGENCE

Intelligence may well be the most controversial topic in psychology. **Question 16: Just what is intelligence?** The concept of intelligence is closely related to thinking. Whereas thinking involves the understanding and manipulating of information, **intelligence** is considered to be the underlying ability to understand the world and cope with its challenges (Cornoldi, 2006; R. J. Sternberg et al., 2005). That is, intelligence is seen as making thinking possible.

Although these concepts overlap, psychologists tend to be concerned with *how* we think, but laypeople and psychologists are often concerned with *how much* intelligence we have. At an early age, we gain impressions of how intelligent or bright we are compared to other people.

Intelligence provides the basis for academic achievements. It allows people to think—to understand complex ideas, reason, and solve problems—to learn from experience and adapt to the environment (Gottfredson & Saklofske, 2009). As we see in architecture and space travel, intelligence also permits people to create environments. Although intelligence, like thinking, cannot be directly seen or touched, psychologists tie the concept to achievements such as school performance and occupational status (Nisbett, 2009; Pind et al., 2003).

Psychologists have engaged in thousands of studies on intelligence, yet they do not quite agree on what it is. They have therefore developed theories to help them understand and define intelligence. In this section, we discuss these theories of the nature of intelligence. Then we see how intelligence is measured and discuss group differences in intelligence. Finally, we examine the determinants of intelligence: heredity and the environment. Along the way, you'll see why intelligence may just be the most controversial concept in the science of psychology. **Question 17: What are the various theories of intelligence?**

Theories of Intelligence

Theories of intelligence have taken the concept apart and then put it back together again. But like Humpty Dumpty, the pieces don't necessarily fit together easily. Let's begin with factor theories.

FACTOR THEORIES

Many investigators have viewed intelligence as consisting of one or more *factors*. Factor theories argue that intelligence is made up of a number of mental abilities, ranging from one kind of ability to hundreds.

In 1904, British psychologist Charles Spearman suggested that the behaviors we consider intelligent have a common underlying factor. He labeled this factor *g*, for “general intelligence” or broad reasoning and problem-solving abilities. Spearman supported his view by noting that people rarely score very high in one area (such as knowledge of the meaning of words) and very low in another (such as the ability to compute numbers). People who excel in one area are also likely to excel in others. But he also noted that even the most capable people are relatively superior in some areas—such as music or business or poetry. For this reason, he suggested that specific, or *s*, factors account for specific abilities.

To test his views, Spearman developed **factor analysis**—a statistical technique that allows researchers to determine which items on tests seem to be measuring the same things. When he compared relationships among test scores of verbal, mathematical, and spatial reasoning, Spearman repeatedly found evidence supporting the existence of *s* factors. The evidence for *g* was more limited. Interestingly, more than 100 years later, researchers continue to find a key role for *g* in performance on many intelligence tests (Gottfredson & Saklofske, 2009). A number of cognitive psychologists (e.g., Colom

Intelligence A general mental capability that involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly, and learn from experience.

g Spearman's symbol for general intelligence, which he believed underlay more specific abilities.

s Spearman's symbol for *specific* factors, or *s factors*, which he believed accounted for individual abilities.

Factor analysis A statistical technique that allows researchers to determine the relationships among large number of items, such as test items.

Table 8.1 ■ Primary Mental Abilities, According to Thurstone

Ability	Definition
Visual and spatial abilities	Visualizing forms and spatial relationships
Perceptual speed	Grasping perceptual details rapidly, perceiving similarities and differences between stimuli
Numerical ability	Computing numbers
Verbal meaning	Knowing the meanings of words
Memory	Recalling information (words, sentences, etc.)
Word fluency	Thinking of words quickly (rhyming, doing crossword puzzles, etc.)
Deductive reasoning	Deriving examples from general rules
Inductive reasoning	Inferring general rules from examples

et al., 2003; Saggino et al., 2006) find evidence that connects *g* with *working memory*—that is, the ability to keep various elements of a problem in mind at once. Psychologists continue to use the term *g* in research, speaking, for example, of the extent to which they believe a particular kind of test, such as the SAT, measures *g* (Lubinski & Benbow, 2006).

American psychologist Louis Thurstone (1938) used factor analysis with tests of specific abilities and concluded that Spearman had oversimplified intelligence. Thurstone's data suggested the presence of nine specific factors, which he labeled **primary mental abilities** (see Table 8.1) ■. Thurstone's primary mental abilities contain the types of items measured on the most widely used intelligence tests today. The question remains as to whether his primary mental abilities are distinct or whether they are different ways of assessing *g*.

THE THEORY OF MULTIPLE INTELLIGENCES

Thurstone wrote about various factors or components of intelligence. Howard Gardner's (1983/1993, 2009) **theory of multiple intelligences** proposes, instead, that there are a number of *intelligences*, not just one. Gardner refers to each kind of intelligence in his theory as “an intelligence” because they can differ so much (see Figure 8.6) ■. He also believes that each kind of intelligence is based in a different part of the brain. Two of these intelligences are familiar ones: language ability and logical-mathematical ability.

Primary mental abilities According to Thurstone, the basic abilities that make up intelligence.

Theory of multiple intelligences Gardner's view that there are several intelligences, not just one.

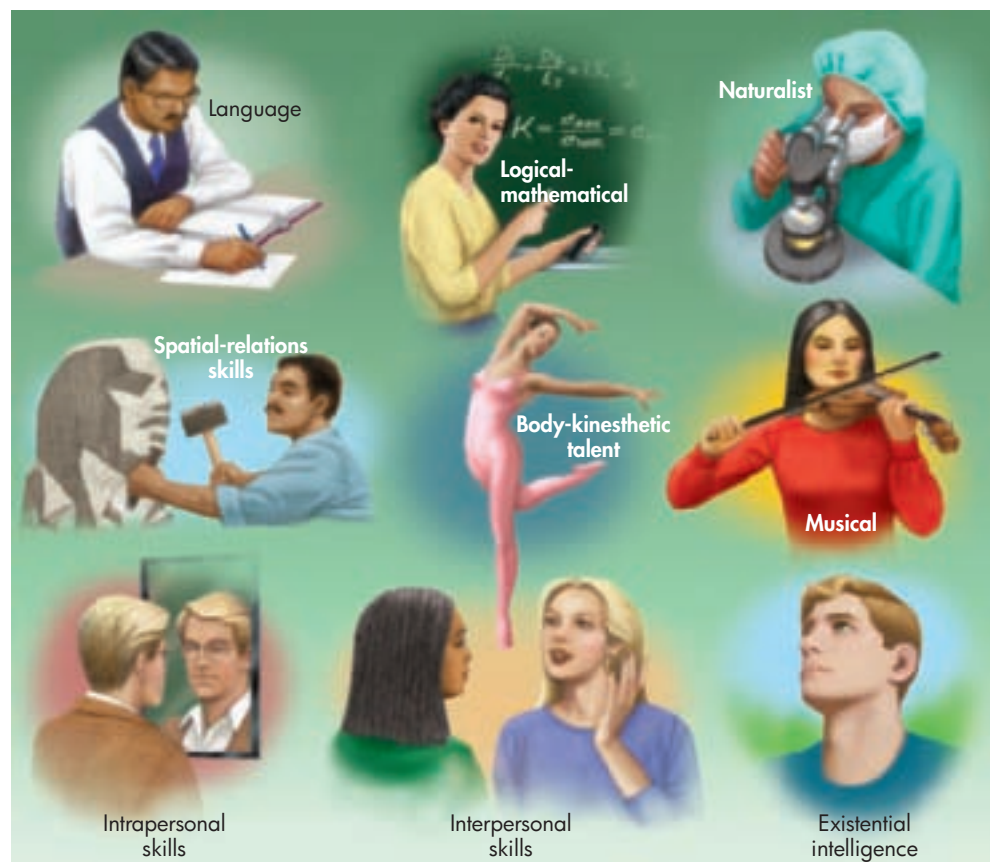


Figure 8.6 ■ Gardner's Theory of Multiple Intelligences According to Gardner, there are several intelligences, not one, each based in a different area of the brain. Language ability and logic are familiar aspects of intelligence. But Gardner also refers to bodily talents, musical ability, spatial-relations skills, and two kinds of personal intelligence—sensitivity to one's own feelings (intrapersonal sensitivity) and sensitivity to the feelings of others (interpersonal sensitivity) as intelligences. Gardner's critics ask whether such special talents are truly “intelligences” or specific talents.

However, Gardner also refers to bodily-kinesthetic talents (of the sort shown by dancers and athletes), musical talent, spatial-relations skills, and two kinds of personal intelligence: awareness of one's own inner feelings and sensitivity to other people's feelings. Gardner (2001) subsequently added "naturalist intelligence" and "existential intelligence." Naturalist intelligence refers to the ability to look at natural events, such as kinds of animals and plants or the stars above and to develop insights into their nature and the laws that govern their behavior. Existential intelligence means dealing with the larger philosophical issues of life. According to Gardner, one can compose symphonies or advance mathematical theory yet be average in, say, language and personal skills. (Are not some academic "geniuses" foolish in their personal lives?)

Critics of Gardner's view agree that people function more intelligently in some aspects of life than in others. They also agree that many people have special talents, such as bodily-kinesthetic talents, even if their overall intelligence is average. But they question whether such special intellectual skills are best thought of as intelligences or special talents (Neisser et al., 1996). Language skills, reasoning ability, and the ability to solve math problems seem to be more closely related than musical or gymnastic talent to what most people mean by intelligence. If people have no musical ability, do we really think of them as *unintelligent*? It is difficult to define intelligence in a way that everyone agrees on.

THE TRIARCHIC THEORY OF INTELLIGENCE

Psychologist Robert Sternberg (2000; Sternberg et al., 2006) has constructed a three-pronged or **triarchic theory of intelligence** that resembles a view proposed by the Greek philosopher Aristotle (Tigner & Tigner, 2000). The three prongs include *analytical*, *creative*, and *practical intelligence* (see Figure 8.7) ■.

Analytical intelligence is similar to Aristotle's "theoretical intelligence" and can be defined as academic ability. It enables us to solve problems and acquire new knowledge. It is the type of intelligence measured by standard intelligence tests. Problem-solving skills include encoding information, combining and comparing bits of information, and generating a solution. Consider Sternberg's analogy problem:

Washington is to *1* as *Lincoln* is to (a) 5, (b) 10, (c) 15, (d) 50?

To solve the analogy, we must first correctly *encode* the elements—*Washington*, *1*, and *Lincoln*—by identifying them and comparing them to other information. We can first encode *Washington* and *Lincoln* as the names of presidents and then try to combine *Washington* and *1* in a meaningful manner. (There are other possibilities: Both are

Triarchic theory of intelligence Sternberg's theory that intelligence has three prongs, consisting of analytical, creative, and practical intelligence ("street smarts").

Figure 8.7 ■ Sternberg's Theory of Intelligence According to Robert Sternberg, there are three types of intelligence: analytical (academic ability), creative, and practical ("street smarts"). Psychologists discuss the relationships between intelligence and creativity, but within Sternberg's model, creativity is a type of intellectual functioning.



Analytical intelligence
(Academic ability)
Abilities to solve problems, compare and contrast, judge, evaluate, and criticize



Creative intelligence
(Creativity and insight)
Abilities to invent, discover, suppose, or theorize



Practical intelligence
("Street smarts")
Abilities to adapt to the demands of one's environment, apply knowledge in practical situations

also the names of memorials and cities, for example.) If we do encode the names as presidents, two possibilities quickly come to mind. Washington was the first president, and his picture is on the \$1 bill. We can then generate two possible solutions and try them out. First, was Lincoln the 5th, 10th, 15th, or 50th president? Second, on what bill is Lincoln's picture found? (Do you need to consult a history book or peek into your wallet at this point?) The answer is (a) 5, because Lincoln's likeness is found on the \$5 bill. (He was the nation's 16th president, not the 15th.)

Creative intelligence is similar to Aristotle's "productive intelligence" and is defined by the abilities to cope with novel situations and generate many possible solutions to problems. It is creative to quickly relate novel situations to familiar situations (that is, to perceive similarities and differences). Psychologists who consider creativity to be separate from analytical intelligence or academic ability find there is only a moderate relationship between academic ability and creativity (Simonton, 2009). However, to Sternberg, creativity *is* a form of intelligence.

Aristotle and Sternberg both speak of practical intelligence, or "street smarts." **Truth or Fiction Revisited:** It is therefore true that street smarts are a sign of intelligence—at least according to Aristotle and Sternberg. Practical intelligence enables people to deal with people, including difficult people, and to meet the demands of their environment. For example, keeping a job by adapting one's behavior to the employer's requirements is adaptive. But if the employer is making unreasonable demands, finding a more suitable job is also adaptive. Street smarts appear to help people get by in the real world, especially with other people, but are not particularly predictive of academic success (Heng, 2000).

There are thus many views of what intelligence is and how many kinds of intelligence there may be. We do not yet have the final word on the nature of intelligence, but I would like to share Linda Gottfredson's definition (on the next page):

A CLOSER LOOK • RESEARCH

EMOTIONAL INTELLIGENCE AND SOCIAL INTELLIGENCE

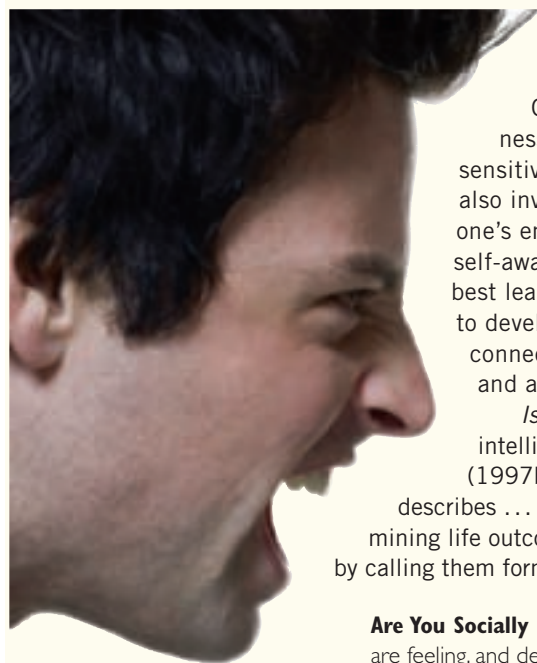
Psychologists Peter Salovey and John Mayer developed the theory of emotional intelligence, which was popularized by *The New York Times* writer Daniel Goleman (1995). The theory holds that social and emotional skills are a form of intelligence, just as academic skills are (Mayer et al., 2008; Salovey et al., 2008). Emotional intelligence resembles two of Gardner's intelligences—awareness of one's inner feelings and sensitivity to the feelings of others. It also involves control or regulation of one's emotions. The theory suggests that self-awareness and social awareness are best learned during childhood. Failure to develop emotional intelligence is connected with childhood depression and aggression.

Is emotional intelligence a form of intelligence? Psychologist Ulric Neisser (1997b) wrote, "The skills that Goleman describes . . . are certainly important for determining life outcomes, but nothing is to be gained by calling them forms of intelligence."

Are You Socially Intelligent? Social intelligence can help us understand other people, feel what they are feeling, and develop productive relationships with them.

Ten years later, Goleman stirred the controversy anew by returning with another best seller, *Social Intelligence* (2006). This time around, Goleman described how an American commander prevented a confrontation between his troops and an Iraqi mob by ordering the troops to point their rifles at the ground and smile. Although there was a language barrier, the aiming of the weapons downward and the smiles were a form of universal language that was understood by the Iraqis, who then smiled back. Conflict was avoided. According to Goleman, the commander had shown social intelligence—the ability to read the Iraqis' social concerns and solve the social problem by coming up with a useful social response. Social intelligence, like emotional intelligence, also corresponds to Gardner's intelligences, and critics ask whether it brings anything new to the table (Landy, 2006).

Goleman (and Gardner before him) suggests that we may be genetically "prewired" to connect with other people. The purpose of social intelligence, as Goleman sees it, is not to manipulate other people but rather to understand them, feel what they are feeling, and develop mutually nourishing relationships with them.



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[Intelligence is] a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather it reflects a broader and deeper capability for comprehending our surroundings—“catching on,” “making sense,” of things, or “figuring out what to do.”

—Linda Gottfredson in Nisbett, 2009, p. 4

Creativity and Intelligence

Think of artists, musicians, poets, scientists who innovate research methods, and other creative individuals. **Question 18: What is creativity, and how is it related to intelligence?**

The concept of creativity has been difficult to define, just as the concept of intelligence. One issue is whether creativity is distinct from intelligence or is, as Sternberg suggests, a type of intelligence. For example, we would not ask the question “Do creative people tend to be intelligent?” unless we saw creativity as distinct from intelligence.

CONCEPT REVIEW THEORIES OF INTELLIGENCE

Theory

Basic Information

Comments

General versus specific factors (main proponent: Charles Spearman)



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- Spearman created factor analysis to study intelligence.
- There is strong evidence for the general factor (g) in intelligence.
- s factors are specific abilities, skills, talents.

- Concept of g remains in use today—a century later.

Primary mental abilities (proponent: Louis Thurstone)



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- Thurstone used factor analysis.
- There are many “primary” abilities.
- All abilities and factors are academically oriented.

- Other researchers (e.g., Guilford) claim to have found hundreds of factors.
- The more factors that are claimed, the more they overlap.

Triarchic theory (proponent: Robert Sternberg)



© Robert Sternberg/Florida University

- Intelligence has three prongs—with analytical, creative, and practical components.
- Analytical intelligence is analogous to academic ability.

- The theory coincides with the views of Aristotle.
- Critics do not view creativity as a component of intelligence.

Multiple intelligences (proponent: Howard Gardner)



© 2003 J. Gardner

- Gardner theorized distinct “intelligences.”
- Intelligences include academic intelligences, personal and social intelligences, talents, and philosophical intelligences.
- The theory posits different bases in the brain for different intelligences.

- Proponents continue to expand the number of intelligences.
- Critics see little value to theorizing intelligences rather than aspects of intelligence.
- Most critics consider musical and bodily skills to be special talents, not intelligences.



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Truth or Fiction Revisited: The answer to whether an intelligent person is creative or a creative person is intelligent thus partly depends on definitions. If you consider creativity an aspect of intelligence, then the two concepts—intelligence and creativity—overlap. But if you think of intelligence as more closely related to academic ability, it is not always true that a highly intelligent person is creative or that a creative person is highly intelligent. Research findings suggest that the relationship between intelligence test scores and standard measures of creativity is only moderate (Simonton, 2009).

Within his triarchic theory, Sternberg (2007) defines **creativity** as the ability to do things that are novel and useful. Other psychologists note that creative people can solve problems to which there are no preexisting solutions, no tried and true formulas (Simonton, 2009). Creative people share a number of qualities (R. M. Milgram & Livne, 2006; Sternberg, 2006; Sternberg et al., 2009). They take chances. They refuse to accept limitations. They appreciate art and music. They use common materials to make unique things. They challenge social norms and take unpopular stands. They challenge ideas that other people accept at face value.

Creative problem solving demands divergent rather than convergent thinking. In **convergent thinking**, thought is limited to present facts; the problem solver narrows his or her thinking to find the best solution. (You use convergent thinking to arrive at the right answer to a multiple-choice question.) In **divergent thinking**, the problem solver associates freely to the elements of the problem, allowing “leads” to run a nearly limitless course. (You may use divergent thinking when you are trying to generate ideas to answer an essay question on a test.) Problem solving can involve both kinds of thinking. At first, divergent thinking helps generate many possible solutions. Convergent thinking is then used to select likely solutions and reject others. The nearby Remote Associates Test may afford you insight into your creativity.

Intelligence test questions usually require analytical, convergent thinking to focus in on the one right answer. Tests of creativity determine how flexible a person’s thinking is (Simonton, 2009). Here is an item from a test used by Getzels and Jackson (1962) to measure associative ability, a factor in creativity: “Write as many meanings as you can for each of the following words: (a) duck; (b) sack; (c) pitch; (d) fair.” Those who write several meanings for each word, rather than only one, are rated as potentially more creative.

Another measure of creativity asks people to produce as many words as possible that, say, begin with T and end with N within a minute. Still another item might give people a minute to classify a list of names in as many ways as possible. How many ways can you group the following names?

MARTHA PAUL JEFFRY SALLY PABLO JOAN

One way would be to classify them as men’s names or women’s names. Another would be English names versus Spanish names. Still another would be six-letter names, five-letter names, and four-letter names. The ability to do well on these kinds of items is connected with scores on standard intelligence tests, but only moderately so.

Creativity The ability to generate novel and useful solutions to problems.

Convergent thinking A thought process that narrows in on the single best solution to a problem.

Divergent thinking A thought process that attempts to generate multiple solutions to problems.

SELF ASSESSMENT

The Remote Associates Test

One aspect of creativity is the ability to associate freely to all aspects of a problem. Creative people take far-flung ideas and piece them together in novel combinations. Following are items from the Remote Associates Test, which measures the ability to find words that are distantly related to stimulus

words. For each set of three words, try to think of a fourth word that is related to all three words. For example, the words *rough*, *resistance*, and *beer* suggest the word *draft*, as in the phrases *rough draft*, *draft resistance*, and *draft beer*. The answers are given in the Appendix.

- | | | | | | | | |
|-------------|---------|----------|-------|-------------|-------|----------|-------|
| 1. food | catcher | hot | _____ | 6. attorney | self | spending | _____ |
| 2. hearted | feet | bitter | _____ | 7. magic | pitch | power | _____ |
| 3. dark | shot | sun | _____ | 8. arm | coal | peach | _____ |
| 4. Canadian | golf | sandwich | _____ | 9. type | ghost | story | _____ |
| 5. tug | gravy | show | _____ | | | | |

Now that we have begun speaking of scores on intelligence tests, let's see how psychologists go about measuring intelligence. We will also see how psychologists attempt to *validate* their measures of intelligence—that is, how they try to demonstrate that they are in fact measuring intelligence.

The Measurement of Intelligence

Although psychologists disagree about the nature of intelligence, laypeople and educators are concerned with how much intelligence people have because the issue affects educational and occupational choices. In this section, we consider two of the most widely used intelligence tests.

THE STANFORD–BINET INTELLIGENCE SCALE

Many of the concepts of psychology have their origins in common sense. The common-sense notion that academic achievement depends on children's intelligence led Alfred Binet and Theodore Simon to invent measures of intelligence.

Question 19: What is the Stanford–Binet Intelligence Scale? Early in the 20th century, the French public school system was looking for a test that could identify children who were unlikely to benefit from regular classroom instruction. If these children were identified, they could be given special attention. The first version of that test, the Binet–Simon scale, came into use in 1905. Since that time, it has undergone extensive revision and refinement. The current version is the Stanford–Binet Intelligence Scale (SBIS).

Binet assumed that intelligence increases with age, so older children should get more items right than younger children. He therefore included a series of age-graded questions, as in Table 8.2 ■, arranged in order of difficulty.

The Binet–Simon scale yielded a score called a **mental age (MA)**. The MA shows the intellectual level at which a child is functioning. For example, a child with an MA of 6 is functioning intellectually like the average 6-year-old. In taking the test, children earned “months” of credit for each correct answer. Their MA was determined by adding up the years and months of credit they attained.

Louis Terman adapted the Binet–Simon scale for use with American children at Stanford University. The first version of the resultant Stanford–Binet Intelligence Scale (SBIS) was published in 1916. The SBIS included more items than the original test and was used with children aged 2 to 16. It also yielded an **intelligence quotient (IQ)** rather than an MA.

Mental age (MA) The accumulated months of credit that a person earns on the Stanford–Binet Intelligence Scale.

Intelligence quotient (IQ) (a) Originally, a ratio obtained by dividing a child's score (or mental age) on an intelligence test by chronological age. (b) Generally, a score on an intelligence test.

In Profile

You never would have guessed that Alfred Binet (1857–1911) would invent the method that transformed the testing of intelligence from nonsense into science. It's not that he wasn't, well, intelligent enough. It's that he wasn't quite focused enough.

Binet, the only child of separated parents, was reared by his mother and grew up a loner. He got a degree in law and then transferred to medical school, where he stayed until he got bored and dropped out. He turned to psychology, but because he was independently wealthy, he saw no need to earn a degree. In 1883, a former classmate, Joseph Babinski (who would go on to describe the *Babinski reflex*), introduced Binet to Jean Martin Charcot, the director of the Salpêtrière Hospital. Charcot, who would also influence Sigmund Freud, gave Binet a position practicing hypnosis.

Binet and a colleague conducted some bad experiments in hypnosis. For example, Binet used magnets to try to shift an action (such as lifting an arm) from one side of the body to the other.



ALFRED BINET

© Calver Pictures

He also believed he had shown that he could use magnets to transform an emotion into its opposite. He was criticized for this silliness and later admitted that his “findings” could all be attributed to the power of suggestion. He resigned from the hospital and began writing and producing plays that wallowed in terror, mental illness, and murder. (Dare we wonder if he was simply ahead of his time in his writing?)

He later earned a doctorate in natural science and enthusiastically dove into craniometry—skull measurement—as a way of measuring intelligence. But

his own data showed him the error of his ways. Only in middle age would he develop a method that he had first used with his own children to assess intelligence for the Ministry of Public Instruction. (For example, he had asked his children to point to parts of their bodies, to explain how things were used, and to show that they understood concepts such as *more* and *less*.) The result was the Binet–Simon scale.

You never would have guessed that it would be Binet.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Alfred Binet.

Table 8.2 ■ Items Similar to Those on the Stanford–Binet Intelligence Scale

Level (Years)	Item
2	<ol style="list-style-type: none"> Children show knowledge of basic vocabulary words by identifying parts of a doll, such as the mouth, ears, and hair. Children show counting and spatial skills along with visual-motor coordination by building a tower of four blocks to match a model.
4	<ol style="list-style-type: none"> Children show word fluency and categorical thinking by filling in the missing words when they are asked questions such as: “Father is a man; mother is a _____?” “Hamburgers are hot; ice cream is _____?” Children show comprehension by answering correctly when they are asked questions such as: “Why do people have automobiles?” “Why do people have medicine?”
9	<ol style="list-style-type: none"> Children can point out verbal absurdities, as in this question: “In an old cemetery, scientists unearthed a skull which they think was that of George Washington when he was only 5 years of age. What is silly about that?” Children display fluency with words, as shown by answering these questions: “Can you tell me a number that rhymes with snore?” “Can you tell me a color that rhymes with glue?”
Adult	<ol style="list-style-type: none"> Adults show knowledge of the meanings of words and conceptual thinking by correctly explaining the differences between word pairs like “sickness and misery,” “house and home,” and “integrity and prestige.” Adults show spatial skills by correctly answering questions like: “If a car turned to the right to head north, in what direction was it heading before it turned?”

As a result, American educators developed interest in learning the IQs of their pupils. The SBIS is used today with children from the age of 2 upward and with adults.

The IQ reflects the relationship between a child’s mental age and his or her actual or chronological age (CA). Use of this ratio reflects the fact that the same MA score has different implications for children of different ages. That is, an MA of 8 is an above-average score for a 6-year-old but below average for a 10-year-old. In 1912, German psychologist Wilhelm Stern suggested the IQ as a way to deal with this problem. Stern computed IQ using the formula

$$IQ = \frac{\text{Mental Age (MA)}}{\text{Chronological Age (CA)}} \times 100$$

According to this formula, a child with an MA of 6 and a CA of 6 would have an IQ of 100. Children who can handle intellectual problems as well as older children do have IQs above 100. For instance, an 8-year-old who does as well on the SBIS as the average 10-year-old would attain an IQ of 125. Children who do not answer as many items correctly as other children of the same age attain MAs lower than their CAs. Thus, their IQ scores are below 100.

IQ scores on the SBIS today are derived by comparing their results to those of other people of the same age. People who answer more items correctly than the average for people of the same age attain IQ scores above 100. People who answer fewer items correctly than the average for their age attain scores below 100. **Truth or Fiction Revisited:** Therefore, two children can answer exactly the same items on an intelligence test correctly, yet one can be above average and the other below average in IQ. This is because the ages of the children may differ. The more intelligent child would be the younger of the two.



The Stanford–Binet Intelligence Scale In 1905, Alfred Binet and Theodore Simon in France introduced the idea of measuring intelligence. This version of the test was produced in 1937 by Lewis Terman and Maude Merrill in the United States and was specifically designed for younger children.

THE WECHSLER SCALES

David Wechsler developed a series of scales for use with children and adults. **Question 20: How do the Wechsler scales of intelligence differ from the Stanford-Binet?** The Wechsler scales group test questions into a number of separate subtests (see Figure 8.8) ■. Each subtest measures a different intellectual task. For this reason,

Figure 8.8 ■ Items similar to those on the Wechsler Adult Intelligence Scale

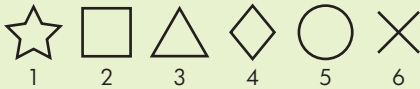
Verbal Subtests

1. *Information*: “What is the capital of the United States?” “Who was Shakespeare?”
2. *Comprehension*: “Why do we have ZIP codes?” “What does ‘A stitch in time saves 9’ mean?”
3. *Arithmetic*: “If 3 candy bars cost 25 cents, how much will 18 candy bars cost?”
4. *Similarities*: “How are good and bad alike?” “How are peanut butter and jelly alike?”
5. *Digit span*: Repeating a series of numbers forwards and backwards.
6. *Vocabulary*: “What does canal mean?”

Performance Subtests

7. *Digit Symbol*: Learning and drawing meaningless figures that are associated with numbers. The faster a person memorizes the correlations, the higher he or she scores on this subtest.

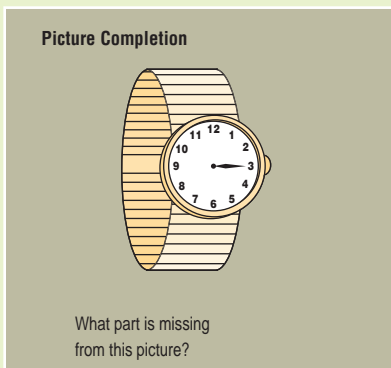
Answer key:



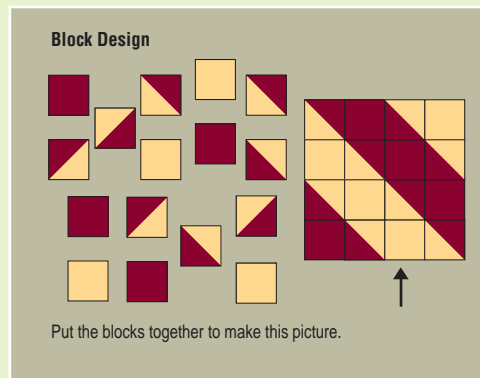
Test: (fill in the corresponding number)



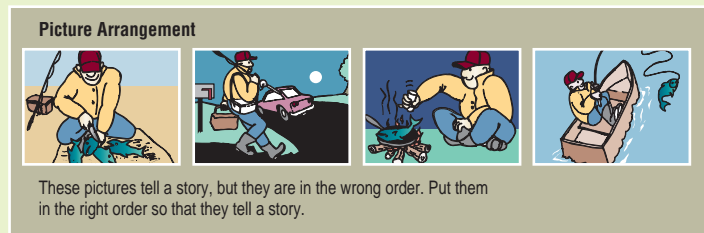
8. *Picture completion*: Pointing to the missing part of a picture.



9. *Block design*: Copying pictures of geometric designs using multicolored blocks.



10. *Picture arrangement*: Arranging cartoon pictures in sequence so that they tell a meaningful story.



11. *Object assembly*: Putting pieces of a puzzle together so that they form a meaningful object.



the test shows how well a person does on one type of task (such as defining words) compared with another (such as using blocks to construct geometric designs). In this way, the Wechsler scales highlight children's relative strengths and weaknesses as well as measure overall intellectual functioning.

Wechsler described some of his scales as measuring *verbal* tasks and others as assessing *performance* tasks. In general, verbal subtests require knowledge of verbal concepts, whereas performance subtests require familiarity with spatial-relations concepts. But it is not that easy to distinguish between the two groupings. For example, recognizing the name of the object being assembled (the puzzle) in subtest 11 is a sign of word fluency and general knowledge as well as of spatial-relations ability, and it helps the person piece together the puzzle more rapidly. In any event, Wechsler's scales permit the computation of verbal and performance IQs. Nontechnically oriented college students often attain higher verbal than performance IQs. Less-well-educated people often obtain higher performance than verbal IQs.

Wechsler also introduced the concept of the *deviation IQ*. Instead of dividing mental by chronological age to compute an IQ, he based IQ scores on how a person's answers compared with those attained by people in the same age group. The average test result at any age level is defined as an IQ score of 100. Wechsler distributed IQ scores so that the middle 50% were defined as the "broad average range" of 90 to 110.

As you can see in Figure 8.9 ■, IQ scores cluster around the average. Only 4% of the population have IQ scores of above 130 or below 70.

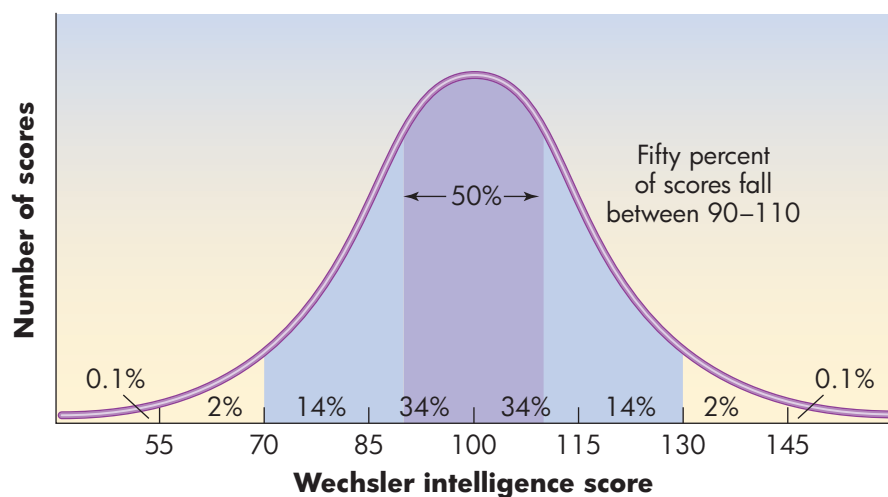


Figure 8.9 ■ Approximate Distribution of IQ Scores Wechsler defined the deviation IQ so that 50% of scores fall within the broad average range of 90 to 110. This bell-shaped curve is referred to as a normal curve by psychologists. It describes the distribution of many traits, including height.

GROUP TESTS

The SBIS and Wechsler scales are administered to one person at a time. This one-to-one ratio is optimal because it allows the examiner to observe the test taker closely. Examiners are alerted to factors that impair performance, such as language difficulties, illness, or a noisy or poorly lit room. But large institutions with few trained examiners, such as the public schools and armed forces, require tests that can be administered simultaneously to large groups.

Group tests for children were first developed during World War I. At first, these tests were hailed as remarkable instruments because they helped school administrators place children. However, as the years passed, group tests came under attack because many administrators relied on them exclusively and did not seek other sources of information about children's abilities.

At their best, intelligence tests provide just one source of information about individual children. Numbers alone, and especially IQ scores, cannot adequately define children's special abilities and talents.

THE RELIABILITY AND VALIDITY OF INTELLIGENCE TESTS

Over the years, the SBIS and the Wechsler scales have been shown to be reliable and valid. In terms of **reliability**, the scores are rather consistent from testing to testing. (After all, we would not trust a bathroom scale that yielded different results each time we weighed ourselves—unless we had stuffed or starved ourselves between weighings.) This kind of reliability is called *test–retest reliability*.

The tests also show **validity** in that the scores correlate moderately to highly with the variables they are supposed to predict, such as school performance, even though motivation and adjustment to the school setting are also involved (R. M. Kaplan & Saccuzzo, 2008; Roid & Tippin, 2009).

Reliability The consistency of a method of measurements, as, for example, shown by obtaining similar scores on different testing occasions.

Validity The extent to which a method of measurement measures what it is supposed to measure, as, for example, shown by the extent to which test scores predict or are related to an external standard. In the case of intelligence tests, the external standard might involve academic performance.

The question of whether there are innate differences in intelligence between blacks and whites goes back more than a thousand years, to the time when the Moors [who were from North Africa] invaded Europe. The Moors speculated that Europeans might be congenitally incapable of abstract thought.

RICHARD E. NESBITT

Differences in Intellectual Functioning

The average IQ score in the United States is very close to 100. Yet for some socioeconomic and ethnic groups in the United States, the average is higher, and for others, it is lower. Questions have also been raised as to whether males or females are more intelligent overall and as to whether there are gender differences in the kinds of intellectual or cognitive skills valued in society. Tests of intellectual functioning have thus been seen as divisive and as maintaining a class system or social order that is based on prejudices and “tradition” as much as on science. In this section, we discuss (a) socioeconomic and ethnic differences and (b) gender differences in cognitive skills.

SOCIOECONOMIC AND ETHNIC DIFFERENCES

There is a body of research suggestive of differences in intelligence—or more precisely, intelligence test scores—between socioeconomic and ethnic groups. **Question 21: What are the socioeconomic and ethnic differences in intelligence?** Lower-class U.S. children obtain IQ scores some 10 to 15 points lower than those obtained by middle- and upper-class children. African American children tend to obtain IQ scores some 15 points lower than those obtained by their European American age-mates (Helms, 2006; Neisser et al., 1996). Latino and Latina American and Native American children also tend to score below the norms for European Americans (Neisser et al., 1996; Sternberg, 2007b).

Many studies of IQ confuse the factors of social class and ethnicity because disproportionate numbers of African Americans, Latino and Latina Americans, and Native Americans are found among the lower socioeconomic classes (Helms, 2006; Nisbett, 2009). When we limit our observations to particular ethnic groups, however, we still find an effect for social class. That is, middle-class European Americans outscore poorer European Americans. Middle-class African Americans, Latino and Latina Americans, and Native Americans also outscore poorer members of their own ethnic groups.

In Profile

“His research may shed fresh light on why many [African Americans] do poorly on standardized tests,” writes Ethan Watters. Claude Steele has noted that African Americans experience a feeling of racial vulnerability when, for example, they see Band-Aids tinted to match pink skin. This concept of *stereotype threat* describes what African Americans can feel when they see standardized tests, such as intelligence tests, that seem designed to be taken by students with “pink” skin. He argues that the sense of vulnerability is hard to overcome and that society as well as individuals must change.

Steele, a Stanford University psychologist, began developing his ideas in the 1980s when he took a teaching position at the University of Michigan and became aware of the greater dropout rate of African American students. In an experiment designed to test this view, Steele and Aronson (1995) gave two groups of African American and European American Stanford undergraduates the most difficult verbal skills test questions from the GRE. One group was told that the researchers were attempting to learn about the “psychological factors involved in solving verbal



CLAUDE STEELE

© L.A. Green, Stanford University News Service

problems.” The other group was told that the items were “a genuine test of your verbal abilities and limitations.” African American students who were given the first message performed as well as European American students. African American students who were given the second message—that proof of their abilities was on the line—performed significantly more poorly than the European American students. Apparently, the second message triggered their stereotype vulnerability, which led them to perform poorly on the test.

Interestingly, Shelby Steele (Claude’s twin brother and well-known conservative essayist) has been very outspoken against his brother’s views. In fact, Shelby has argued that African Americans need willpower to achieve despite the odds, not affirmative action as Claude suggests. Claude reported that the 21st Century Program he began at University of Michigan reduced the grade gap between African and European American students. It remains to be seen whether the 21st century will also reduce the gap between Claude and Shelby Steele.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Claude Steele.

There may also be intellectual differences between Asians and Caucasians. Asian Americans, for example, frequently outscore European Americans on the math portion of the Scholastic Aptitude Test. Students in China (Taiwan) and Japan also outscore European Americans on achievement tests in math and science (Nisbett, 2009). In the United States, moreover, people of Asian Indian, Korean, Japanese, Filipino, and Chinese descent are more likely than European Americans, African Americans, and Latino and Latina Americans to graduate high school and complete college (Sternberg, 2007b; Xie & Goyette, 2003; Yeh & Chang, 2004). Asian Americans are also highly over-represented in the most competitive U.S. colleges and universities (A. Liu, 2009).

There are differences in mathematical ability between high school students in Germany and Japan, with Japanese students outscoring German students (Randel et al., 2000). Most psychologists believe that such ethnic differences reflect cultural attitudes toward education rather than inborn racial differences (Nisbett, 2009). That is, Asian students may be more motivated to work in school. Research shows that Chinese and Japanese students and their mothers tend to attribute academic successes to hard work (Bae et al., 2008). European Americans are more likely to attribute their children’s academic successes to “natural” ability (Bae et al., 2008).

These ethnic differences lead us to ask, **Question 22: Do intelligence tests contain cultural biases against ethnic minority groups and immigrants?** Are the tests valid when used with ethnic minority groups or people who are poorly educated? Some psychologists and social critics argue that intelligence tests measure many things other than intelligence—including familiarity with the dominant middle-class culture—and motivation to perform well (Steinmayr & Spinath, 2009).

Intelligence tests may be said to have a **cultural bias** because children reared in African American or Latino and Latina American neighborhoods are at a cultural disadvantage in intelligence testing (Dotson et al., 2009). Many psychologists, including Raymond B. Cattell (1949) and Florence Goodenough (1926; now revised as the Goodenough–Harris Drawing Test), have tried to construct culture-free intelligence tests. Cattell’s Culture-Fair Intelligence Test evaluates reasoning through the child’s ability to understand and use the rules that govern a progression of geometric designs (see Figure 8.10) ■. Goodenough’s Draw-A-Person test is based on the premise that children from all cultural backgrounds have had the opportunity to observe people and note the relationships between the parts and the whole. Her instructions simply require children to draw a picture of a man or woman.

Ironically, European American children outperform African American children on “culture-fair” tests (Rushton et al., 2003), perhaps because they are more likely to be familiar with materials such as blocks and pencils and paper. They are more likely than disadvantaged children to have played with blocks (which is relevant to the Cattell test) and to have sketched animals, people, and things (which is relevant to the Goodenough test). Nor have culture-fair tests predicted academic success as well as other intelligence tests. Yet psychologists are still working to develop culture-fair intelligence tests (e.g., Fagan & Holland, 2009).

GENDER DIFFERENCES

It was once widely believed that males were more intelligent than females because of their greater knowledge of world affairs and their skills in science



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Who’s Smart? Asian American children outperform all other groups of American children in school. Is it because they are more intelligent or because they work harder?

Cultural bias A factor that provides an advantage for test takers from certain cultural backgrounds, such as using test items that are based on middle-class culture in the United States.

A.		1	2	3	4	5	Answers
B.		1	2	3	4	5	<input type="checkbox"/>
C.		1	2	3	4	5	<input type="checkbox"/>
D.		1	2	3	4	5	<input checked="" type="checkbox"/>
E.		1	2	3	4	5	<input type="checkbox"/>
F.		1	2	3	4	5	<input type="checkbox"/>

Figure 8.10 ■ Examples of Types of Items Found on CFIT (Cattell’s Culture-Fair Intelligence Test) Culture-fair tests attempt to use items that do not discriminate against ethnic groups on the basis of their cultural background. For each item above, which answer (1, 2, 3, 4, or 5) completes the series? Answers are shown in the Appendix.

Source: Sample Items from Cattell’s Culture-Fair Intelligence Test. Copyright © 1949, 1960. Reproduced with permission from the publishers, Hogrefe Ltd, from Culture Fair Scale 2, Test A by R. B. Cattell and A. K. S. Cattell. The UK version of this test is soon to be updated and restandardized.

Some recent philosophers seem to have given their moral approval to these deplorable verdicts that affirm that the intelligence of an individual is a fixed quantity, a quantity that cannot be augmented. We must protest and react against this brutal pessimism; we will try to demonstrate that it is founded on nothing.

ALFRED BINET

and industry. But these differences did not reflect differences in cognitive ability. Rather, they reflected exclusion of females from world affairs, science, and industry. Moreover, intelligence tests do not show overall gender differences in cognitive abilities (Halpern & LaMay, 2000).

Question 23: Do males and females differ in intellectual functioning?

However, studies suggest that girls are somewhat superior to boys in verbal abilities, such as vocabulary, ability to generate sentences and words that are similar in meaning to other words, spelling, knowledge of foreign languages, and pronunciation (Andreano & Cahill, 2009; Lohman & Lakin, 2009). Girls seem to acquire language somewhat faster than boys do. Also, in the United States, more boys than girls have reading problems ranging from reading below grade level to severe disabilities (Brun et al., 2009).

Males seem to do somewhat better than females at manipulating visual images in working memory. Males as a group excel in visual-spatial abilities of the sort used in math, science, and reading maps (Andreano & Cahill, 2009; Yazzie, 2010). One study compared the navigation strategies of 90 male and 104 female university students (Dabbs et al., 1998). In giving directions, men more often referred to miles and directional coordinates (north, south, east, and west). Women were more likely to refer to landmarks and turning right or left. The implication in the Dabbs study, and in recent studies that use computer-generated virtual environments (Castelli et al., 2008; Chai & Jacobs, 2009), is that males have a slight advantage in visualizing distances and coordinates.

For half a century or more, it has been believed that male adolescents generally outperform females in mathematics, and research has tended to support that belief (Collaer & Hill, 2006; Halpern et al., 2007). But a recent study by Janet Hyde and her colleagues (2008) of some 7 million 2nd through 11th graders found no gender differences for performance in mathematics on standardized tests. The complexity of the test items apparently made no difference. Nevertheless, most Americans have different expectations for boys and girls, and these expectations may still dissuade some math-proficient girls from entering so-called STEM (science, technology, engineering, and mathematics) fields (Hyde & Mertz, 2009).

Regarding differences in verbal abilities and spatial-relations skills, note that the reported gender differences are *group* differences. There is greater variation in these skills among individuals *within* the groups than between males and females (Halpern et al., 2007). That is, there may be a greater difference in, say, verbal skills between two women than between the typical woman and the typical man. Millions of females outdistance the “average” male in math and spatial abilities. Men have produced their verbally adept Shakespeares. Moreover, in most cases, differences in cognitive skills are small (Hyde & Plant, 1995). Differences in verbal, math, and visual-spatial abilities also appear to be narrowing as more females pursue course work in fields that had been typically populated by males.

Thus, there is reason to believe that women have the capacity to be entering STEM fields in greater numbers. So why, in the 21st century in the United States, do women remain underrepresented in STEM fields? According to psychologists Stephen Ceci, Wendy Williams, and Susan Barnett (2009), who have studied the issue extensively, the reasons are likely as follow:

- Women who are proficient in math are more likely than math-proficient men to prefer careers that do not require skills in math.
- More males than females obtain extremely high scores on the SAT mathematics test and the quantitative reasons sections of the Graduate Record Exam.
- Women who are proficient in math are more likely than men with this proficiency to have high verbal competence as well, which encourages many such women to choose other careers.
- In some STEM fields, women with children find themselves penalized in terms of promotions.

Women’s preferences are apparently the strongest reason today that there are more men entering and remaining in STEM fields; however, the other powerful factor

Table 8.3 ■ Percentage of Bachelor's and Doctoral Degrees Women Earned, by Field of Study: Academic Years 1990–1991, 1995–1996, and 2005–2006

Bachelor's Degrees	1990–1991	1995–1996	2005–2006
Health professions & related clinical sciences	83.9%	81.5%	86%
Biological & biomedical sciences	50.8	52.6	61.5
Physical sciences & science technologies	31.6	36.0	41.8
Mathematics & statistics	47.3	46.1	45.1
Engineering & engineering technologies	14.1	16.2	17.9
Doctoral Degrees			
Health professions & related clinical sciences	57.7%	60.3%	72.5%
Biological & biomedical sciences	36.9	41.8	49.2
Physical sciences & science technologies	19.6	22.9	30.0
Mathematics & statistics	19.2	20.6	29.5
Engineering & engineering technologies	9.3	12.6	20.2

Source: U.S. Department of Education, National Center for Education Statistics (NCES). *Digest of Education Statistics, 2007* (NCES 2008-022), tables 258, 286, 288, 290–294, 296, 299–301, 303, 305, and 307, data from U.S. Department of Education, NCES, 1990–91, 1995–96, and 2005–06 Integrated Postsecondary Education Data System, “Completions Survey” (IPEDS-C:91–96), and IPEDS, Fall 2006. Table 27.1.

appears to be performance on tests such as the SAT and the GRE. Could there also be inborn or “natural” reasons that women are less likely to enter STEM fields? The researchers find the evidence for biological cognitive differences between females and males to be “contradictory and inconclusive.” Even so, women are in fact entering STEM fields in increasing numbers (Cox & Alm, 2005; G. Park et al., 2008; see Table 8.3) ■.

INTELLECTUAL DEFICIENCY AND GIFTEDNESS

About 50% of U.S. children obtain IQ scores in the broad average range from 90 to 110. Nearly 95% obtain scores between 70 and 130. But what about the other 5%? Children who obtain IQ scores below 70 are generally labeled as intellectually deficient. Children who obtain scores of 130 or above are usually labeled as gifted. Both of these labels create certain expectations. Both can place heavy burdens on children and their parents.

Question 24: What does it mean to be intellectually deficient? According to the American Psychiatric Association (2000), intellectual deficiency—also commonly referred to as mental retardation—refers to substantial limitations in general intellectual functioning that are accompanied by limitations in at least two or more areas of adaptive skills: communication, self-care, maintaining a home life, interpersonal skills, use of community resources, and organization of one’s academic life, vocational life, health and safety needs, and leisure activities. Most people who are deficient are mildly deficient. They are capable of adjusting to the demands of educational institutions and, eventually, to society at large.

Children with Down syndrome are most likely to fall within the moderately deficient range. Moderately intellectually deficient children can learn to speak; to dress, feed, and clean themselves; and eventually to engage in work under supportive conditions, as in sheltered workshops. Severely and profoundly deficient children may not acquire speech and self-help skills and are likely to remain highly dependent on others throughout their lives.

Intellectual deficiency can stem from chromosomal abnormalities such as Down syndrome, from genetic disorders, or from brain damage. Brain damage may have many origins, including accidents during childhood and problems during pregnancy. Maternal alcohol abuse, malnutrition, or smoking can all lead to intellectual deficiency in the child.

Question 25: What does it mean to be gifted? Giftedness involves more than excellence in the tasks provided by standard intelligence tests. Most educa-

tors include children as gifted who have outstanding abilities, are capable of high performance in a specific academic area such as language arts or mathematics, or who show creativity or leadership, distinction in the visual or performing arts, or talent in physical activities such as gymnastics and dancing. This view of giftedness exceeds academic ability and is consistent with Gardner's view that there are multiple intelligences, not just one.

Much of our knowledge of the progress of children who are gifted in overall intellectual functioning stems from Louis Terman's classic longitudinal studies of genius (Janos, 1987). In 1921, Terman began to track the progress of some 1,500 California schoolchildren who had attained IQ scores of 135 or above. The average score was 150, which places these children in a very superior group.

There is a stereotype that extremely bright—gifted—children tend to be “geeky”—that is, physically and socially awkward. **Truth or Fiction Revisited:** But Terman found that gifted individuals tended to be taller, better developed physically, healthier, and superior in both social adaptability and leadership skills. As adults, the group was extremely successful, compared with the general population, in terms of level of education (nearly 10% had earned doctoral degrees), socioeconomic status, and creativity (the group had published more than 90 books and many more shorter pieces). The people in the study were also well adjusted, with rates of psychological disorders and suicide below the national averages.

Nature and Nurture in Intelligence: Where Does Intelligence Come From?

If different ethnic groups tend to score differently on intelligence tests, psychologists—like educators and other people involved in public life—want to know why. We will see that this is one debate that can make use of key empirical findings. Psychologists can point with pride to a rich mine of research on the roles of nature (genetic influences) and nurture (environmental influences) in the development of intelligence.

GENETIC INFLUENCES ON INTELLIGENCE

Question 26: What are the genetic influences on intelligence? Research on the genetic influences has employed kinship studies, twin studies, and adoptee studies. Let's consider each of these to see whether heredity affects intellectual functioning.

KINSHIP AND TWIN STUDIES We can examine the IQ scores of closely and distantly related people who have been reared together or apart. If heredity is involved in human intelligence, closely related people ought to have more similar IQs than distantly related or unrelated people, even when they are reared separately (Petrill et al., 2010).

Figure 8.11 ■ is a composite of the results of studies in IQ and heredity in human beings (McGue et al., 1993; Plomin & Spinath, 2004; Plomin et al., 2008). The IQ scores of identical (monozygotic, or MZ) twins are more alike than scores for any other pairs, even when the twins have been reared apart. There are moderate correlations between the IQ scores of fraternal (dizygotic, or DZ) twins, between those of siblings, and between those of parents and their children. Correlations between the scores of children and their foster parents and between those of cousins are weak.

The results of large-scale twin studies are consistent with the data in Figure 8.11 (e.g., Haworth et al., 2009b). A classic study of 500 pairs of MZ and DZ twins in Louisville, Kentucky (R. S. Wilson, 1983), found that the correlations in intelligence between MZ twins were higher than those for DZ twins, as shown in Figure 8.11. The correlations in intelligence between DZ twin pairs were the same as those between other siblings. The MacArthur Longitudinal Twin Study examined the intellectual abilities of 200 fourteen-month-old pairs of twins (Oliver & Plomin, 2007). They found that MZ twins were more similar than DZ twins in spatial memory, ability to categorize things, and word comprehension.

Twins have a special claim upon our attention; it is, that their history affords means of distinguishing between the effects of tendencies received at birth, and those that were imposed by the special circumstances of their after lives.

SIR FRANCIS GALTON

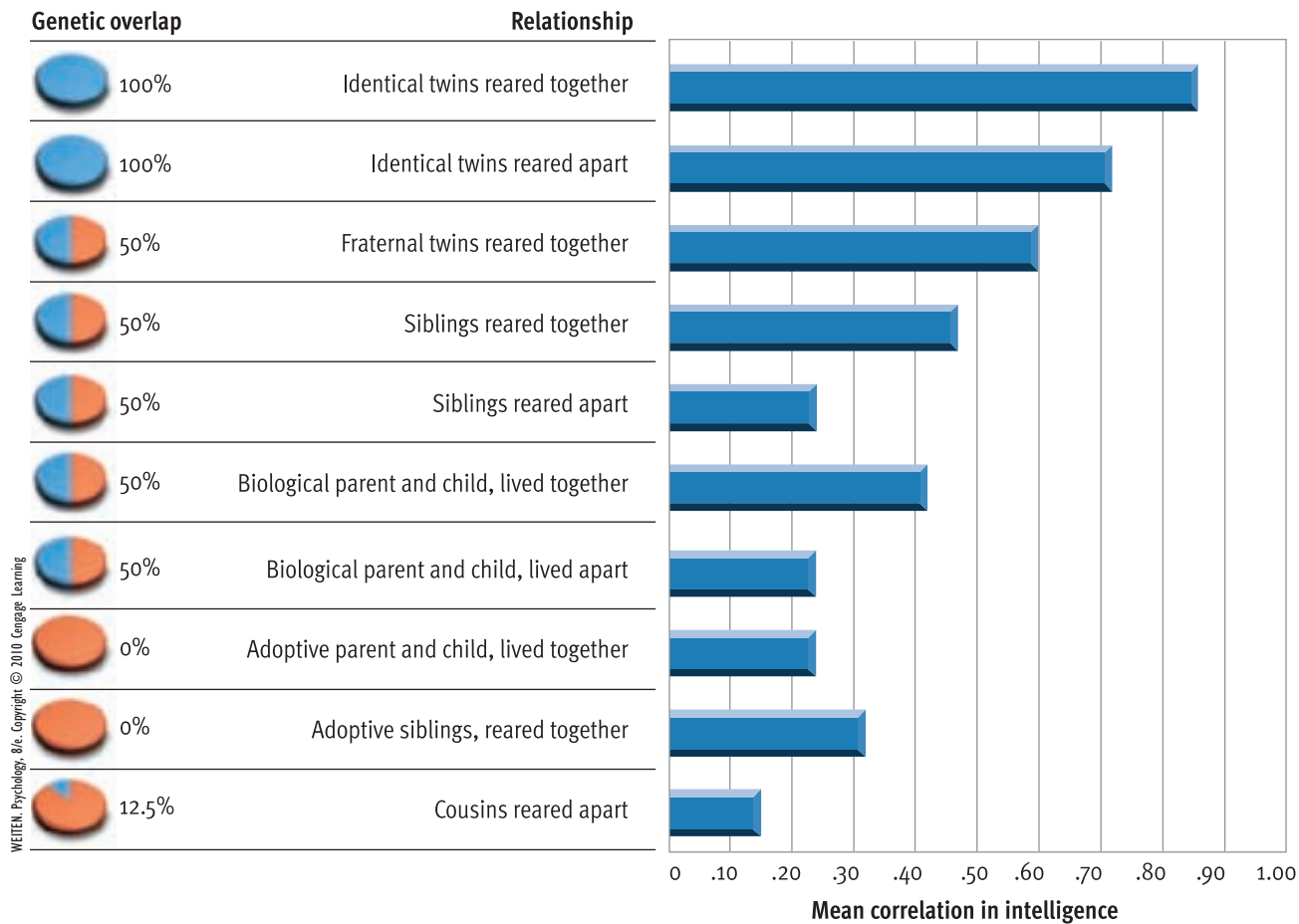


Figure 8.11 ■ Findings of Studies of the Relationship between IQ Scores and Heredity The data represent a composite of several studies. By and large, correlations are higher between people who are more closely related, yet people who are reared together have more similar IQ scores than people who are reared apart. Such findings suggest that both genetic and environmental factors contribute to IQ scores.

In sum, studies generally suggest that the **heritability** of intelligence is between 40% and 60% (Haworth et al., 2009; Neisser et al., 1996). That is, about half of the difference between your IQ score and the IQ scores of other people can be explained by heredity.

Note, too, that genetic pairs (such as MZ twins) who were reared together show higher correlations in their IQ scores than similar genetic pairs (such as other MZ twins) who were reared apart. This finding holds for DZ twins, siblings, parents and their children, and unrelated people. Being reared together is therefore related with similarities in IQ. *For this reason, the same group of studies used to demonstrate a role for the heritability of IQ scores also suggests that the environment plays a role in determining IQ scores.*

ADOPTEE STUDIES Another strategy for exploring genetic influences on intelligence is to compare the correlations between the IQ scores of adopted children and those of their biological and adoptive parents. When children are separated from their biological parents at an early age, one can argue that strong relationships between their IQs and those of their natural parents reflect genetic influences. Strong relationships between their IQs and those of their adoptive parents might reflect environmental influences. Several studies with 1- and 2-year-old children in Colorado (L. A. Baker et al., 1983), Texas (Horn, 1983), and Minnesota (Scarr & Weinberg, 1983) have found a stronger relationship between the IQ scores of adopted children and those of their biological parents than between the children’s scores and those of their adoptive parents.

Heritability The degree to which the variations in a trait from one person to another can be attributed to, or explained by, genetic factors.

ENVIRONMENTAL INFLUENCES ON INTELLIGENCE

Question 27: What are the environmental influences on intelligence? To answer this question, we must consider studies that employ a variety of research strategies. These include observation of the role of the home environment and evaluation of the effects of educational programs.

THE HOME ENVIRONMENT Research shows that the home environment and styles of parenting affect IQ scores (Bradley, 2006). Children of parents who are emotionally and verbally responsive, furnish appropriate play materials, are involved with their children, encourage independence, and provide varied daily experiences obtain higher IQ scores later on (Bradley, 2006). Other studies support the view that children's early environment is linked to IQ scores and academic achievement. For example, Victoria Molfese and her colleagues (1997) found that the home environment was the single most important predictor of scores on IQ tests among children aged 3 to 8.

EDUCATION Although intelligence is viewed as permitting people to profit from education, education also apparently contributes to intelligence. Government-funded efforts to provide preschoolers with enriched early environments such as Head Start enhance the IQ scores, the achievement test scores, and the academic skills of disadvantaged children (Bierman et al., 2008) by exposing them to materials and activities that middle-class children take for granted. These include letters and words, numbers, books, exercises in drawing, pegs and pegboards, puzzles, toy animals, and dolls. On the other hand, many children's IQ scores and achievements tend to decrease again in the years following the Head Start experience if they return to the less intellectually stimulating environment that preceded Head Start (Nisbett, 2009).

Later schooling also contributes to IQ. When children of about the same age start school a year apart because of admissions standards related to their date of birth, children who have been in school longer obtain higher IQ scores (Neisser et al., 1996). Moreover, test scores tend to decrease during the summer vacation (Neisser et al., 1996).

The findings on intelligence, the home environment, and educational experiences show that much can be done to enhance intellectual functioning in children. Now let's return to research on the intellectual development of adopted children.

ADOPTEE STUDIES As mentioned earlier, the Minnesota adoption studies reported by Scarr and Weinberg suggest a genetic influence on intelligence. But the same studies



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The Home Environment The home environment and styles of parenting affect IQ scores.

(Scarr & Weinberg, 1976, 1977) also suggest a role for environmental influences. African American children who were adopted during their first year by European American parents with above-average income and education obtained IQ scores some 15 to 25 points higher than those obtained by African American children reared by their natural parents (Scarr & Weinberg, 1976).

All in all, intellectual functioning appears to reflect the interaction of a complex web of genetic, physical, personal, and sociocultural factors (Bartels et al., 2002; E. G. Bishop et al., 2003), as suggested by Figure 8.12 ■.

Perhaps we need not be so concerned with whether we can sort out exactly how much of a person's IQ is due to heredity and how much is due to environmental influences. Psychology has traditionally supported the dignity of the individual. It might be more appropriate for us to try to identify children of *all ethnic groups* whose environments place them at risk for failure and do what we can to enrich their environments. As noted by Paul Ehrlich (2000), professor of biology and population studies at Stanford University:

There is no such thing as a fixed human nature, but rather an interaction between our genotypes—the genetic information we have—and the different environments we live in, with the result that all our natures are unique.

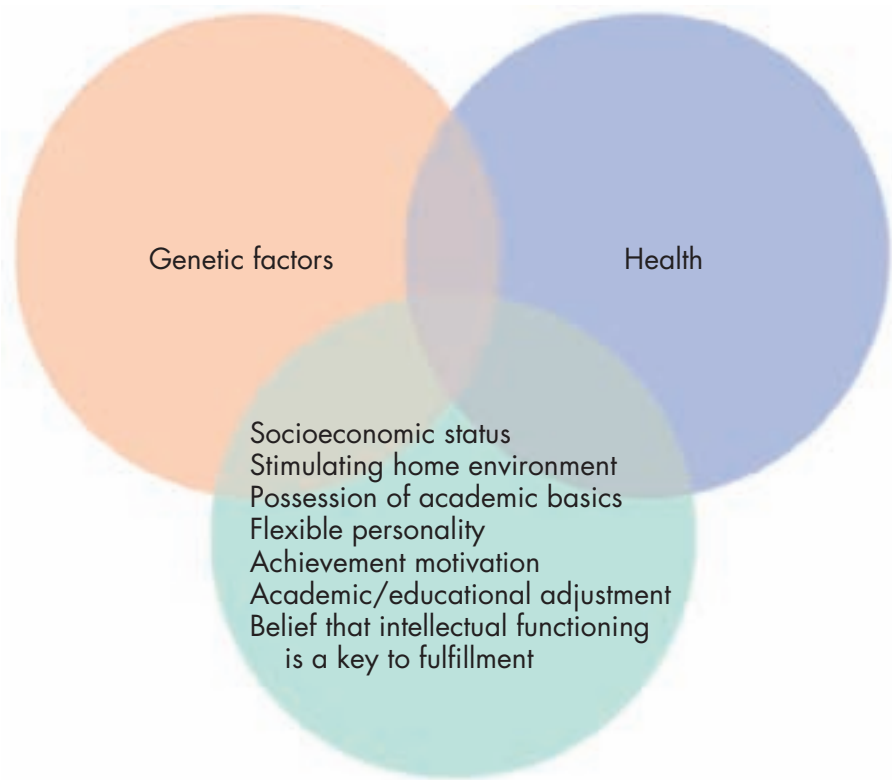


Figure 8.12 ■ The Complex Web of Factors That Appears to Affect Intellectual Functioning Intellectual functioning appears to be influenced by the interaction of genetic factors, health, personality, and sociocultural factors.

LearningConnections • INTELLIGENCE

ACTIVE REVIEW (19) Spearman suggested that intelligent behaviors have a common underlying factor, which he labeled _____, and specific factors that account for specific abilities. (20) Gardner proposes the existence of _____ intelligences, each of which is based in a different area of the brain. (21) Sternberg constructed a “triarchic” model of intelligence, including analytical, creative, and _____ intelligence. (22) _____ has been defined as the ability to do things that are novel and useful. (23) Creativity appears to involve _____ thinking rather than convergent thinking. (24) The Stanford–Binet Intelligence Scale yields a score called a(n) _____ (IQ). (25) The _____ scales have verbal and performance subtests. (26) Approximately _____

percent of the population obtain IQ scores within the broad average range (90–110). (27) Estimates place the heritability of intelligence at about _____.

REFLECT AND RELATE When did you form an impression of how intelligent you are? Has this impression helped you or hurt you? Explain.

CRITICAL THINKING Critical thinkers pay attention to the definition of terms. Do the talents of dancers, gymnasts, artists, and musicians strike you as kinds of intelligences? Why or why not?



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Life Connections ENHANCING INTELLECTUAL FUNCTIONING

Does enhancing intellectual functioning sound like an impossible dream? It does only if you believe that intelligence is a fixed commodity—a sort of “knob in the head.” Actually, intelligence—or intellectual functioning—changes with age, experiences in the home, education, and many other factors, including day-to-day differences in responding to items on intelligence tests. Research into the effects of the home environment and early educational experiences suggests that there are many things you can do to enhance your children’s intellectual functioning—and your own:

- Provide a safe, organized home for your children.
- Be emotionally and verbally responsive to your children. Provide appropriate and stimulating play materials. Get involved in their play.
- Provide a variety of experiences. Take your children to local museums and cultural events. Do whatever traveling your budget and time will allow.
- Encourage your children to be independent, to try to solve their own problems, to do as much of their schoolwork on their own as they can. (But make yourself available to offer a helping hand when they need it.) Note that restrictiveness and punish-

ment in the home environment are linked to lower IQ scores.

- Make sure your children know the educational basics. Expose them to materials and activities that include letters and words, numbers, books, exercises in drawing, pegs and pegboards, puzzles, toy animals, and dolls.
- Consider giving your children training in music. Not only will music broaden their intellectual horizons, but it may also enhance their spatial-relations skills.

And what about you? It is not too late to enhance your own intellectual functioning, even if you are a grandparent. Psychologist Walter Schaie and his colleagues (Schaie, 1994) have been studying the cognitive development of adults for four decades and discovered factors that contribute to intellectual functioning across the life span:

- *General health.* People in good health tend to retain higher levels of intellectual functioning into late adulthood. Therefore, paying attention to one’s diet, exercising, and having regular medical checkups contribute to intellectual functioning as well as physical health.
- *Socioeconomic status (SES).* People with high SES tend to maintain

intellectual functioning more adequately than people with low SES. High SES is also connected with above-average income and levels of education, a history of stimulating occupational pursuits, maintenance of intact families, and better health.

- *Stimulating activities.* Cultural events, travel, participation in professional organizations, and extensive reading contribute to intellectual functioning.
- *A relationship with a partner with a high level of intellectual functioning.* The partner whose level of intellectual functioning is lower at the beginning of a long-term relationship tends to increase in intellectual functioning as time goes by. Perhaps that partner is continually challenged by the other.
- *Openness to new experience.* Being open to new challenges of life apparently helps keep us young—at any age.

How can you apply Schaie’s research findings? There are a number of ways:

- *Take care of your health.* As we will see in the chapter on Stress and Health, good health is not simply a matter of luck. We can all do things to maximize our own health, including eating properly, exercising, and having regular medical checkups.



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Enhancing Intellectual Functioning Intelligence is not a fixed quantity, like a knob of a certain size in the head. Intellectually challenging activities, such as chess, can help enhance cognitive functioning—at any age.

And there is a relationship between one's intellectual functioning and general health.

- *Choose intellectually challenging companions.*

- *Remain (or become) flexible.* Be open to new experiences. Try new things. Be willing to consider evidence and change your opinions, even on political issues.

None of these measures is a guarantee, of course. But regardless of how they affect intelligence, they will certainly lead to a more stimulating life—both for your children and for you.

Thinking

1. What is thinking?

Thinking is conscious mental activity that involves attending to information, representing it mentally, reasoning about it, and making judgments about it.

2. What are concepts?

Concepts are mental categories for grouping objects, relations, events, abstractions, ideas, or qualities that have common properties.

3. What tools do people use to solve problems?

People first try to understand the problem. Then they use strategies such as algorithms, heuristic devices, and analogies.

4. Is it best to use a tried-and-true formula to solve a problem?

Not necessarily. Heuristic devices can help us “jump” to right answers. Heuristics are rules of thumb that help us simplify and solve problems, but they are less reliable than algorithms.

5. What factors make it easier or harder to solve problems?

Key factors include level of expertise, mental sets, insight, incubation, functional fixedness, and insight.

6. How do people make judgments and decisions?

People sometimes make decisions by weighing the pluses and minuses, but most make decisions with limited information and heuristic devices.

7. What is the framing effect?

People often phrase or frame arguments in ways to persuade others.

8. Why do people tend to be convinced that they are right, even when they are clearly wrong?

People tend to retain their convictions because they are unaware of the flimsiness of their assumptions, they focus on examples that confirm their judgments, their working memory has limited space, and they work to bring about results that fit their judgments.

Language

9. Do apes really use language?

Apes can be said to “use” language in that they learn signs for objects and actions and produce these signs to communicate. However, critics of the notion that apes use language as humans do argue that apes’ use of grammar is inadequate.

10. Just how do we define language?

Language is the communication of thoughts and feelings by means of symbols that are arranged according to rules of grammar.

11. What are the properties of a “true” language?

True language is distinguished from the communication systems of lower animals by properties such as semanticity, infinite creativity, and displacement.

12. What are the relationships between language and thinking?

Language is not necessary for thinking, but language makes possible cognitive activity that involves the use of symbols arranged according to rules of grammar.

13. Is it possible for English speakers to share all the thoughts experienced by people who speak other languages?

Perhaps it is. According to the linguistic-relativity hypothesis, the concepts we use to understand the world are derived from our language. But the vocabulary of a language may suggest the range of concepts users have found to be useful, not their cognitive limits.

14. How does language develop?

Children make the prelinguistic sounds of crying, cooing, and babbling before true language develops. Single-word utterances occur at about 1 year; two-word utterances by 2. Early language is characterized by overextension and overregularization.

15. What are the roles of nature and nurture in language development?

The two main theories of language development are learning theories and nativist theories. Learning theories focus on reinforcement and imitation. Nativist theories assume that innate factors enable children to attend to and perceive language.

Intelligence

16. Just what is intelligence?

Gottfredson defines intelligence as “a very general mental capability that ... involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience.”

17. What are the various theories of intelligence?

Spearman and Thurstone believed that intelligence is composed of factors. Spearman believed that a common factor, *g*, underlies all intelligent behavior but that people also have specific abilities, or *s* factors. Gardner believes that people have several intelligences, not one, and that each is based in a different area of the brain. Sternberg’s triarchic theory proposes three kinds of intelligence: academic ability, creativity, and practical intelligence. The theory of emotional intelligence holds that social and emotional skills are a form of intelligence that helps children avert violence and depression.

18. What is creativity, and how is it related to intelligence?

Creative people take chances, defy limits, and appreciate art and music. Creative problem solving involves divergent thinking. Creativity is only moderately related to analytical skills or academic ability.

19. What is the Stanford–Binet Intelligence Scale?

This is the test originated by Binet in France and developed by Terman at Stanford University. It includes age-graded questions and compares mental age with chronological age.

20. How do the Wechsler scales of intelligence differ from the Stanford–Binet?

The Wechsler scales use deviation IQs, which compare a person's performance with that of age-mates. The Wechsler scales contain verbal and performance subtests.

21. What are the socioeconomic and ethnic differences in intelligence?

Middle- and upper-class children outscore lower-class children by 10 to 15 points on intelligence tests. Asian Americans tend to outscore European Americans, and European Americans tend to outscore African Americans and Latino and Latina Americans.

22. Do intelligence tests contain cultural biases against ethnic minority groups and immigrants?

Many psychologists believe that intelligence tests are biased against African Americans and people in the lower classes because they require familiarity with concepts that reflect middle-class European American culture.

23. Do males and females differ in intellectual functioning?

Females would appear to excel in verbal skills, and males in math and spatial relations. However, these group differences

are small and narrowing. Moreover, many males excel in verbal skills, and many females in math and spatial relations.

24. What does it mean to be intellectually deficient?

Intellectual deficiency is characterized by an IQ score of below 70 and problems in adaptive skills. Most people who are intellectually deficient are mildly deficient.

25. What does it mean to be gifted?

Giftedness combines high scores on IQ along with ability in a specific academic area, creativity, leadership, or special talents.

26. What are the genetic influences on intelligence?

The heritability of intelligence is estimated at 40% to 60%. Kinship studies find a stronger relationship between the IQ scores of adopted children and their biological parents than between the children's scores and those of their adoptive parents.

27. What are the environmental influences on intelligence?

Environmental influences on intelligence include, among other things, the home environment and education.



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KEY TERMS

Algorithm (p. 268)	Heritability (p. 297)	Overregularization (p. 280)
Anchoring and adjustment heuristic (p. 273)	Heuristics (p. 268)	Primary mental abilities (p. 283)
Availability heuristic (p. 273)	Holophrase (p. 278)	Prototype (p. 264)
Cognition (p. 263)	Incubation (p. 271)	Psycholinguistic theory (p. 281)
Concept (p. 264)	Infinite creativity (p. 276)	Reliability (p. 291)
Convergent thinking (p. 287)	Insight (p. 270)	Representativeness heuristic (p. 273)
Creativity (p. 287)	Intelligence (p. 282)	s (p. 282)
Cultural bias (p. 293)	Intelligence quotient (IQ) (p. 288)	Semantic (p. 275)
Displacement (p. 277)	Language (p. 276)	Semanticity (p. 276)
Divergent thinking (p. 287)	Language acquisition device (LAD) (p. 281)	Syntax (p. 279)
Exemplar (p. 265)	Linguistic-relativity hypothesis (p. 277)	Systematic random search (p. 268)
Factor analysis (p. 282)	Means–end analysis (p. 269)	Theory of multiple intelligences (p. 283)
Framing effect (p. 273)	Mental age (MA) (p. 288)	Thinking (p. 263)
Functional fixedness (p. 271)	Mental image (p. 270)	Triarchic theory of intelligence (p. 284)
g (p. 282)	Mental set (p. 270)	Validity (p. 291)

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9

Motivation and Emotion



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MAJOR TOPICS

The Psychology of Motivation:
The *Whys* of Why
Theories of Motivation: Which
Why Is Which?
Hunger: Do You Go by
“Tummy-Time”?
Aggression: Of
Australopithecines, Humans,
Robins, and Testosterone
Achievement Motivation:
“Just Do It”?
Emotion: Adding Color to Life

FEATURES

Self-Assessment: The Sensation-Seeking Scale
A Closer Look—Real Life: Anorexia Nervosa—The Case of Rachel
Self-Assessment: Eating Disorders Quiz
A Closer Look—Diversity: Cross-Cultural Aspects of Aggression
Controversy in Psychology: The Catharsis Controversy
Controversy in Psychology: Just What Do Lie Detectors Detect?
Life Connections: Obesity: A Serious and Pervasive Problem

TRUTH OR FICTION?

- T F** Siamese fighting fish that have been reared without ever seeing another fish assume stereotypical threatening postures and attack other males when they are introduced into their tanks.
- T F** Getting away from it all by going on a vacation from all sensory input for a few hours is relaxing.
- T F** People feel hunger due to contractions (“pangs”) in the stomach.
- T F** You can never be too rich or too thin.
- T F** Checking out the Victoria’s Secret catalog can contribute to eating disorders among women.
- T F** A good way to prevent harmful aggression is to encourage the venting of aggressive impulses through activities such as cheering on a football team or attending a prizefight.
- T F** Money can’t buy you happiness.
- T F** You may be able to fool a lie detector by wiggling your toes.
- T F** More than half of adult Americans are overweight.
- T F** Dieting accelerates the body’s metabolic rate so that dieters are more likely than nondieters to burn calories.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

The Seekers had received word that

the world was coming to an end on December 21. A great flood would engulf their city and the rest of the Earth. Now they were gathered around their leader, Marian Keech, in her home, as she recorded messages that she said were sent to her by the Guardians from outer space. The messages were received through “automatic writing”; that is, the Guardians communicated through Ms. Keech, who wrote down their words while in a kind of semiconscious trance. Another message brought good news, however. Because of their faith, the Seekers would be saved by flying saucers at the stroke of midnight on the 21st.

In their classic observational study, Leon Festinger and his colleagues (1956) described how they managed to be present in Ms. Keech’s household at the fateful hour by pretending to belong to the group. Their purpose was to observe the behavior of the Seekers during and following the prophecy’s failure.

The cognitive theory of motivation that Festinger was working on—*cognitive-dissonance theory*—suggested that there would be a discrepancy or conflict between two key cognitions: (a) Ms. Keech is a prophet, and (b) Ms. Keech is wrong.

How might the conflict be resolved? One way would be for the Seekers to lose faith in Ms. Keech. But the researchers expected that according to their theory, the Seekers could also be motivated to resolve the conflict by going out to spread the word and find additional converts. Otherwise, the group would be painfully embarrassed.

Let’s return to the momentous night. Many members of the group had quit their jobs and gone on spending sprees before the anticipated end. Now, as midnight approached, they fidgeted while awaiting the flying saucers. Midnight came, but there were no saucers. Anxious glances were exchanged. There was silence, and then some coughs. Minutes passed, torturously slowly. Watches were checked, more glances exchanged.

At 4:00 A.M., a bitter and frantic Ms. Keech complained that she sensed members of the group were doubting her. At 4:45 A.M., however, she seemed suddenly relieved. Still another message was arriving, and Ms. Keech was spelling it out through automatic writing! The Seekers, it turned out, had managed to save the world through their faith. The universal powers had decided to let the world travel on along its sinful way for a while longer. Why? Because of the faith of the Seekers, there was hope!



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When Prophecy Failed Believing Earth was in peril, “the Seekers” waited for flying saucers that their leader said would rescue them. (Don’t worry, the flying saucer in the photo is Photoshopped, not real.) Needless to say, the saucers never arrived. How did the group react?

When I was young I thought that
money was the most important
thing in life; now that I am old
I know that it is.

OSCAR WILDE

No man but a blockhead ever
wrote except for money.

DR. SAMUEL JOHNSON

Motivation The state in which an organism experiences an inducement or incentive to do something.

Motive A hypothetical state within an organism that propels the organism toward a goal. (From the Latin *movere* meaning “to move.”)

Need A state of deprivation.

Drive A condition of arousal in an organism that is associated with a need.

Incentive An object, person, or situation perceived as capable of satisfying a need or as desirable for its own sake.

With their faith restored, the followers called wire services and newspapers to spread the word. The three psychologists from the University of Minnesota went home, weary but enlightened. They wrote a book titled *When Prophecy Fails*, which serves as a key document of their theory.

Mr. Keech? He was a tolerant sort. He slept through it all.

THE PSYCHOLOGY OF MOTIVATION: THE WHYS OF WHY

The psychology of **motivation** is concerned with the *whys* of behavior. Why do we eat? Why do some of us strive to get ahead? Why do some of us ride motorcycles at breakneck speeds, while others look on in disapproval or horror? Why are some people aggressive? Why were the Seekers in a state of discomfort when the prophecy failed?

To answer these questions, psychologists use concepts such as *motives*, *needs*, *drives*, and *incentives*. **Question 1: What are motives, needs, drives, and incentives?** **Motives** are hypothetical states that activate behavior, propelling one toward goals. We call them “hypothetical states” because motives are not seen and measured directly; they are inferred from behavior. May we infer that Ms. Keech was motivated to continue to earn the adulation of her followers when the flying saucers failed to arrive? Motives can take the form of *needs*, *drives*, and *incentives*, which are also inferred from behavior.

Psychologists speak of physiological and psychological **needs**. We must meet physiological needs to survive. Examples include the needs for oxygen, food, drink, pain avoidance, proper temperature, and elimination of waste products. Some physiological needs, such as hunger and thirst, are states of physical deprivation. When we have not eaten or drunk for a while, we develop needs for food and water. Psychological needs include needs for achievement, power, self-esteem, social approval, and belonging. The Seekers certainly needed one another’s approval, to belong to the group, and yes, to maintain their self-esteem in the light of the prophecy that failed. Psychological needs may be acquired through experience, or learned, whereas physiological needs reside in the physical makeup of the organism. People share similar physiological needs, but we are also influenced by our social and cultural settings. All of us need food, but some prefer a vegetarian diet whereas others prefer meat.

Needs give rise to **drives**. Depletion of food gives rise to the hunger drive, and depletion of liquids gives rise to the thirst drive. Physiological drives are the counterparts of physiological needs. When we have gone without food and water, our body may *need* these substances. However, our *experience* of drives is psychological. Drives arouse us to action. Drives tend to be stronger when we have been deprived longer. Psychological needs for approval, achievement, and belonging also give rise to drives. We can have a drive to get ahead in the business world just as we have a drive to eat. We can also be driven to obtain *incentives*.

An **incentive** is an object, person, or situation that is viewed as capable of satisfying a need or as desirable for its own sake. Money, food, a sexually attractive person, social approval, and attention can all act as incentives that motivate behavior.

LearningConnections • THE PSYCHOLOGY OF MOTIVATION: THE WHYS OF WHY

ACTIVE REVIEW (1) _____ are hypothetical states that activate behavior and direct organisms toward goals. (2) Some physiological needs reflect states of physical _____. (3) A(n) _____ is an object, person, or situation that is perceived as capable of satisfying a need.

REFLECT AND RELATE What are some of the key motives in your own life? What are your needs? What drives you? What incentives do you work for? Can you think of any needs or drives that motivate you but might not motivate other people?

CRITICAL THINKING If we observe a person behaving in a certain way, are we justified in assuming that the person is motivated to behave in that way? For example, if we see one person acting aggressively toward another, can we assume that the motive is aggression or that the person is an aggressive individual?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

THEORIES OF MOTIVATION: WHICH WHY IS WHICH?

Although psychologists agree that it is important to understand why humans and lower animals do things, they do not agree about the precise nature of motivation. Let's consider various theoretical perspectives on motivation.

The Evolutionary Perspective: The Fish, the Spiders, and the Bees

The evolutionary perspective notes that many animals are neurally “prewired”—that is, born with preprogrammed tendencies—to respond to certain situations in certain ways (Burghardt, 2009; Confer et al., 2010). **Truth or Fiction Revisited:** It is true that Siamese fighting fish reared in isolation from other fish assume stereotypical threatening postures and attack other males when they are introduced into their tank. Spiders spin webs instinctively. Bees “dance” instinctively to communicate the location of food to other bees.

These instinctive behaviors are found in particular species. They are *species-specific*. **Question 2: What are species-specific behaviors?** Species-specific behaviors are also called **instincts**, or *fixed-action patterns (FAPs)*. Such behavior patterns are inborn. That is, they are genetically transmitted from generation to generation.

Psychologists have asked whether humans have instincts and, if so, how many. More than a century ago, psychologists William James (1890) and William McDougall (1908) argued that humans have instincts that foster survival and social behavior. James numbered love, sympathy, and modesty among his social instincts. McDougall compiled 12 “basic” instincts, including hunger, sex, and self-assertion. Other psychologists have made longer lists, and still others deny that people have any instincts. The question as to whether people have instincts—and which instincts—remains unresolved.

Drive-Reductionism and Homeostasis: “Steady, Steady ...”

Freud believed that tension motivates us to behave in ways that restore us to a resting state. His views are similar to those of the **drive-reduction theory**, as set forth by psychologist Clark Hull in the 1930s. **Question 3: What is drive-reduction theory?**

According to Hull, **primary drives** such as hunger, thirst, and avoidance of pain trigger arousal (tension) and activate behavior. We learn to engage in behaviors that reduce the tension. We also acquire drives through experience. These drives are called **acquired drives**. We may acquire a drive for money because money enables us to obtain food, drink, and homes, which protect us from predators and extremes of temperature. We might acquire drives for social approval and affiliation because other people, and their goodwill, help us reduce primary drives, especially when we are infants. In all cases, reduction of tension is the goal. Yet some people appear to acquire what could be considered excessive drives for money or affiliation. They gather money long after their material needs have been met, and some people find it difficult to be alone, even briefly.

Primary drives like hunger are triggered when we are in a state of deprivation. Sensations of hunger motivate us to act in ways that will restore the bodily balance. This tendency to maintain a steady state is called **homeostasis**. Homeostasis works much like a thermostat. When the temperature in a room drops below the set point, the heating system is triggered. The heat stays on until the set point is reached. Similarly, most animals eat until they are no longer hungry.



© George Diebold/PhotoDisc/Getty Images

A Fixed Action Pattern In the presence of another male, Siamese fighting fish (*Betta splendens*) assume stereotypical threatening postures in which they extend their fins and gills and circle one another. If neither male retreats, there will be conflict.

— ■ —

*Such is the state of life, that
none are happy but by the
anticipation of change: the
change itself is nothing; when
we have made it, the next wish
is to change again.*

DR. SAMUEL JOHNSON

— ■ —

Instinct An inherited disposition to activate specific behavior patterns that are designed to reach certain goals.

Drive-reduction theory The view that organisms learn to engage in behaviors that have the effect of reducing drives.

Primary drives Unlearned, or physiological, drives.

Acquired drives Drives acquired through experience or that are learned.

Homeostasis The tendency of the body to maintain a steady state.



Harlow Primate Lab/University of Wisconsin

Monkeying Around Do organisms have innate drives to obtain sensory stimulation, manipulate objects (like these young rhesus monkeys), and explore the environment? The monkeys appear to monkey around with gadgets just for the fun of it. No external incentives are needed. Children similarly enjoy manipulating gadgets that honk, squeak, rattle, and buzz, even though the resultant honks and squeaks do not satisfy physiological drives such as hunger or thirst.

The fact is that people are good. Give people affection and security, and they will give affection and be secure in their feelings and their behavior.

ABRAHAM MASLOW

Stimulus motive A state within an organism that propels it toward increasing the amount of stimulation it obtains.

Self-actualization According to Maslow and other humanistic psychologists, self-initiated striving to become what one is capable of being. The motive for reaching one's full potential, for expressing one's unique capabilities.

The Search for Stimulation: Is Downtime a Downer?

Physical needs give rise to drives like hunger and thirst. In such cases, we are motivated to *reduce* the tension or stimulation that impinges on us. **Question 4: Are all motives aimed at the reduction of tension?** No, in the case of **stimulus motives**, organisms seek to *increase* stimulation.

A classic study conducted at McGill University in Montreal during the 1950s suggests the importance of sensory stimulation and activity. Some “lucky” students were paid \$20 a day (which, with inflation, would now be well above \$100) for doing nothing—literally. Would you like to “work” by doing nothing for \$100 a day? Don’t answer too quickly. According to the results of classic research on sensory deprivation, you might not like it at all.

In that experiment, student volunteers were placed in quiet cubicles and blindfolded (Bexton et al., 1954). Their arms were bandaged so that they felt little if anything with their hands. They could hear nothing but the dull, monotonous hum of air conditioning. Many slept for a while, but after a few hours of sensory-deprived wakefulness, most felt bored and irritable. As time went on, many grew more uncomfortable. Many students quit the experiment during the first day despite the financial incentive. **Truth or Fiction Revisited:** Therefore, it is not necessarily true that getting away from it all by going on a vacation from all sensory input is relaxing. Many of those who remained for a few days found it hard to concentrate on simple problems days afterward. For many, the experiment did not provide a relaxing vacation. Instead, it produced boredom and disorientation.

Lower animals and humans appear motivated to seek novel stimulation. Even when they have been deprived of food, rats may explore unfamiliar arms of mazes rather than head straight for the spot where they have learned to expect food. Animals that have just copulated and thereby reduced their primary sex drives often show renewed interest in sexual behavior when presented with a new sex partner—a novelty. People (and lower animals) tend to take in more calories at buffets and smorgasbords than when they have fewer kinds of food available (Szentirmai et al., 2010). Children spend hour after hour manipulating the controls of video games for the pleasure of zapping video monsters. Similarly, infants prolong their play with “busy boxes” filled with objects that honk, squeak, rattle, and buzz when manipulated.

Although it is normal enough to seek stimulation, some people—“thrill seekers”—seek unusual amounts of stimulation. Are you one of them? Why not check out the nearby self-assessment?

Stimulus motives provide an evolutionary advantage. Animals that are active and motivated to learn about and manipulate their environment are more likely to survive. If you know where the nearest tall tree is, you’re more likely to be able to escape from a lion. If you’ve explored where to find food and water, you’re more likely to pass your genes to future generations.

But note that survival is more or less a question of defending oneself or one’s group against dangers of one kind or another. In the following section, we see that many psychologists believe people are also motivated to develop their unique potentials, even in the absence of any external threat.

Humanistic Theory: “I’ve Got to Be Me”?

Humanistic psychologists, particularly Abraham Maslow (1908–1970), suggest that human behavior is not just mechanical and aimed toward survival and the reduction of tension. **Question 5: How does humanistic theory differ from other theories of motivation?** As a humanist, Maslow believed that people are also motivated by the conscious desire for personal growth. Humanists note that people tolerate pain, hunger, and many other sources of tension to obtain personal fulfillment.

Maslow believed that we are separated from so-called lower animals by our capacity for **self-actualization**, or self-initiated striving to become whatever we believe we are capable of being. Maslow considered self-actualization to be as important a need in humans as hunger. The need for self-actualization pushes people to strive to become

SELF ASSESSMENT

The Sensation-Seeking Scale

Some people seek higher levels of stimulation and activity than others. John is a couch potato, content to sit by the TV all evening. Marsha doesn't feel right unless she's out on the tennis court or jogging. Cliff isn't content unless he has ridden his motorcycle over back trails at breakneck speeds, and Janet feels exuberant when she's catching the big wave or free-fall diving from an airplane.

What about you? Are you content to read or watch television all day? Or must you catch the big wave or bounce the bike across the dunes of the Mojave Desert? Sensation-seeking scales measure the level of stimulation or arousal a person will seek.

Marvin Zuckerman and his colleagues have identified four factors that are involved in sensation seeking: (a) seeking thrill

1. A. I would like a job that requires a lot of traveling.
B. I would prefer a job in one location.
2. A. I am invigorated by a brisk, cold day.
B. I can't wait to get indoors on a cold day.
3. A. I get bored seeing the same old faces.
B. I like the comfortable familiarity of everyday friends.
4. A. I would prefer living in an ideal society in which everyone is safe, secure, and happy.
B. I would have preferred living in the unsettled days of our history.
5. A. I sometimes like to do things that are a little frightening.
B. A sensible person avoids activities that are dangerous.
6. A. I would not like to be hypnotized.
B. I would like to have the experience of being hypnotized.
7. A. The most important goal in life is to live it to the fullest and experience as much as possible.
B. The most important goal in life is to find peace and happiness.

and adventure, (b) disinhibition (that is, a tendency to express impulses), (c) seeking experience, and (d) susceptibility to boredom. People who are high in sensation seeking are also less tolerant of sensory deprivation. They are more likely to use drugs and become involved in sexual experiences, to be drunk in public, and to volunteer for high-risk activities and unusual experiments (M. Cooper, 2006; Self et al., 2007).

A shortened version of one of Zuckerman's scales follows. To gain insight into your own sensation-seeking tendencies, circle the choice A or B that best describes you. Then compare your answers to those in the answer key in the Appendix.

8. A. I would like to try parachute jumping.
B. I would never want to try jumping out of a plane, with or without a parachute.
9. A. I enter cold water gradually, giving myself time to get used to it.
B. I like to dive or jump right into the ocean or a cold pool.
10. A. When I go on a vacation, I prefer the change of camping out.
B. When I go on a vacation, I prefer the comfort of a good room and bed.
11. A. I prefer people who are emotionally expressive even if they are a bit unstable.
B. I prefer people who are calm and even tempered.
12. A. A good painting should shock or jolt the senses.
B. A good painting should give one a feeling of peace and security.
13. A. People who ride motorcycles must have some kind of unconscious need to hurt themselves.
B. I would like to drive or ride a motorcycle.

Source: From M. Zuckerman, "Sensation Seeking" in *Dimensions of Personality*, H. London and J. Exner, eds., © 1980 John Wiley & Sons. Reprinted by permission.

concert pianists, chief executive officers, or best-selling authors—even when a person has plenty of money to live on.

Maslow (1970) organized human needs into a hierarchy. **Question 6: What is Maslow's hierarchy of needs?** Maslow's **hierarchy of needs** ranges from physiological needs such as hunger and thirst through self-actualization (see Figure 9.1) ■. He believed that we naturally strive to travel up through this hierarchy.

Critics of Maslow's theory argue that there is too much individual variation for the hierarchy of motives to apply to everyone (Cooke, 2008). Some people whose physiological, safety, and love needs are met show little interest in achievement and recognition. And some visual and performing artists devote themselves fully to their craft, even if they have to pass up the comforts of a warm home, live in

Hierarchy of needs Maslow's ordering of needs from most basic (physiological needs such as hunger and thirst) to most elaborate and sophisticated (self-actualization).

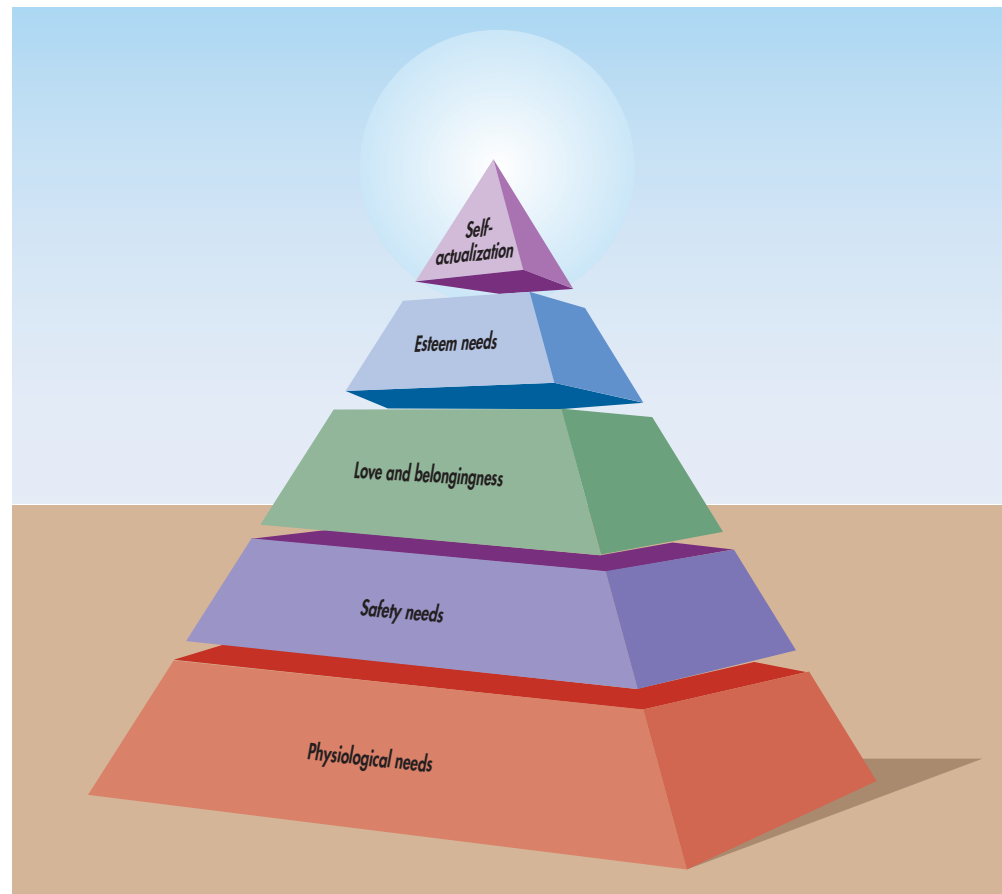


Figure 9.1 ■ Maslow's Hierarchy of Needs Maslow believed we progress toward higher psychological needs once basic survival needs have been met. Where do you fit in this picture?

— ■ —
*A musician must make music,
 an artist must paint, a poet must
 write, if he is to be ultimately at
 peace with himself.*

ABRAHAM MASLOW
 — ■ —

an unsafe part of town, and alienate their friends. Thus, many people seek distant, self-actualizing goals, even while their other needs, as outlined by Maslow, have not yet been met.

You can now see that each theory of motivation may have something to offer. For example, drive-reduction theory may explain why we drink when thirsty, but stimulus motives might explain why we go out to a club and drink alcohol. Each theory might apply to certain aspects of behavior. As the chapter progresses, we will describe research that lends support to each theory. We first describe research on the hunger drive. Hunger is based on physiological needs, and drive reduction would appear to explain some—although not all—eating behavior. Then we consider two powerful motives that push us ahead in life and sometimes to the front of the line: aggression and achievement.

LearningConnections • THEORIES OF MOTIVATION: WHICH WHY IS WHICH?

ACTIVE REVIEW (4) According to the _____ perspective, animals are born with instinctive tendencies to behave in certain ways. (5) Drives help the body maintain a steady state, a tendency that is called _____. (6) Studies in sensory _____ show that lack of stimulation is aversive and irritating. (7) Humanistic psychologist Maslow argued that people have a hierarchy of needs, the highest of which is the need for _____.

REFLECT AND RELATE Do you enjoy roller coasters? If so, why? Where would you place yourself in Maslow's hierarchy? Where do you see yourself as being headed? Why?

CRITICAL THINKING How does rearing an animal in isolation from others of its kind help researchers learn about what behaviors are instinctive? Would it be possible to run such an experiment with humans? Why or why not?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

HUNGER: DO YOU GO BY “TUMMY-TIME”?

We need food to survive, but for many of us, food means more than survival. Food is a symbol of family togetherness and caring. We associate food with the nurturance of the parent–child relationship and with visits home during holidays. Friends and relatives offer us food when we enter their homes, and saying no may be viewed as a personal rejection. Bacon and eggs, coffee with cream and sugar, meat and mashed potatoes—all seem to be part of sharing American values and abundance.

Biological Influences on Hunger

Question 7: What bodily mechanisms regulate the hunger drive? In considering the bodily mechanisms that regulate hunger, let’s begin with the mouth. (After all, we are talking about eating.) We also get signals of **satiety** from the digestive tract, although it takes longer for these signals to reach the brain. Therefore, if we did not receive signals of satiety from chewing and swallowing, we might eat for a long time after we had taken in enough food.

In classic “sham feeding” experiments with dogs, researchers implanted a tube in the animals’ throats so that any food swallowed fell out of the body. Even though no food reached the stomach, the animals stopped feeding after a while (Janowitz & Grossman, 1949). Thus, sensations of chewing and swallowing must provide some feelings of satiety. However, the dogs in the study resumed feeding sooner than animals whose food did reach the stomach. Let’s proceed to the stomach, too, as we seek further regulatory factors in hunger.

An empty stomach leads to stomach contractions, which we call *hunger pangs*. Classic research suggested that stomach contractions are crucial to hunger. A man (A. L. Washburn) swallowed a balloon that was inflated in his stomach. His stomach contractions squeezed the balloon, so the contractions could be recorded by observers. Washburn also pressed a key when he felt hungry, and the researchers found a correspondence between his stomach contractions and his feelings of hunger (Cannon & Washburn, 1912).

Truth or Fiction Revisited: It is true that pangs in the stomach are connected with feelings of hunger, *but* stomach contractions are not as influential as formerly thought. (We apparently go by more than “tummy-time.”) Medical observations and classic research also find that people and animals whose stomachs have been removed still regulate food intake so as to maintain their normal weight (Tsang, 1938). (Food is absorbed through their intestines.) This finding led to the discovery of many other mechanisms that regulate hunger, including the hypothalamus, blood sugar level, and even receptors in the liver. When we are deprived of food, the level of sugar in the blood drops. The drop in blood sugar is communicated to the hypothalamus and apparently indicates that we have been burning energy and need to replenish it by eating.

If you were just reviving from a surgical operation, fighting your way through the fog of the anesthesia, food would probably be the last thing on your mind. But when a researcher uses a probe to destroy the **ventromedial nucleus (VMN)** of a rat’s hypothalamus, the rat will grope toward food as soon as its eyes open (Fetissov & Meguid, 2010). Then it eats vast quantities of Purina Rat Chow or whatever is available.

The VMN seems to function like a “stop-eating center” in the rat’s brain. If the VMN is electrically stimulated—that is, “switched on”—the rat stops eating until the current is turned off. When the VMN is destroyed, the rat becomes **hyperphagic** (see Figure 9.2) ■. That is, it continues to eat until it has about doubled its normal weight. Then it will level off its eating rate and maintain the higher weight. It is as if the set point of the stop-eating center has been raised to a higher level, like turning up the thermostat in a house from 65°F to 70°F. Hyperphagic rats are also more finicky. They eat more fats or sweet-tasting food, but if their food is salty or bitter, they eat less.

I go by tummy-time and I want
my dinner.

SIR WINSTON CHURCHILL

There is no sincerer love than
the love of food.

GEORGE BERNARD SHAW

Satiety The state of being satisfied; fullness.

Ventromedial nucleus (VMN) A central area on the underside of the hypothalamus that appears to function as a stop-eating center.

Hyperphagic Characterized by excessive eating.



© Alley Photography/Wes

What Triggers Your Hunger Drive? Are you only interested in eating when your blood sugar level falls, or do the sights and aromas of foods stimulate you to eat?



© Dr. Neal Miller/Yale University

Figure 9.2 ■ A Hyperphagic Rat This rodent winner of the basketball look-alike contest went on a binge after it received a lesion in the ventromedial nucleus (VMN) of the hypothalamus. It is as if the lesion pushed the set point for body weight up several notches; the rat's weight is now about five times normal. But now it eats only enough to maintain its pleasantly plump figure, so you need not be concerned that it will eventually burst. If the lesion had been made in the lateral hypothalamus, the animal might have become the Calista Flockhart of the rat world.

Lateral hypothalamus An area at the side of the hypothalamus that appears to function as a start-eating center.

Aphagic Characterized by undereating.

Eating disorders A group of disorders marked by persistent, gross disturbances in eating patterns.

Some people develop tumors near the base of the brain, damaging the VMN and apparently causing them to overeat and grow obese (Chance et al., 2007).

The **lateral hypothalamus** may function like a “start-eating center.” If you electrically stimulate the lateral hypothalamus, the rat starts to eat (N. E. Miller, 1995). If you destroy the lateral hypothalamus, the rat may stop eating altogether—that is, become **aphagic**. If you force-feed an aphagic rat for a while, however, it begins to eat on its own and levels off at a relatively low body weight. It is as if you have lowered the rat's set point. It is like turning down the thermostat from, say, 70°F to 40°F.

Are physiological influences the whole story in explaining hunger? **Question 8: What psychological factors are connected with the hunger drive?**

Psychological Influences on Hunger

How many times have you been made hungry by the sight or aroma of food? How many times have you eaten not because you were hungry but because you were at a relative's home or hanging around in a cafeteria? Or because you felt anxious or depressed? Or simply because you were bored? Although many areas of the body work in concert to regulate the hunger drive, psychological as well as physiological factors play an important role.

One study confirmed what most of us already assumed—that watching television increases the amount of food we eat (Higgs & Woodward, 2009). One reason is that watching television can distract us from bodily changes that signal fullness and from cognitive awareness of how much we have already eaten. The same reason seems to hold true for gorging on popcorn, candy, and soft drinks at the movies. Watching television also interferes with memory formation of how much we have eaten, making us vulnerable to overeating at subsequent meals.

As we see in this chapter's Life Connections section, millions of Americans are eating too much and putting on more weight than is healthful for them. But now let's turn our attention to the hundreds of thousands of people—mainly adolescent girls and young women but boys and men as well—who are eating less than is healthful.

Eating Disorders: Is It True that “You Can Never Be Too Rich or Too Thin”?

Consider some facts about eating and eating disorders in the United States as reported by the National Eating Disorders Association (2010):

- More than half of teenage girls and nearly one third of teenage boys use unhealthy methods to try to control their weight, including fasting, skipping meals, smoking cigarettes, vomiting, and using laxatives.
- About two of five 1st- through 3rd-grade girls would like to be thinner.
- More than four of five 10-year-old girls report fear of being fat.
- The average American woman is about 5' 4" tall and weighs about 140 pounds. The typical American model is 5' 11" and weighs in at 117 pounds.
- Nearly half of 9- to 11-year-old girls are “sometimes” or “very often” dieting.
- More than 90% of college women have dieted at some time.

Question 9: What are eating disorders? **Eating disorders** are characterized by persistent, gross disturbances in eating patterns. In this section, we focus on an eating disorder in which individuals are too thin, *anorexia nervosa*, and one in which the person may be normal in weight but certainly not in the methods used to maintain that weight, *bulimia nervosa*.

ANOREXIA NERVOSA

The Duchess of Windsor once said, “You can never be too rich or too thin.” **Truth or Fiction Revisited:** Most people make no objection to having a fat bank account, but the fact is that one can most certainly be too skinny, as in the case of anorexia nervosa. **Anorexia nervosa** is a life-threatening eating disorder characterized by extreme fear of being too heavy, dramatic weight loss, a distorted body image, and resistance to eating enough to reach or maintain a healthful weight, as we see in the nearby Closer Look on the case of Rachel.

Anorexia nervosa A life-threatening eating disorder characterized by dramatic weight loss and a distorted body image.

A CLOSER LOOK • REAL LIFE

ANOREXIA NERVOSA—IN RACHEL’S OWN WORDS



© Lea Peterson/Photo Researchers, Inc.

I wanted to be a runner. Runners were thin and I attributed this to dieting, not training. So I began restricting my diet: No butter, red meat, pork, dessert, candy, or snacking. If I ate any of the forbidden items I obsessed about it and felt guilty for days.

As a high school freshman, I wanted to run with the fastest girls so I trained hard, really hard and ate less. Lunch was lettuce sandwiches, carrots, and an apple. By my senior year, I was number three on the team and lunch was a bagel and an orange.

I maintained a rigid schedule—running cross country and track, having a seat on student council, volunteering, and maintaining a 3.9 GPA throughout high school—while starving myself (1,000 calories per day), trying to attain the impossible perfection I thought couldn’t be far away if I only slimmed down a little bit more.

Several teammates were concerned, but I shrugged them off saying family members were tall and slender; I was a health nut, I didn’t like fatty foods; I was a vegetarian; I didn’t like sweets; I wasn’t hungry; I wasn’t starving.

A psychiatrist didn’t help at all. I went in, sat on the couch and told her what she wanted to hear: I would eat more, run less, stop restricting myself, and quit obsessing about being thin. I was very good at knowing exactly what to tell others.

I dropped 10 pounds my freshman year—from 125 to 115 lbs. I was 5' 8" tall and wore a size five. I hated my body so I starved myself and ran like a mad woman.

In quiet moments, I was sad and worried about what might be going on inside me.

I was already taking birth control to regain my menstrual cycle; my weight was 15% below what was recommended for my height; I was always cold; I had chest pains and an irregular heartbeat; my hair was limp and broke off; my skin was colorless.

It wasn’t until I came to the University of Iowa and joined the varsity women’s cross country team that I began to see what I was doing to myself. A teammate had an eating problem. Every time I saw her, I felt sick to my stomach. She had sunken cheeks, eyes so big they swallowed her face. She was an excellent student and a college-level varsity athlete. Many people wondered at her determination, but I understood. She used the same excuses I did.

For one sick instant, I wondered if I would be happier if I were that thin. That is when I started to realize I was slowly killing myself.

At the urging of my coach, I saw the team nutritionist who recommended a psychiatrist who felt no pity for me and made me take a brutally honest look at who I was and why I was starving myself. She didn’t accept any of my excuses. She helped me realize that there are other things to think about besides food and body image. About this time I decided to quit the cross country team. The pressure I felt to be thin and competition at the college level were too much when I needed to focus on getting well.

After two months of therapy, my weight had dropped again. I’m not sure how far because I refused to step on a scale, but my size five pants were falling off. My psychiatrist required weekly weigh-ins.

I wasn’t putting into practice any of the things my nutritionist and counselor suggested. They told me that if I wanted to have children someday I needed to eat. They warned me of osteoporosis at age 30. Then my psychiatrist scared me to death. She told me I needed to start eating more or I would be checked into the hospital and hooked up to an IV. That would put me on the same level as my Iowa teammate. I had looked at her with such horror and never realized that I was in the same position.

My psychiatrist asked how my family would feel if they had to visit me in the hospital because I refused to eat. It was enough to make me think hard the next time I went through the food service lines.

Of course, I didn’t get better the next day. But it was a step in the right direction. It’s taken me three years to get where I am now. At 5' 8¾" (I even grew as I got healthier) and 145 lbs, I look and feel healthier, have better eating and exercise habits, and I don’t obsess about food as much as I used to. On rare occasions, I think about controlling my food intake. My eating disorder will haunt me for the rest of my life. If I’m not careful, it could creep back.

Source: *Well&Good*. (2002). A publication of University of Iowa Health Care. Used with permission.

Table 9.1 ■ Incidence of Anorexia Nervosa and Bulimia Nervosa among African American Women and European American Women

	Anorexia Nervosa	Bulimia Nervosa
African Americans	0%	0.4%
European Americans	1.5%	2.3%

In their study of 985 European American women and 1,062 African American women who had participated in the 10-year National Heart, Lung, and Blood Institute (NHLBI) Growth and Health Study, Ruth Striegel-Moore and her colleagues (2003) found that the incidence of eating disorders was higher among European Americans than African Americans.

Rachel, like other people with anorexia nervosa, weighed less than 85% of her desirable body weight, and “desirable” body weights are already too slender for many individuals. By and large, anorexia nervosa afflicts mainly women during adolescence and young adulthood (Ackard et al., 2007). The typical person with anorexia is a young European American female of higher socioeconomic status. Affluent females have greater access to fitness centers and health clubs and are more likely to read the magazines that idealize slender bodies and shop in the boutiques that cater to females with svelte figures. All in all, they are regularly confronted with unrealistically high standards

of slimness that make them extremely unhappy with their own physiques (Ackard et al., 2007).

The incidences of anorexia nervosa and bulimia nervosa have increased markedly in recent years. We also find eating disorders among some males, particularly among males who are compelled by their chosen activities—for example, wrestling or dancing—to keep their weight within a certain range or to remain very slender (K. Cobb, 2008; Lock, 2009). However, women with these disorders greatly outnumber the men who have them by more than six to one, although we lack precise data on their prevalence because so many people deny their disorder (Ackard et al., 2007). A study of 985 European American women and 1,061 African American women found that 1.5% of the European Americans and none of the African Americans had met the diagnostic standards for anorexia nervosa at some time during their lives (Striegel-Moore et al., 2003; see Table 9.1) ■.

Females with anorexia nervosa can drop 25% or more of their weight within a year. Severe weight loss triggers abnormalities in the endocrine system (that is, with hormones) that prevent ovulation (A. E. Andersen & Ryan, 2009). General health deteriorates. Nearly every system in the body is affected. There are problems with the respiratory system (Gardini et al., 2009) and with the cardiovascular system (Papadopoulos et al., 2009). Females with anorexia are also at risk for premature development of osteoporosis, a condition characterized by loss of bone density that usually afflicts people in late adulthood (Andersen & Ryan, 2009). Given all these problems, it is not surprising that the mortality rate for females with anorexia nervosa is approximately 5%.

In one common pattern, the girl sees that she has gained some weight after reaching puberty, and she resolves that she must lose it. But even after the weight is gone, she maintains her pattern of dieting and, in many cases, exercises at a fever pitch. This pattern continues as she plunges below her “desirable” weight—according to standardized weight charts—and even after those who care about her tell her that she is becoming all skin and bones.

Denial is a huge part of anorexia nervosa. Girls with the disorder tragically tend to deny that they are losing too much weight. They are in denial about any health problems, pointing to their feverish exercise routines as evidence of their strength. Distortion of the body image—seeing oneself as heavier than one is—is a major feature of the disorder (Hrabosky et al., 2009; Miyake et al., 2010). Friends, coworkers, and families see females with anorexia nervosa as skin and bones. Meanwhile, the women fix their gaze into the mirror and believe that they are looking at a body shape that is too heavy.

Ironically, individuals with anorexia do not literally distance themselves from food. They may become as preoccupied with food as they are with their own body shape. They may develop a fascination with cookbooks, shop for their families, and prepare gourmet feasts—for other people, that is.

Video Connections—Anorexia Nervosa



Eating disorders affect many Americans, especially women. Why? Watch the video to hear this woman's story of battling her eating disorder.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

BULIMIA NERVOSA

Bulimia nervosa is sort of a companion disorder to anorexia nervosa. Bulimia nervosa also tends to afflict women during adolescence and young adulthood (Bravender et al., 2010). It entails repeated cycles of binge eating and purging. Binge eating often follows on the heels of food restriction—as in dieting (Cifani et al., 2009; White et al., 2009). There are various methods of purging. Some people vomit. Other avenues include strict dieting or fasting, the use of laxatives, and engaging in demanding, prolonged exercise regimens. Individuals with eating disorders tend to be perfectionists about their bodies. They will not settle for less than their idealized body shape and weight (Franco et al., 2009; H. J. Watson et al., 2010). Bulimia, like anorexia, triggers hormonal imbalances: Studies find that many females with bulimia nervosa have irregular menstrual cycles (Mendelsohn & Warren, 2010).

Eating disorders are upsetting and dangerous in themselves, of course, but they are also often connected with deep depression (G. T. Wilson et al., 2010). However, it seems that depression is more likely to co-occur with eating disorders than to be caused by them (T. D. Wade et al., 2000).

ORIGINS OF EATING DISORDERS

Question 10: What are the origins of eating disorders? Health professionals have done a great deal of research into the origins of eating disorders. Yet they will be the first to admit that many questions about these disorders remain unanswered.

According to some psychoanalysts, anorexia nervosa may symbolize a young woman's efforts to cope with sexual fears, especially fear of pregnancy. Anorexia is connected with *amenorrhea* (lack of menstruation) (Mendelsohn & Warren, 2010); therefore, some psychoanalysts interpret anorexia as a female's attempt to regress to her lifestyle prior to puberty. Anorexia nervosa prevents some adolescents from separating from their families and assuming adult responsibilities. Their breasts and hips flatten again due to the loss of fatty tissue. In the adolescent's fantasies, perhaps, she remains a sexually undifferentiated child.

Many parents are obsessed with getting their children—especially their infants—to eat. Thus, some psychoanalysts suggest that children now and then refuse to eat as a way of engaging in warfare with their parents. (“You have to eat something!” “I’m not hungry!”) It often seems that warfare does occur in the families of adolescents with eating disorders. Parents in such families are often unhappy with the family's functioning. They frequently have issues with eating and dieting themselves. They also “act out” against their daughters—letting them know that they consider them unattractive and, prior to the development of the eating disorder, letting them know that they think they should lose weight (M. Cooper et al., 2001; Crittenden & Dallos, 2009).

A particularly disturbing risk factor for eating disorders in adolescent females is a history of child abuse, particularly sexual abuse (Leung et al., 2010; Maniglio, 2009). One study found a history of childhood sexual abuse in about half of women with bulimia nervosa as opposed to a rate of about 7% among women without the disorder (Deep et al., 1999). Another study compared 45 pairs of sisters, one of whom was diagnosed with anorexia nervosa (Karwautz et al., 2001). Those with anorexia were significantly more likely to be exposed to high parental expectations *and* to sexual abuse.

We must also consider sociocultural factors that may contribute to the development of eating disorders. Slimness is idealized in the United States, but when you check out *Cosmopolitan*, *Glamour*, or the Victoria's Secret catalog, you are looking at models who, on average, are 9% taller and 16% thinner than the typical female—

Every night that I throw up I can't help but be afraid that my heart might stop or something else happen. I just pray and hope I can stop this throwing up before it kills me. I hate this bulimia and I won't stop. It's hard for me to binge and throw up now (refrigerator is locked) and I just can't do it anymore. I just can't race through so much food so fast and then throw it up. I don't really want to. There are times that I do but not often. My new pattern is sure leaving me with an awful feeling in the morning. I eat dinner and kind of keep eating (snacking) afterwards to the point where I either feel too full or think (know) I've eaten too much, then I fall asleep (one hour or so) wake up and think I have to throw up. Half of me doesn't want to, the other half does and I always find myself throwing up. I try falling back asleep but it always seems like eventually sometime during the night I always throw up.

FROM COSTIN, 1996, PP. 62–63

Bulimia nervosa An eating disorder characterized by repeated cycles of binge eating and purging.

and who still manage to have ample bust lines. Miss America, the annually renewed American role model, has also been slenderizing herself over the years. The pageant began in 1922. Over the past 90 years, the winner has added only 2% in height but has lost 12 pounds in weight. In the early days of the 1920s, Miss America's weight relative to her height yielded a body mass index (BMI) of 20 to 25, which is considered normal by the World Health Organization (WHO). The WHO labels people as malnourished when their BMIs are lower than 18.5. However, recent Miss Americas come in at a BMI near 17 (Schick et al., 2009). So Miss America adds to the woes of "normal" young women and even to those of young women who hover near the WHO "malnourished" borderline. (You can calculate your body mass index as follows. Write down your weight in pounds. Multiply it by 703. Divide the product by your height in inches squared. For example, if you weigh 160 pounds and are 5' 8" tall, your BMI is $(160 \times 703) / 68^2$, or 24.33. A BMI of 25 or higher is defined as overweight. A BMI of 30 or higher is defined as obese.)

Truth or Fiction Revisited: Thus, it is true that checking out the Victoria's Secret catalog can contribute to eating disorders among women. As the cultural ideal slenderizes, women with desirable body weights according to the health charts feel overweight, and overweight women feel gargantuan (Schick et al., 2009).

Many individuals with eating disorders, like Rachel, are involved in activities that demand weight limits, such as dancing, acting, and modeling. As noted earlier, male wrestlers and other athletes also feel the pressure to stay within an "acceptable" weight range (Lock, 2009). Men, like women, experience pressure to create an ideal body, one with power in the upper torso and a trim abdomen (Lock, 2009).

Eating disorders tend to run in families, which raises the possibility of the involvement of genetic factors (J. H. Baker et al., 2009). Genetic factors might be involved in the obsessionist and perfectionist personality traits that often accompany the need to be super thin (Altman & Shankman, 2009; Ansell et al., 2010). Genetically inspired perfectionism, cultural emphasis on slimness, self-absorption, and family conflict may create a perfect recipe for the development of eating disorders (Altman & Shankman, 2009; J. H. Baker et al., 2009).

The Model Figure for the 2010s? The great majority of women who compare themselves to the idealized embodiment of the tall, slender model are likely to be disappointed. Their body mass index (BMI) is about 17, and nearly two of three American women have a BMI in excess of 25.



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SELF ASSESSMENT

Eating Disorders Quiz

The following are some questions that may help identify the presence or potential for an eating disorder. These are not a substitute for evaluation by a professional in the field.

1. Are you preoccupied about your weight or shape? (note: some concern is normal in our society)
2. If you are dieting, have you lost a significant amount of weight or have you lost weight rapidly?
3. (if you answered yes to question 2) Are your family, friends, or your doctor concerned about your weight loss?
4. (if you answered yes to question 2) Is your weight more than 10% under a healthy weight for your age and height?
5. (if you answered yes to question 2) Do you feel colder than your friends or family?
6. (if you answered yes to question 2) Has your energy level decreased significantly?
7. (if you answered yes to question 2) Females: have your periods stopped or become irregular?
8. (if you answered yes to question 2) If you are still growing, have you failed to increase weight as you have become taller and older?
9. Do you experience binge eating or “grazing” with a sense of loss of control that causes physical or psychological distress?
10. Do you purge after eating by inducing vomiting, using laxatives, taking water pills, using diet pills, skipping meals, or compensate in other ways for eating more than you thought you should?
11. Do you compulsively exercise—to the point where your friends or family are concerned, your coach is concerned, or you have medical symptoms from excessive exercise?
12. Are you using any bodybuilding steroids to increase your muscle mass?
13. Do you experience yo-yo (up and down) weights on a regular basis?
14. Do you have a significant increase in carbohydrate craving or binge eating or grazing in the fall and winter months?
15. Do you have a continuing negative attitude toward your body weight or shape to the extent that it interferes with the quality of daily life or preoccupies you much of the time?

The above questions address only some of the signs and symptoms of an eating disorder. If you answered “yes” to any of the above questions, there is a possibility that you have an eating disorder and you may want to seek assistance. If you answered “yes” to five or more items, you should seriously consider seeking professional advice.

Source: University of Iowa Hospitals and Clinics. Department of Psychiatry. (2007). Accessed February 6, 2009. <http://www.uihealthcare.com/depts/med/psychiatry/divisions/eatingdisorders/quiz.html>

Do you have an eating disorder, or are you at risk of developing one? The nearby Eating Disorders Quiz might provide some insight. In Chapter 16, “Methods of Therapy,” we will see how health professionals treat eating disorders. We will find that there are roles for both psychotherapy and medicines.

LearningConnections • HUNGER: DO YOU GO BY “TUMMY-TIME”?

ACTIVE REVIEW (8) Biological factors in hunger include _____ contractions. (9) The _____ nucleus (VMN) of the hypothalamus functions as a stop-eating center. (10) As time passes after a meal, the _____ sugar level drops, and fat is drawn from fat cells to provide nourishment. (11) _____ disorders are characterized by persistent, gross disturbances in eating patterns. (12) _____ nervosa is a life-threatening eating disorder characterized by dramatic weight loss and a distorted body image. (13) The typical person with anorexia is a young, affluent _____ American female. (14) _____ nervosa involves repeated cycles of binge eating and purging. (15) One risk factor for eating disorders in adolescent females is a history

of _____ abuse. (16) Eating disorders (do or do not?) tend to run in families.

REFLECT AND RELATE Why do you eat? How do you experience the hunger drive? Have you ever eaten because you were anxious or bored or because you passed a bakery window with some enticing pastries? What are the effects on your health?

CRITICAL THINKING Since genetic factors are involved in the development of eating disorders, is there any purpose in trying to challenge the cultural idealization of the extremely thin female? Explain.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

AGGRESSION: OF AUSTRALOPITHECINES, HUMANS, ROBINS, AND TESTOSTERONE

A murder trial took place in the library of anthropologist Raymond Dart. His guest, Robert Ardrey, held the evidence in his hand—the smashed jawbone of an adolescent. Dart had deduced that the adolescent had been struck in the head with the humerus bone of an antelope—a weapon derived from the animal’s leg. The angle of the blow, its intensity, and other pieces of evidence swept aside any possibility that the death was accidental.

What was stunning to Ardrey was that the murder had taken place more than 500,000 years ago. The victim was an *australopithecine*, an early hominid that had grown to something over 4 feet, weighed 90 pounds, and walked upright. Though not a direct ancestor of humans, this primate shared a branch on the evolutionary tree with humans. The murderer would also have been an australopithecine. And here in a flash, to Ardrey, was an explanation of human aggression: Murder and warfare were not the products of modern society and the state. Rather, they were instinctive. Here in the dawn of time, close relatives of humans had stalked antelopes, baboons, and each other with weapons.

There were those who argued that social deprivation and inequality lay at the root of human aggression. If people were to remove poverty, inequality, and social injustice, went the litany, there would be an end to crime, aggression, and war. Ardrey (1961) dubbed this view the *romantic fallacy*. It was founded, in part, by French philosopher Jean-Jacques Rousseau, who had argued that people were “noble savages” who had been corrupted by twin inventions: private property and the state. Yet Ardrey asserted that *Australopithecus* was undoubtedly savage but was not noble. Long before the invention of the state, australopithecines bore weapons and used them to brutally take the lives of not only animals but also other australopithecines.

Critical thinking teaches us to search for rival explanations for the behavior we observe—whether we observe it in the present or its record from the distant past, and whether we observe it in humans or other species. What kinds of rival

One Scientist's point of view:
The tendency to aggression is an innate, independent, instinctual disposition in man . . . it constitutes the powerful obstacle to culture.

SIGMUND FREUD

A Speculative View of the Primate Past from the film 2001 Researchers have unearthed evidence that the ancestors and relatives of humans used weapons against each other as well as prey. In the film *2001*, a fictitious primate—similar in appearance to a relative but not an ancestor of humans—uses a bone from an antelope as a weapon.



explanations might there be for aggression and even murder? One possibility is that aggressive behavior among humans (and perhaps among australopithecines) is and was learned—at one time, perhaps, by trial and error, but frequently by observing others. In Chapter 6, for example, we noted evidence that observing violence in the media is connected with violent behavior among viewers. The idea of an instinct also suggests that a behavior pattern occurs automatically, without thinking, without decision making. Many—perhaps most—psychologists believe that violence between people is not automatic but involves evaluation of one’s situation and possible patterns of behavior.

Still, we cannot ignore the fact that humans are aggressive—today. There are armed conflicts of one kind or another on nearly every continent of planet Earth. There is murder and battering, often by people’s most intimate partners. There is rape. Ardrey’s evidence for a killer instinct is flawed, but there is evidence of a role for biology in aggression, even among humans. **Question II: What have psychologists and other scientists learned about the biological and psychological origins of aggressive behavior?**

Biology, Chemistry, and Aggression

Evolutionary psychologists believe that “genetic whisperings” influence aggression (Buss, 2009b; Confer et al., 2010). Numerous biological structures and chemicals appear to be involved in aggression. In response to certain stimuli, many lower animals show instinctive aggressive reactions (J. Archer, 2009). This behavior is automatic, although it can be modified somewhat by learning. For example, the male robin responds aggressively to the red breast of another robin. The hypothalamus appears to be involved in this inborn reaction pattern. Electrical stimulation of part of the hypothalamus triggers stereotypical aggressive behaviors in many lower animals. However, in humans, whose brains are more complex, other brain structures apparently moderate possible aggressive instincts.

Chemistry is also involved in aggression, especially in the form of the male sex hormone testosterone. Testosterone appears to affect the tendencies to dominate and control other people. Men have higher testosterone levels than women do and are also (usually) more aggressive than women, especially with male strangers (Pope et al., 2000; Pradhan et al., 2010). For example, aggressive boys and adolescents are likely to have higher testosterone levels than their less aggressive peers (Popma et al., 2007). James Dabbs and his colleagues (1996) found that members of so-called rambunctious fraternities have higher testosterone levels, on average, than members of more “well-behaved” fraternities. Testosterone levels also vary with the occasion: Men’s testosterone levels tend to be higher when they are “winning”—whether in athletic competitions such as football or even in chess (Carré et al., 2009; Carré & Putnam, 2010).

Another point of view:
*Human nature is potentially
aggressive and destructive
and potentially orderly and
constructive.*

MARGARET MEAD

Psychological Aspects of Aggression

Psychologists have recognized the importance of understanding (and curbing) human aggression for many generations. Let’s consider various psychological views of aggression.

PSYCHODYNAMIC THEORY AND AGGRESSION

Sigmund Freud, the originator of psychodynamic theory, believed, like Ardrey, that aggression is natural and instinctive. But Freud viewed aggressive impulses as inevitable reactions to the frustrations of daily life. He was not thinking so much in terms of the evolutionary history of humans. According to Freud, children (and adults) naturally desire to vent aggressive impulses on other people, including parents, because even the most attentive parents cannot gratify all of their demands immediately. Yet children also fear punishment and loss of love, so they repress most aggressive impulses and store them in the unconscious recesses of the mind. Instinctive behavior is thus modified by experience.

As we see in the nearby Controversy in Psychology, the Freudian perspective, in a sense, sees humans as akin to “steam engines.” By holding in steam rather than venting

CROSS-CULTURAL ASPECTS OF AGGRESSION

Anthropological research shows that the stereotype of the aggressive male is not universal. Margaret Mead's (1935) research on the South Pacific island of New Guinea revealed that the sociocultural milieu influences motives such as aggression and nurturance. Among the Mundugumor, a tribe of headhunters and cannibals, both women and men were warlike and aggressive. The women felt that motherhood sidetracked them from more important activities, such as butchering inhabitants of neighboring villages. In contrast, both women and men of the Arapesh tribe were gentle and nurturant of children. Then there were the Tchambuli. In that tribe, the women earned a living while the men spent most of their time nurturing the children, primping, and gossiping.

As noted in Chapter 3, there is a 99.9% overlap among people in the genetic code. There is no reason to believe that significant differences in that other 0.1% account for differences in aggression among the Mundugumor, the Arapesh, and the Tchambuli. Is it not more likely that the people within the various tribes had arrived at a consensus as to proper behavior over the generations and that they taught their children to behave accordingly?



Library of Congress

What Does Cross-Cultural Research Suggest about Aggression? Margaret Mead's anthropological research in New Guinea found wide variety in the incidence of aggression. Among a tribe of headhunters and cannibals, both women and men were warlike. In another tribe, both women and men were gentle and nurturant. A third tribe found reversal of the masculine and feminine stereotypes: Women earned a living while the men nurtured the children and spent time primping.

it, we set the stage for future explosions. Pent-up aggressive impulses demand an outlet. They may be expressed toward parents in roundabout ways, such as destroying furniture; later in life, they may be expressed toward strangers.

COGNITIVE PSYCHOLOGY AND AGGRESSION

Cognitive psychologists assert that it is natural for people to attempt to understand their environments and make decisions. From this perspective, our behavior is influenced by our values, by how we interpret situations, and by choice. People who believe that aggression is necessary and justified—as during wartime—are likely to act aggressively. People who believe that a particular war or act of aggression is unjust, or who oppose aggression regardless of the circumstances, are less likely to behave aggressively (Hurka, 2010; Maxwell et al., 2009).

One cognitive theory suggests that frustration and discomfort trigger unpleasant feelings (Archer, 2009). These feelings, in turn, prompt aggression. Aggression is *not* automatic, however. Cognitive factors intervene (Berkowitz, 1994; P. Fischer et al., 2008). People *decide*—sometimes making split-second decisions—whether they will strike out or not on the basis of factors such as their previous experiences with aggression and their interpretation of the other person's motives.

But researchers find that many individuals who act aggressively distort other people's motives for their behavior. For example, they assume that other people wish them harm when they actually do not (Dodge, 2006; M. A. Ellis et al., 2009). Cognitive therapists note that we are more likely to respond aggressively to a provocation when we magnify

Controversy in Psychology THE CATHARSIS CONTROVERSY

Does watching violent sports such as football, boxing, and pro wrestling make viewers more or less likely to engage in violent behavior themselves?

According to psychodynamic theory, the best way to prevent harmful aggression may be to encourage less harmful aggression. In the steam engine analogy, verbal aggression (through wit, sarcasm, or expression of negative feelings) may vent some of the aggressive steam in a person's unconscious mind. So might cheering on a football team or attend-

ing a prizefight. Psychoanalysts refer to the venting of aggressive impulses as *catharsis*. Thus, catharsis is viewed as a safety valve.

But research findings on the usefulness of catharsis are mixed. Some studies suggest that catharsis leads to pleasant reductions in tension and reduced likelihood of future aggression (e.g., Doob & Wood, 1972). Other studies, however, suggest that venting some steam actually encourages more aggression later on (e.g., Bushman, 2002; Verona & Sullivan, 2008). **Truth or Fiction Revisited:**

Research evidence does *not* support the view that venting aggressive impulses through activities such as cheering on a football team or attending a prizefight is a good way of preventing harmful aggression. Research evidence has been hard on the psychodynamic perspective, yielding partial support for Freud's views at best. Most psychologists believe that Freud's views on aggression remain highly speculative. As we will see in this chapter, we see that there is reason to believe that people *choose* to act aggressively.

the importance of the “insult” or otherwise stir up feelings of anger (M. A. Ellis et al., 2009). How do you respond when someone bumps into you? If you view it as an intentional insult to your honor, you may respond with aggression. If you view it as an accident or as a social problem in need of a solution, you are less likely to act aggressively.

From the cognitive perspective, in sum, it is natural for people to appraise their situations. Whether or not they behave aggressively depends on the outcome of that appraisal.

LEARNING AND AGGRESSION

What do the behavioral and social-cognitive perspectives have to say about aggression? From the behavioral perspective, learning is acquired through reinforcement. Organisms that are reinforced for aggressive behavior are more likely to behave aggressively in situations similar to those in which reinforcement occurs. Environmental consequences make it more likely that an animal will be rewarded for aggression if it “picks on” a smaller, weaker animal. Strong, agile organisms are likely to be reinforced for aggressive behavior.



© Monika Graff/The Image Works

Catharsis? Are these football fans harmlessly venting aggressive impulses, or are they building the likelihood of behaving aggressively themselves? What does Freudian theory say about “catharsis”? Does the research support Freud's theory?

Among lower animals, reinforcement is usually physical—for example, food, mating, or escaping a predator. Humans respond to such reinforcements but also to other reinforcers, such as social approval. Research shows that children are less likely to behave aggressively when teachers and classmates communicate strong disapproval of aggressive behavior (Henry, 2008; Simon et al., 2009).

The behavioral perspective would describe aggressive behaviors as instinctive, as in the case of many lower animals, or as acquired by means of reinforcement. From the social-cognitive perspective, aggressive skills are mainly acquired by the observation of other people acting aggressively. Most behaviorists would see aggressive behavior as being mechanical even in humans either because it is inborn or because the learning of aggressive behaviors is controlled by reinforcements. However, social-cognitive theorists—like other cognitive theorists—believe that consciousness and choice play key roles in aggressive behavior among humans. Social-cognitive theorists believe that we are not likely to act aggressively unless we believe that aggression is appropriate under the circumstances and likely to be reinforced.

— ■ —
*It is impossible to overlook
the extent to which civilization
is built upon a renunciation
of instinct.*

SIGMUND FREUD
— ■ —

Situational Factors and Aggression

Situational factors can contribute to aggression. For example, aggression sometimes takes place within the context of a mob. When people act as individuals, fear of consequences and awareness of their moral values tend to prevent them from hurting other people. But in a mob, they may experience *deindividuation*, which is a state of reduced self-awareness with less of a focus on one's values. Factors that lead to deindividuation include anonymity, sharing of responsibility for aggressive behavior (also called *diffusion of responsibility*), a high level of emotional arousal due to noise and crowding, and a focus on the group's norms rather than on one's own concepts of right and wrong (McKimmie et al., 2009). Under these circumstances, crowd members behave more aggressively than they would as individuals.

The overall message seems to be something like this: Yes, some of the foundations of aggression may be embedded in our genes, but that does not mean aggressive behavior is instinctive in humans. Moreover, human survival on planet Earth no longer requires physical aggression in the way it once may have. Yes, aggression may be affected by testosterone levels and other biological factors, but that does not mean human aggression is mechanical or automatic. Yes, aggressive behaviors may be learned, but people make decisions about whether to act aggressively based on their appraisal of their situations. People's cultural milieus are one source of information used in making these decisions. When aggression is valued within a culture or seen as being "normal," people are more likely to choose to act aggressively. Situational factors such as being part of a mob also affect the likelihood of aggressive behavior.

LearningConnections • AGGRESSION: OF AUSTRALOPITHECINES, HUMANS, ROBINS, AND TESTOSTERONE

ACTIVE REVIEW (17) Electrical stimulation of part of the brain structure called the _____ triggers stereotypical aggressive behaviors in many lower animals. (18) The male sex hormone _____ affects tendencies to dominate and control other people. (19) Cognitive psychologists assert that our behavior is influenced by our values, by how we _____ situations, and by choice. (20) When individuals are part of an aggressive mob, they may experience _____.

REFLECT AND RELATE Consider people you would label "explosive." Do you believe that they actually explode or that they decide where and when to behave violently? Explain.

CRITICAL THINKING What can we deduce about humans from the murder trial in Dart's library? Yes, one australopithecine may have killed another and used a weapon to do so. People have also killed other people and used weapons to do so. But do these incidents provide evidence that aggressive behavior is instinctive in humans or in australopithecines, for that matter? Does it show whether killing and the use of weapons is hard-wired into our nervous systems or learned? Does the "evidence" presented by Dart and Ardrey answer this question?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

ACHIEVEMENT MOTIVATION: “JUST DO IT”?

Many students persist in studying despite being surrounded by distractions. Many people strive relentlessly to get ahead, to “make it,” to earn large sums of money, to invent, to accomplish the impossible. **Question 12: Why do some people strive to get ahead while others do not?** Psychological research has pointed to these people having something called *achievement motivation*.

Psychologist David McClelland (1958) helped pioneer the assessment of achievement motivation through the evaluation of fantasies. One method involves the Thematic Apperception Test (TAT) developed by Henry Murray. The TAT contains cards with pictures and drawings that are subject to various interpretations. Individuals are shown one or more TAT cards and asked to construct stories about the pictured theme: to indicate what led up to it, what the characters are thinking and feeling, and what is likely to happen.

One TAT card is similar to that in Figure 9.3 ■. The meaning of the card is ambiguous—unclear. Is the girl starting to nod off, thinking about the book, wishing she were out with friends? Consider two stories that could be told about this card:

- *Story 1:* “She’s upset that she’s got to read the book because she’s behind in her assignments and doesn’t particularly like to work. She’d much rather be out with her friends, and she may very well sneak out to do just that.”
- *Story 2:* “She’s thinking, ‘Someday I’ll be a great scholar. I’ll write books like this, and everybody will be proud of me.’ She reads all the time.”

The second story suggests the presence of more achievement motivation than the first. Research finds that people with high achievement motivation earn higher grades than people with comparable learning ability but lower achievement motivation (E. A. Turner et al., 2009). They are more likely to envision themselves as becoming successful and work harder to achieve success (Story et al., 2009; E. A. Turner et al., 2009).

McClelland (1965) used the TAT to sort college students into groups—students with high achievement motivation and students with low achievement motivation. He found that 83% of college graduates with high achievement motivation found jobs in occupations characterized by risk, decision making, and the chance for great success, such as business management, sales, or self-employment. Most (70%) of the graduates who chose nonentrepreneurial positions showed low achievement motivation. People with high achievement motivation seem to prefer challenges and are willing to take moderate risks to achieve their goals.

What Flavor Is Your Achievement Motivation?

Do you want to do well in this course? If you do, why? Carol Dweck (2009; Dweck & Master, 2008) finds that achievement motivation can be driven by different forces. Are you motivated mainly by performance goals? That is, is your grade in the course of most importance? If it is, it may be in part because your motives concern tangible rewards such as getting into graduate school, landing a good job, reaping approval from parents or your instructor, or avoiding criticism. Performance goals are usually met through **extrinsic rewards** such as prestige and income. Parents of children who develop performance goals are likely to respond to good grades with tangible rewards such as toys or money and to respond to poor grades with anger and removal of privileges.

Work is the curse of the
drinking classes.

OSCAR WILDE

Extrinsic rewards The rewards associated with performance goals, such as a good salary, health care, and retirement benefits.



Figure 9.3 ■ Tapping Fantasies in Personality Research This picture is similar to a Thematic Apperception Test card used to measure the need for achievement. What is happening in this picture? What is the person thinking and feeling? What is going to happen? Your answers to these questions reflect your own needs as well as the content of the picture itself.

Intrinsic rewards The rewards associated with learning goals, such as self-esteem and increased understanding and insight.

Or do learning goals mainly motivate you to do well? That is, is your central motive enhancing your knowledge and skills—your ability to understand and master the subject matter? Learning goals usually lead to **intrinsic rewards**, such as self-satisfaction. Students who develop learning goals often have parents with strong achievement motivation who encourage their children to think and act independently from an early age. They help their children develop learning goals by showing warmth and praising them for their efforts to learn, exposing them to novel and stimulating experiences, and encouraging persistence (Dweck, 2006; 2009). Children of such parents frequently set high standards for themselves, associate their achievements with self-worth, and attribute their achievements to their own efforts rather than to genetic factors, chance, or the intervention of others.

Many of us strive to meet both performance and learning goals in our courses as well as in other areas of life. Grades are important because they are connected with (very) tangible benefits, but learning for its own sake is also of value.

LearningConnections • ACHIEVEMENT MOTIVATION: “JUST DO IT”?

ACTIVE REVIEW (21) Individuals with (high or low?) achievement motivation are more likely to earn high salaries and be promoted on the job. (22) McClelland used the Thematic _____ Test to measure achievement motivation. (23) Students with _____ goals are mainly motivated by factors such as good grades, rewards from parents, and the prospect of landing a good job. (24) Students with _____ goals are usually more motivated by intrinsic rewards like self-satisfaction.

REFLECT AND RELATE Do you seem to be driven mainly by performance goals or learning goals in this course and in your other courses? Explain.

CRITICAL THINKING Some people strive harder to get ahead than others. Is it circular reasoning to “explain” the difference in terms of more or less achievement motivation?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Emotion A state of feeling that has cognitive, physiological, and behavioral components.

Autonomic nervous system (ANS) The division of the peripheral nervous system that regulates glands and activities such as heartbeat, respiration, digestion, and dilation of the pupils.

Sympathetic nervous system The branch of the autonomic nervous system that is most active during processes that spend body energy from stored reserves, such as in a fight-or-flight reaction to a predator or when you are anxious about a big test. When people experience fear, the sympathetic nervous system accelerates the heart rate, raises blood pressure, tenses muscles, and so on.

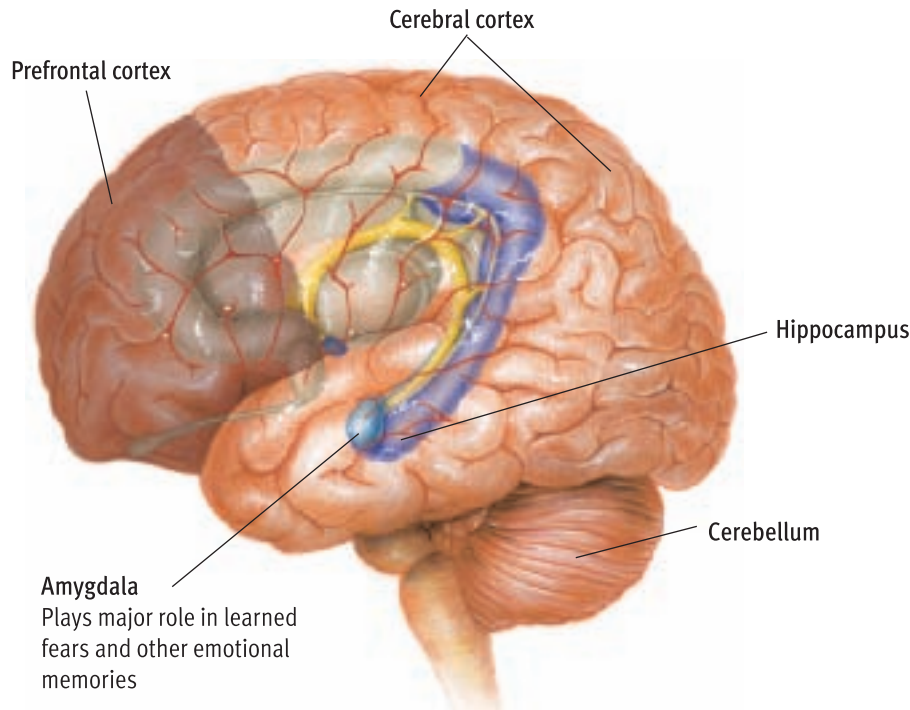
Amygdala An almond-shaped structure in the frontal part of the temporal lobe that is part of the limbic system and involved in processing and expressing emotions, particularly fear.

EMOTION: ADDING COLOR TO LIFE

Emotions color our lives. We are green with envy, red with anger, blue with sorrow. Positive emotions such as love and desire can fill our days with pleasure. Negative emotions such as fear, depression, and anger can fill us with dread and make each day a chore. Sometimes, our emotions “lurk in the background.” Sometimes, they seize control of the day. And as noted by Solomon (2008), emotion can be hard to define.

Question 13: Just what is an emotion? An emotion can be a response to a situation in the way that fear is a response to a threat. An emotion can motivate behavior (for example, anger can motivate us to act aggressively). An emotion can also be a goal in itself. We may behave in ways that will lead us to experience happiness or feelings of love. Emotions are thus intertwined with motivation. We are driven by emotions, and meeting—or failing to meet—our needs can have powerful emotional results.

Emotions are feeling states with physiological, cognitive, and behavioral components (Solomon, 2008). In terms of physiology, strong emotions arouse the **autonomic nervous system** but also involve the limbic system and other parts of the brain (LeDoux & Phelps, 2008) (see Chapter 3). The greater the arousal, the more intense the emotion. It also appears that the type of arousal affects the emotion being experienced. Although the word *emotion* might seem to be about feeling and not about thinking, cognitions—particularly interpretations of the meanings of events—are important aspects of emotions. *Fear*, which usually occurs in response to a threat, involves cognitions that one is in danger as well as arousal of the **sympathetic nervous system** (rapid heartbeat and breathing, sweating, muscle tension) and significant activity of the **amygdala**—part of the limbic system (LeDoux & Phelps, 2008). The amygdala sends messages to the hypothalamus that control the autonomic responses related to fear, as in increasing blood pressure. The amygdala receives pain messages as well as visual and auditory information, so it is well suited to the conditioning of fear responses (see Figure 9.4) ■.



Source: WEITEN, *Psychology*, 8/e. © 2010 Cengage Learning.

Figure 9.4 ■ The Amygdala and the Learning of Fears The amygdala is significantly involved in the learning of fears. The basolateral part of the amygdala receives visual and auditory information and then transmits messages to the central amygdala. The central amygdala, in turn, transmits messages to the gray matter in the midbrain, which relays the messages to the part of the pons that is responsible for the startle reflex.

Emotions also involve behavioral tendencies. Fear is connected with behavioral tendencies to avoid or escape from a particular situation (see Table 9.2) ■. As a response to a social provocation, *anger* involves cognitions involving revenge, arousal of both the sympathetic and **parasympathetic nervous systems**, and tendencies to approach the object of the anger—that is, to attack (Carver & Harmon-Jones, 2009). *Depression* usually involves cognitions of helplessness and hopelessness, parasympathetic arousal, and tendencies toward inactivity—or sometimes, self-destruction. *Happiness*, *grief*, *jealousy*, *disgust*, *embarrassment*, and *liking* all have cognitive, physiological, and behavioral components as well.

The Expression of Emotions: The Smile Seen Round the World?

Happiness and sadness are found in all cultures, but **Question 14: Do people around the world express emotions in the same way?** It turns out that the expression of many emotions may be universal (Ekman, 2003). Smiling is apparently a universal sign of friendliness and approval. Baring the teeth, as noted by Charles Darwin (1872) in the 19th century, may be a universal sign of anger. As the originator of the theory of evolution, Darwin believed that the universal recognition of facial expressions would have survival value. For example, in the absence of language, facial expressions could signal the approach of enemies (or friends).

Most investigators concur that certain facial expressions suggest the same emotions in people who are reared in different cultures (e.g., Matsumoto et al., 2008; Sebe et al., 2007). Moreover, people in diverse cultures recognize the emotions manifested by

Table 9.2 ■ Components of Emotions

Emotion	Physiological	Cognitive	Behavioral
Fear	Sympathetic arousal	Belief that one is in danger	Avoidance tendencies
Anger	Sympathetic and parasympathetic arousal	Frustration or belief that one is being mistreated	Attack tendencies
Depression	Parasympathetic arousal	Thoughts of helplessness, hopelessness, worthlessness	Inactivity, possible self-destructive tendencies

Parasympathetic nervous system The branch of the autonomic nervous system that is most active during processes that restore reserves of energy to the body, such as relaxing and eating. When people relax, the parasympathetic nervous system decelerates the heart rate, normalizes blood pressure, relaxes muscles, and so on. The parasympathetic division also stimulates digestion.



© 1976 Paul Ekman/Human Interaction Laboratory

Figure 9.5 ■ Photographs Used in Research by Paul Ekman Ekman’s research suggests that the facial expressions connected with several important emotions such as happiness, anger, surprise, and fear are universally recognized.

Positive psychology The field of psychology that is about personal well-being and satisfaction; joy, sensual pleasure, and happiness; and optimism and hope for the future.

Emotions have always lurked in the background—often as a threat to reason. . . . One of the most enduring metaphors of reason and emotion has been the metaphor of master and slave, with the wisdom of reason firmly in control and the dangers of emotion safely suppressed, channeled, or (ideally) in harmony with reason. But the question “What is an emotion?” has proved to be as difficult to resolve as the emotions have been to master.

ROBERT C. SOLOMON, 2008, P. 3

certain facial expressions, such that there is some immediate cross-cultural communication of feelings. In a classic study, Paul Ekman (1980) took photographs of people exhibiting anger, disgust, fear, happiness, sadness, and surprise (see Figure 9.5 ■.) He then asked people around the world to indicate what emotions were being depicted. Those queried ranged from European college students to members of the Fore, a tribe that dwells in the New Guinea highlands. All groups, including the Fore, who had almost no contact with Western culture, agreed on the emotions being portrayed. The Fore also displayed familiar facial expressions when asked how they would respond if they were the characters in stories that called for basic emotional responses. Ekman and his colleagues (1987) obtained similar results in a study of 10 cultures. In that study, participants were allowed to identify more than one emotion in facial expressions. The participants generally agreed on which two emotions were shown and which emotion was more intense.

On the other hand, there is no perfect one-to-one relationship between facial expressions and emotions (Matsumoto et al., 2008). Facial expressions sometimes occur in the absence of the emotion they are thought to accompany (S. Porter & ten Brinke, 2008). As noted by psychologist Joseph Campos (2000), the voice, posture, and gestures also provide clues as to what people are feeling and about to do.

Many psychologists help individuals cope with negative emotions such as fear, anger, and depression. But psychologists have also studied positive emotions, such as happiness, and considered ways you might increase your own feelings of happiness.

“Is Evvvrybody Happy?” An Excursion into Positive Psychology

Ted Lewis, the Great Depression–era bandleader, used to begin his act by asking, “Is evvvvrybody happy?” Well, everybody is not happy, but surveys do suggest that the majority of people in developed nations are satisfied with their lives (Cummins & Nistico, 2002). Many people might think that psychologists are only interested in negative emotions such as anxiety, depression, and anger. Not at all. An area of psychology called **positive psychology** deals with positive emotions such as happiness and love, optimism and hope, and joy and sensual pleasures.

Question 15: What factors contribute to happiness? Are some people just “born happy,” or do life experiences determine happiness? What factors interfere with happiness? Some psychologists, such as David Lykken (Lykken & Csikszentmihalyi, 2001), believe that genetic factors play a powerful role in happiness. They note that happiness tends to run in families and that we tend to have a rather stable level of happiness throughout much of our lives (W. Johnson & Krueger, 2006). Positive events such as learning that the person we love also loves us or receiving recognition for our work can certainly raise the level of happiness we experience at the moment. Similarly, negative

life events such as the loss of a loved one, financial reverses, or injuries can depress us—and understandably so. Yet we may tend to bounce back to a more or less characteristic level of happiness, as did actor Christopher Reeve following the accident—being thrown from a horse—that paralyzed him.

Which life experiences contribute to happiness? **Truth or Fiction Revisited:** Despite the saying that “Money can’t buy you happiness,” surveys in the United States, Russia, China, and Latin America suggest that people tend to be happier when they live in affluent societies and earn decent incomes (W. Johnson & Krueger, 2006). Perhaps money doesn’t make people happy in itself, but when we have enough money, at least we don’t have to worry about it. Money aside, Chinese college students tend to think about happiness in terms of feelings of contentment, inner harmony, personal achievement, physical wellness, spiritual enrichment, hopefulness about the future, generosity, and self-development (Lu, 2001).

People who are married (Waite et al., 2009) and people in enduring gay and lesbian relationships (Wienke & Hill, 2009) tend to be happier than loners. There is a difference, of course, between loneliness and solitude, and maybe people who are extraverted and who have the skills to maintain social relationships are generally more capable of finding life satisfaction. Happy people also tend to be open to new experiences; they are more willing to risk becoming involved in new relationships (Demir & Weitekamp, 2007).

Then there are the attitudinal aspects of happiness. People at any income level can make themselves miserable when they compare their incomes to those who bring in more (Cheung & Leung, 2008). Happiness also tends to be accompanied by optimism—a cognitive bias toward assuming that things will work out (Ho et al., 2010; Wilhelm et al., 2010). But the bias is not groundless because happy people often believe in their ability to effect change. Thus, they try harder. They are also willing to pat themselves on the back for their successes and are not quick to blame themselves when things go wrong. These attitudes contribute to self-esteem, yet another factor in happiness.

“COME ON! GET HAPPY!” A POSSIBLE OR IMPOSSIBLE DREAM?

Are there lessons for you in these research findings on happiness? Perhaps. But keep in mind that the studies are correlational; for example, not one of them provided individuals with money to determine whether affluence would affect their mood. Nor did any of them manipulate people’s attitudes toward life and measure the outcomes. Still, there might be no harm in placing oneself within the groups of people who are more likely to be happy. Here are some suggestions:

- Take advantage of your education to develop knowledge and skills that can help you be free from want. Even if money does not make you happy in itself, it is good not to have to worry about money.
- Do not let the fact that other people have more impair your ability to appreciate and enjoy what you have.
- Value friendships and other social relationships. Be open to developing new relationships.
- Think about the meaning of your life and whether you can make your life more meaningful to yourself.
- Consider whether you are generally optimistic or pessimistic about your future. If you are pessimistic, examine the reasons for your pessimism and work to overcome them. If you cannot find reasons for your pessimism, challenge yourself to change your outlook.
- Consider whether you blame yourself too much when things go wrong or give yourself too little credit when things go right.

In the following section on the facial-feedback hypothesis, we see that you may also find it worthwhile to “put on a happy face.”



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Christopher Reeve The actor who played Superman in several films turned out not to be invulnerable when he was thrown from a horse. The accident paralyzed Reeve but did not destroy his fighting spirit or his general tendency toward happiness.

The Facial-Feedback Hypothesis: Does Smiling Make You Happy?

The face has a special place among visual stimuli. Social animals like humans need to differentiate and recognize members of their group, and for people, the face is the most distinctive key to identity (Parr et al., 2000). Faces are also a key to social communication. Facial expressions reflect emotional states, and our ability to “read” these expressions enables us to interact appropriately with other people.

It is known that various emotional states give rise to certain patterns of electrical activity in the facial muscles and in the brain (Davis et al., 2009; Porter & ten Brinke, 2008). But can it work the other way around? The **facial-feedback hypothesis** argues that facial expressions can also affect our emotional state; that is, the causal relationship between emotions and facial expressions can work in the opposite direction.

Question 16: Can smiling give rise to feelings of goodwill? (Can frowning produce anger?) Perhaps they can.

Psychological research has yielded some interesting findings concerning the facial-feedback hypothesis. Inducing people to smile, for example, leads them to report more positive feelings and to rate cartoons as more humorous (Soussignan, 2002; Strack et al., 1988; see Figure 9.6 ■, part A). When induced to frown, as by holding the pen between their lips, they rate cartoons as more aggressive (see Figure 9.6, part B). When they exhibit pain through facial expressions, they rate electric shocks as more painful.

An interesting study found that women’s college yearbook pictures predicted life outcomes as much as 30 years later. LeeAnne Harker and Dacher Keltner (2001) found that women who showed more positive emotions in yearbook photos—as by smiling—were more likely to show social competence, personal well-being, and even happier marriages as the years went by. By the way, their physical attractiveness did not seem to matter; it was the display of positive emotions that told the lifelong tale.

What are the possible links between facial feedback and emotion? One is arousal. Intense contraction of facial muscles such as those used in signifying fear heightens arousal, which, in turn, boosts emotional response. Feedback from the contraction of facial muscles may also induce emotions. Engaging in the “Duchenne smile,” characterized by “crow’s feet wrinkles around the eyes and a subtle drop in the eye cover fold so that the skin above the eye moves down slightly toward the eyeball” (Ekman, 2003), can induce pleasant feelings (Soussignan, 2002).

You may have heard the British expression “Keep a stiff upper lip” as a recommendation for handling stress. Perhaps a “stiff” lip suppresses emotional response—as long as the lip is relaxed rather than quivering with fear or tension. But when the lip is stiffened through strong muscle tension, facial feedback may heighten emotional response.

Facial-feedback hypothesis The view that stereotypical facial expressions can contribute to stereotypical emotions.

Figure 9.6 ■ We May Smile When We Are Pleased, but Can Smiling Make Us Feel Good about Things? According to the facial-feedback hypothesis, smiling just might have that effect. When people are compelled to smile because they are holding a pen between their teeth, they are more likely to rate comic strips as funny (see part A). Holding the pen between their lips forces a frown, and the rating of the cartoons plummets (part B).



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David, 32, is not sleeping well. He wakes before dawn and cannot get back to sleep. His appetite is off, his energy level is low, he has started smoking again. He has a couple of drinks at lunch and muses that it's lucky that any more alcohol makes him sick to his stomach—otherwise, he'd probably be drinking too much, too. Then he thinks, “So what difference would it make?” Sometimes he is sexually frustrated; at other times he wonders whether he has any sex drive left. Although he's awake, each day it's getting harder to drag himself out of bed in the morning. This week he missed one day of work and was late twice. His supervisor has suggested in a nonthreatening way that he “do something about it.” David knows that her next warning will not be unthreatening. It's been going downhill since Sue walked out. Suicide has even crossed David's mind. He wonders if he's going crazy.

David is experiencing the emotion of depression, seriously so. Depression is to be expected following a loss, such as the end of a relationship, but David's feelings have lingered. His friends tell him that he should get out and do things, but David is so down that he hasn't the motivation to do much of anything at all. After much prompting by family and friends, David consults a psychologist who, ironically, also pushes him to get out and do things—the things he used to enjoy. The psychologist also shows David that part of his problem is that he sees himself as a failure who cannot make meaningful changes.

Question 17: How do the physiological, situational, and cognitive components of emotions interact to produce feelings and behavior? Some psychologists argue that physiological arousal comes first. It is more central to emotional response than cognition is. Moreover, the type of arousal we experience strongly influences our cognitive appraisal and our labeling of the emotion (e.g., Izard, 1984). For these psychologists, the body takes precedence over the mind. Do David's bodily reactions—for example, his loss of appetite and energy—take precedence over his cognitions? Other psychologists argue that cognitive appraisal and physiological arousal are so strongly intertwined that cognitive processes may determine the emotional response. Are David's ideas that he is helpless to make meaningful changes more at the heart of his feelings of depression?

The “common-sense theory” of emotions is that something happens (a situation) that is cognitively appraised (interpreted) by the person, and the feeling state (a combination of arousal and thoughts) follows. For example, you meet someone new, appraise that person as delightful, and feelings of attraction follow. Or as in the case of David, a social relationship comes to an end, you recognize your loss, feel powerless to change it, and feel down in the dumps.

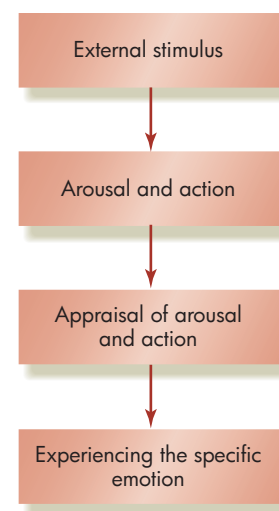
However, both historical and contemporary theories of how the components of emotions interact are at variance with this common-sense view. Let's consider a number of theories and see whether we can arrive at some useful conclusions.

THE JAMES-LANGE THEORY

A century ago, William James suggested that our emotions follow, rather than cause, our behavioral responses to events. At about the same time, this view was also proposed by the Danish physiologist Karl G. Lange. It is therefore termed the **James-Lange theory of emotion**.

According to James and Lange, certain external stimuli instinctively trigger specific patterns of arousal and action, such as fighting or fleeing (see Figure 9.7 ■, part A). We then become angry *because* we are acting aggressively or become afraid *because* we are running away. Emotions are simply the cognitive representations (or by-products) of automatic physiological and behavioral responses.

The James-Lange theory is consistent with the facial-feedback hypothesis. That is, smiling apparently can induce pleasant feelings, even if the effect may not be strong enough to overcome feelings of sadness (Ekman, 1993). The theory also suggests that we may be able to change our feelings by changing our behavior. Changing one's behavior to change one's feelings is one aspect of behavior therapy. When David's psychologist

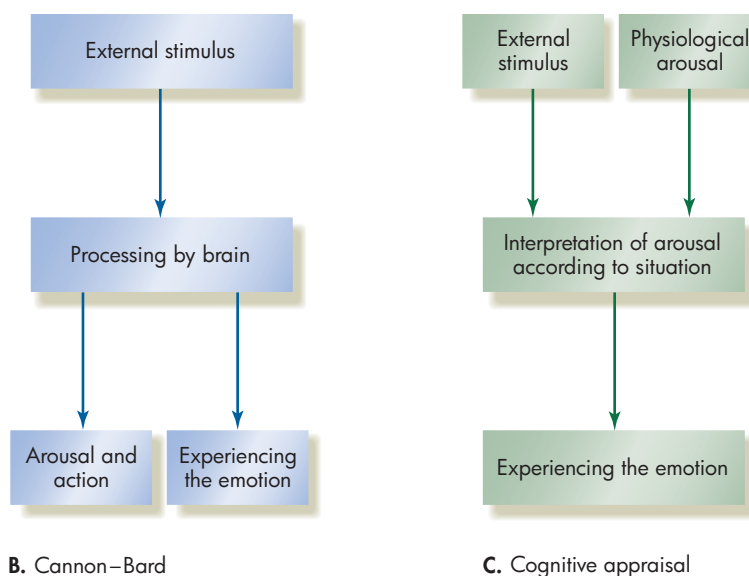


A. James-Lange

Figure 9.7 ■ Part A: The James-Lange Theory of Emotion.

James-Lange theory of emotion The view that certain external stimuli instinctively trigger specific patterns of arousal and action, such as fighting or fleeing. We experience the emotion as a consequence of our physiological and behavioral responses.

Figure 9.7 ■ Parts B and C: Theories of Emotion Several theories of emotion have been advanced, each of which proposes a different role for the components of emotional response. According to the James–Lange theory (part A on page 329), events trigger specific arousal patterns and actions. Emotions result from our appraisal of our body responses. According to the Cannon–Bard theory (part B), events are first processed by the brain. Body patterns of arousal, action, and our emotional responses are then triggered simultaneously. According to the theory of cognitive appraisal (part C), events and arousal are appraised by the individual. The emotional response stems from the person’s appraisal of the situation and his or her level of arousal.



urges him to get out and do things, she is assuming that by changing his behavior, David can have a positive effect on the way he feels.

Walter Cannon (1927) criticized the James–Lange assertion that each emotion has distinct physiological correlates. He argued that the physiological arousal associated with emotion A is not as distinct from the arousal associated with emotion B as the theory asserts. Note that the James–Lange view downplays the importance of human cognition; it denies the roles of cognitive appraisal, personal values, and personal choice in our behavioral and emotional responses to events.

THE CANNON–BARD THEORY

Cannon (1927) was not content to criticize the James–Lange theory. Along with Philip Bard (1934), he suggested that an event might simultaneously trigger bodily responses (arousal and action) and the experience of an emotion. As shown in Figure 9.7 (part B), when an event is perceived (processed by the brain), the brain stimulates autonomic and muscular activity (arousal and action) and cognitive activity (experience of the emotion). Thus, according to the **Cannon–Bard theory of emotion**, emotions *accompany* bodily responses. They are not *produced* by bodily changes, as in the James–Lange theory.

The central criticism of the Cannon–Bard theory focuses on whether bodily responses (arousal and action) and emotions are actually stimulated simultaneously. For example, pain or the perception of danger may trigger arousal before we begin to feel distress or fear. Also, many of us have had the experience of having a “narrow escape” and becoming aroused and shaky afterward, when we have had time to consider the damage that might have occurred. What is needed is a theory that allows for an ongoing interaction of external events, physiological changes (such as autonomic arousal and muscular activity), and cognitive activities.

THE THEORY OF COGNITIVE APPRAISAL

More recent theoretical approaches to emotion have stressed cognitive factors. Among those who argue that thinking comes first are Gordon Bower, Richard Lazarus, Stanley Schachter, Jerome Singer, and Robert Zajonc.

Stanley Schachter asserts that emotions are associated with similar patterns of bodily arousal that may be weaker or stronger depending on the level of arousal. The label we give to an emotion depends largely on our cognitive appraisal of the situation. Cognitive appraisal is based on many factors, including our perception of external events and the ways other people seem to respond to those events (see Figure 9.7, part C). Given the presence of other people, we engage in social comparison to arrive at an appropriate response.

Cannon–Bard theory of emotion The view that emotions *accompany* bodily responses but are not caused by them.

Table 9.3 ■ Injected Substances and Cognitive Manipulations in the Schachter–Singer Study

Group	Substance	Cognitive Manipulation
1	Adrenaline	No information given about effects
2	Adrenaline	Misinformation given: itching, numbness, etc.
3	Adrenaline	Accurate information given: physiological arousal
4	Inactive	None

Source: Schachter and Singer, 1962

In a classic experiment, Schachter and Singer (1962) showed that arousal can be labeled quite differently depending on the situation. The investigators told participants that they wanted to determine the effects of a vitamin on vision. Half of the participants received an injection of adrenaline, a hormone that increases the arousal of the sympathetic branch of the autonomic nervous system. A control group received an injection of an inactive solution. Those who had been given adrenaline then received one of three “cognitive manipulations,” as shown in Table 9.3 ■. Group 1 was told nothing about possible emotional effects of the “vitamin.” Group 2 was deliberately misinformed; members of this group were led to expect itching, numbness, or other irrelevant symptoms. Group 3 was informed accurately about the increased arousal they would experience. Group 4 was a control group injected with an inactive substance and given no information about its effects.

After receiving injections and cognitive manipulations, the participants were asked to wait in pairs while the experimental apparatus was being set up. The participants did not know that the person with whom they were waiting was a confederate of the experimenter. The confederate’s purpose was to exhibit a response that the individual would believe was caused by the injection.

Some of those who took part in the experiment waited with a confederate who acted in a happy-go-lucky manner. He flew paper airplanes about the room and tossed paper balls into a wastebasket. Other participants waited with a confederate who acted angry. He complained about the experiment, tore up a questionnaire, and left the waiting room in a huff. As the confederates worked for their Oscar awards, the real participants were observed through a one-way mirror.

The people in groups 1 and 2 were likely to imitate the behavior of the confederate. Those who were exposed to the happy-go-lucky confederate acted jovial and content. Those who were exposed to the angry confederate imitated that person’s complaining, aggressive behavior. But those in groups 3 and 4 were less influenced by the confederate’s behavior.

Schachter and Singer concluded that participants in groups 1 and 2 were in an ambiguous situation. Members of these groups felt arousal from the adrenaline injection but couldn’t label their arousal as any specific emotion. Social comparison with a confederate led them to attribute their arousal either to happiness or to anger. Members of group 3 expected arousal from the injection, with no particular emotional consequences. These participants did not imitate the confederate’s display of happiness or anger because they were not in an ambiguous situation; they knew they felt arousal because of the shot of adrenaline. Members of group 4 had no physiological arousal for which they needed an attribution, except perhaps for some arousal induced by observing the confederate. They also did not imitate the behavior of the confederate.

Now, happiness and anger are quite different emotions. Happiness is a positive emotion, whereas anger, for most of us, is a negative emotion. Yet Schachter and Singer suggest that any physiological differences between these two emotions are so slight that different views of the situation can lead one person to label arousal as happiness and another person to label it as anger. The Schachter–Singer view could not be further removed from the James–Lange theory, which holds that each emotion is associated with specific and readily recognized body sensations. The truth, it happens, may lie somewhere in between.

In science, it must be possible to replicate experiments and attain identical or similar results; otherwise, a theory cannot be considered valid. The Schachter and Singer

Controversy in Psychology JUST WHAT DO LIE DETECTORS DETECT?

The connection between autonomic arousal and emotions has led to the development of many kinds of lie detectors. Such instruments detect something, but do they detect specific emotional responses that signify lies? Let's take a closer look at the problem of lying.

Lying—for better or worse—is a part of life. People admit to lying in 14% of their e-mails, 27% of their face-to-face interactions, and 37% of their phone calls (Hancock, 2007). Political leaders lie to get elected. When people communicate with online “matches,” men are most likely to lie about their personal assets and their goals for a relationship (J. A. Hall et al., 2010). Women are most likely to lie about their weight (J. A. Hall et al., 2010). The great majority of people lie to their lovers—most often about other relationships (Rowatt et al., 1999; Toma et al., 2008). People also lie about their qualifications to obtain jobs, and of course, some people lie in denying guilt for crimes. Although we are unlikely to subject political leaders, students, and lovers to lie detector tests, such tests are frequently used in hiring and in police investigations.

Facial expressions often offer clues to deceit, but some people can lie with a straight face—or a smile. As Shakespeare pointed out in *Hamlet*, “One may smile, and smile, and be a villain.” The use of devices to detect lies has a long, if not laudable, history:

The Bedouins of Arabia . . . until quite recently required conflicting witnesses to lick a hot iron; the one whose tongue was burned was thought to be lying. The Chinese, it is said, had a similar method for detecting lying: Suspects were forced to chew rice powder and spit it out; if the powder was dry, the suspect was guilty. A variation of this test was used during the Inquisition. The suspect had to swallow a “trial slice” of bread and cheese; if it stuck to the suspect's palate or throat he or she was not telling the truth. (Kleinmuntz & Szucko, 1984, pp. 766–767)

These methods may sound primitive, even bizarre, but they are broadly consistent with modern psychological knowledge. Anxiety about being caught in a lie is linked to arousal of the sympathetic division of the autonomic nervous system. One sign of sympathetic arousal is lack of saliva, or dryness in the mouth. The emotions of fear and guilt are also linked to sympathetic arousal and, hence, to dryness in the mouth.

Question 18: How do lie detectors work? Modern lie detectors, or polygraphs, monitor indicators of sympathetic arousal while a witness or suspect is being examined. These indicators include heart rate, blood pressure, respiration rate, and electrodermal response (sweating). Questions have been

raised about the validity of assessing truth or fiction in this way, however (Iacono, 2008).

The American Polygraph Association claims that use of the polygraph is 85% to 95% accurate. Critics find polygraph testing to be less accurate and claim that it is sensitive to more than lies (Iacono, 2008). Factors such as tense muscles, drugs, and previous experience with polygraph tests can significantly reduce their accuracy rate. In one experiment, people were able to reduce the accuracy of polygraph-based judgments to about 50% by biting their tongue (to produce pain) or by pressing their toes against the floor (to tense muscles) while being interviewed (Fiske & Borgida, 2008; Honts et al., 1985). Hence, you might give the examiner the impression that you are lying even when you are telling the truth, throwing off the test's results. **Truth or Fiction Revisited:** Thus, it is true that you might be able to fool a lie detector by wiggling your toes.

It appears that no identifiable pattern of bodily responses pinpoints lying (Gronau et al., 2005; Iacono, 2008). Because of validity problems, results of polygraph examinations are no longer admitted as evidence in many courts. Even if the polygraph is fallible, other research is under way in the development of techniques that could measure certain brain waves to determine whether a subject recognizes a photo, a name, or another stimulus without even asking a question (Ambach et al., 2010).

study has been replicated but with *different* results (Ekman, 1993). For instance, a number of studies found that participants were less likely to imitate the behavior of the confederate and were likely to perceive unexplained arousal in negative terms, attributing it to nervousness, anger, even jealousy (Zimbardo et al., 1993).

EVALUATION OF THE THEORIES

What can we make of all this? Research suggests that the patterns of arousal connected with various emotions are more specific than suggested by Schachter and Singer—although less so than suggested by James and Lange (Larsen et al., 2008). Research with brain imaging suggests that different emotions, such as happiness and sadness, involve different structures within the brain (Lane et al., 2009; Pollatos et al., 2007; Suslow et al., 2010). Even so, researchers have not found brain cells that respond to but a single emotion. The emotion of disgust apparently has the most specific brain location—in the *insular cortex*, which is a part of the cerebral cortex that lies in the lateral fissure between the temporal lobe and the frontal lobe (Murphy et al., 2003). This area of the cortex is the primary taste cortex, so it makes sense that an emotion that derives from distasteful experiences would be centered here.

Regarding the Schachter and Singer study, Zimbardo and his colleagues (1993) note that lack of control over our emotions and lack of understanding of what is happening to us are disturbing experiences. Thus, our cognitive appraisals of situations apparently do affect our emotional responses, even if not quite in the way envisioned by Schachter.

In sum, various components of an experience—cognitive, physiological, and behavioral—contribute to our emotional responses. Our bodies may become aroused in a given situation, but as we saw in the classic research of Schachter and Singer, people also appraise those situations so that arousal in itself does not appear to directly cause one emotion or another. The fact that none of the theories of emotion we have discussed applies to all people in all situations is comforting. Apparently, our emotions are not quite as easily understood, manipulated, or—as in the case of the polygraph—even detected as some theorists have suggested.

LearningConnections • EMOTION: ADDING COLOR TO LIFE

ACTIVE REVIEW (25) A(n) _____ is a feeling state. (26) The expression of emotions such as anger, fear, happiness, and surprise appears to be (culture-specific or universal?). (27) Genetic factors (do or do not?) appear to be involved in happiness. (28) According to the James-Lange theory, emotions have specific patterns of arousal and _____. (29) According to the theory of _____ appraisal, the emotion a person will experience reflects his or her appraisal of the situation. (30) Polygraphs assess heart rate, blood _____, respiration rate, and electrodermal response (sweating).

REFLECT AND RELATE Have you ever been able to change the way you feel by doing something? For example, have you ever purposefully worked yourself up into a rage? Or have you ever done something enjoyable to elevate your mood? How do your personal experiences relate to the various theories of emotion?

CRITICAL THINKING Should lie detectors be used in screening candidates for mortgages or jobs?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections OBESITY: A SERIOUS AND PERVASIVE PROBLEM

Consider some facts about obesity:

- More than two of three adult Americans are overweight, according to the national body mass index (BMI) guidelines, and one in three are obese (Flegal et al., 2010). **Truth or Fiction Revisited:** It is therefore true that more than half of adult Americans are overweight.
- Problems with unhealthy weight gain have been on the upswing in the United States; for example, 68% of Americans were overweight in 2008 compared with 60% in 1988–1994 (Flegal et al., 2010).
- More than 78% of African American women and 81% of Latina Americans, age 40 and older, are overweight, and about half are obese (Flegal et al., 2010).
- Obesity is a risk in various chronic medical conditions including type 2 diabetes, hypertension (high blood pressure), high cholesterol levels, stroke, heart disease, some cancers, arthritis, gall bladder disease, and respiratory problems (Apovian, 2010; Flegal et al., 2010).
- Weight control is elusive for most people, who regain most of the weight they have lost, even when they have dieted “successfully” (Apovian, 2010; Heber, 2010).

American culture idealizes slender heroes and heroines. For those who “more than measure up” to TV and film idols, food may have replaced sex as the central source of guilt. Studies using data obtained by the federal government find that extremely obese people, whose BMIs are greater than or equal to 40, live shorter lives than people who are normal in weight (Finkelstein et al., 2010; see Table 9.4) ■. Research has contributed to our understanding of obesity and what can be done about it.

Table 9.4 ■ Years of Life Lost by an Extremely Obese, Nonsmoking 40-Year-Old Compared with a Normal-Weight Person of the Same Age

	European American	African American
Male	9 years	8 years
Female	7 years	5 years

Source of data: Finkelstein, E. A., Brown, D. S., Wrage, L. A., Allaire, B. T., & Hoerger, T. J. (2010). Individual and aggregate years-of-life-lost associated with overweight and obesity. *Obesity, 18*(2), 333–339.

Origins of Obesity

We are in real trouble. Having a culture bombarded with rushed lifestyles, fast foods, and physical inactivity has caught up with us.

—Carmen Nevarez, vice president of the Berkeley, California, Public Health Institute

Numerous biological and psychological factors are involved in obesity. On the biological side, we can point to the influences of heredity, adipose tissue (body fat), and metabolism (the rate at which the individual converts calories to energy).

Obesity runs in families. It was once assumed that obese parents encouraged their children to become overweight by serving fattening foods and setting poor examples. However, a study of Scandinavian adoptees by Albert Stunkard and his colleagues (1990) found that children bear a closer resemblance in weight to their biological parents than to their adoptive parents. Today, it is widely accepted that heredity plays a role in obesity in humans (Bouchard, 2010) and other animals, including monkeys and rats (Felsted et al., 2010).

The efforts of obese people to maintain a slender profile may be sabotaged by microscopic units of life within their own bodies: fat cells (Apovian, 2010). No, fat cells are not overweight cells.

They are adipose tissue, or cells that store fat. Hunger might be related to the amount of fat stored in these cells. As noted earlier, as time passes after a meal, the blood sugar level drops. Fat is then drawn from these cells to provide nourishment. At some point, referred to as the **set point**, fat deficiency in these cells is communicated to the hypothalamus in the brain, triggering the hunger drive.



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Overweight in Childhood: Like Mother, Like Daughter? Weight problems run in families, but environmental as well as genetic factors appear to be involved.

People with more adipose tissue than others feel food deprived earlier, even though they may be equal in weight (Heber, 2010). This might occur because more signals are being sent to the brain. Obese and *formerly* obese people tend to have more adipose tissue than people of normal weight. Thus, many people who have lost weight complain that they are always hungry when they try to maintain normal weight levels.

The two biggest sellers in any bookstore are the cookbooks and the diet books. The cookbooks tell you how to prepare the food and the diet books tell you how not to eat any of it.

ANDY ROONEY

Fatty tissue also metabolizes (burns) food more slowly than muscle does. For this reason, a person with a high fat-to-muscle ratio metabolizes food

more slowly than a person of the same weight with a lower fat-to-muscle ratio (Apovian, 2010; Heber, 2010). That is, two people who are identical in weight metabolize food at different rates depending on the distribution of muscle and fat in their bodies. Obese people therefore are doubly disadvantaged in their efforts to lose weight—not only by their extra weight but by the fact that much of their body is composed of adipose tissue.

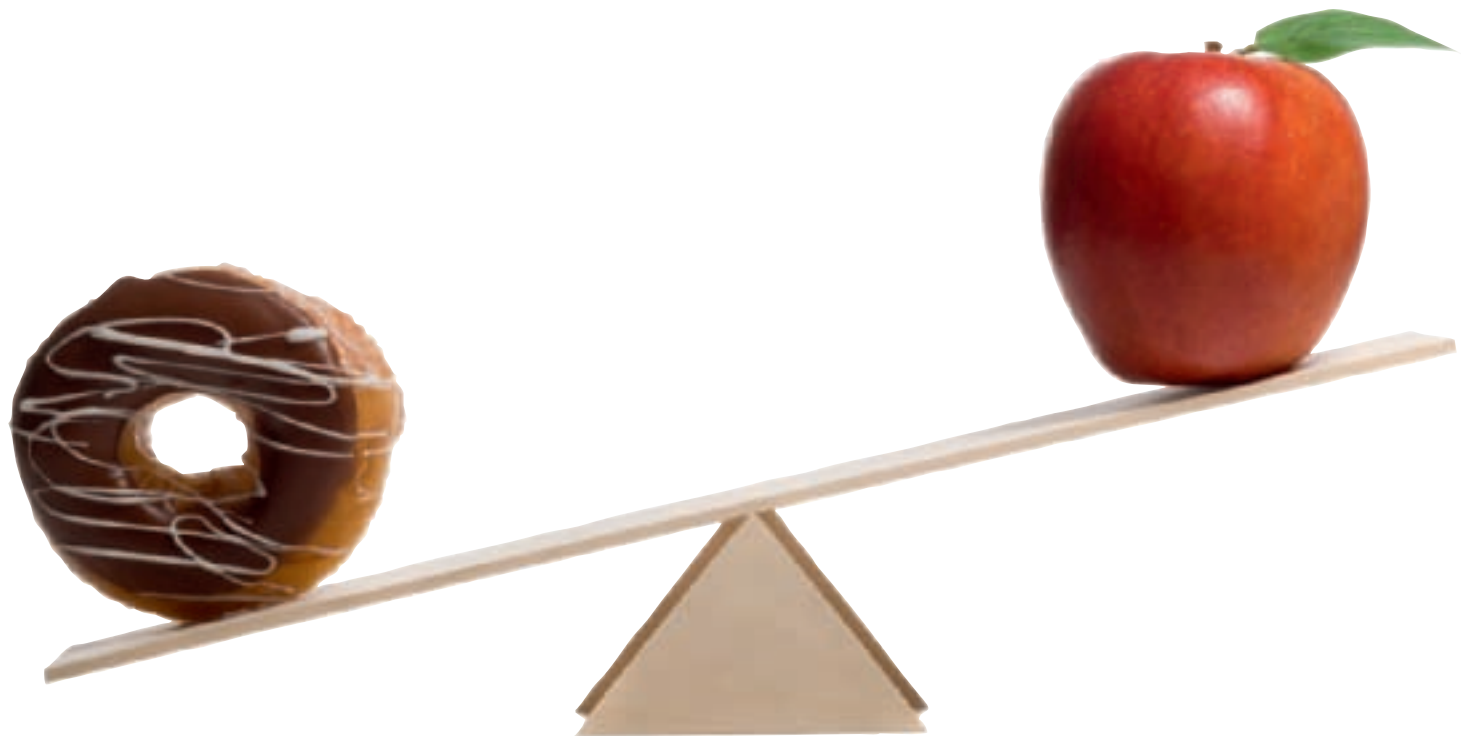
The normal distribution of fat cells is different for men and women. The average man is 40% muscle and 15% fat. The average woman is 23% muscle and 25% fat. If a man and a woman with typical distributions of muscle and fat are of equal weight, therefore, the woman—who has more fat cells—must eat less to maintain that weight.

Truth or Fiction Revisited: It is not true that dieting accelerates the body's metabolic rate. Ironically, the very act of dieting can make it progressively more difficult to lose additional weight. This is because the metabolic rates of people on diets and those who have

lost substantial amounts of weight slow down; that is, they burn fewer calories (Apovian, 2010; Heber, 2010). From an evolutionary perspective, the slowing of the metabolic rate—also known as *adaptive thermogenesis*—appears to be a built-in mechanism that helps preserve life in times of famine (Doucet et al., 2007; Major et al., 2007). However, adaptive thermogenesis makes it more difficult for dieters in our modern era to continue to lose weight (Heber, 2010; Wijers et al., 2009). The pounds seem to come off more and more reluctantly.

We also live in an “obesogenic environment” (Apovian, 2010; Heber, 2010). Foods high in sugar and fat are everywhere. Children in the United States are exposed to an average of 10,000 food commercials a year. More than nine of ten of these commercials are for fast foods (like McDonald's burgers and fries), sugared cereals, candy, and soft

Set point A weight range that one's body is programmed to maintain such that the body will increase or decrease its metabolic rate according to the amount of calories one consumes.



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drinks (Harris et al., 2009; Sixsmith & Furnham, 2010). Psychological factors, such as observational learning, stress, and emotional states, also “bombard” us and play a role in obesity (Apovian, 2010). Situations also contribute. Family celebrations, watching television, arguments, and tension at work can all lead to overeating or going off a diet. Efforts to diet may also be impeded by negative emotions such as depression and anxiety, which can lead to binge eating (Ricca et al., 2009).

The Skinny on Weight Control

As you can see, many factors—biological, psychological, and sociocultural—contribute to obesity. People can do many things, but first be advised that psychologists warn that not everyone should try to slim down. Women in the United States today are under social pressure to conform to an unnaturally slender female ideal. As a result, they tend to set unrealistic weight loss goals (Nordgren et al., 2008). Moreover, many attempts to lose weight are ineffective (Heber, 2010). For many obese people, however, especially those who are severely obese, shedding excess pounds lowers the risks of health problems such as diabetes and heart disease.

Research on motivation and on methods of therapy has enhanced our knowledge of healthful ways to lose weight. Sound weight-control programs do not involve fad diets such as fasting, eliminating carbohydrates, or eating excessive amounts of one particular food (Heber, 2010). They involve improving nutritional knowledge, decreasing calorie intake, exercising, and changing eating habits (see Table 9.5) ■.

Table 9.5 ■ New American Heart Association Diet Recommendations

Vegetables	At least 4 servings a day. Vegetables and fruits are high in vitamins, minerals and fiber—and they’re low in calories. Eating a variety of fruits and vegetables may help you control your weight and your blood pressure.
Fruits	At least 4 servings a day
Grains	Choose whole grains, high fiber: Unrefined whole-grain foods contain fiber that can help lower your blood cholesterol and help you feel full, which may help you manage your weight.
Fish	At least 2 servings a week. Eating oily fish containing omega-3 fatty acids (for example, salmon, trout, and herring) may help lower your risk of death from coronary artery disease.
Fats	Select fat-free, 1% fat, and low-fat dairy products Aims: <ul style="list-style-type: none"> • Cholesterol: <300 mg per day • Trans fat: <1% of total calorie intake. Cut back on foods containing partially hydrogenated vegetable oils to reduce <i>trans</i> fat in your diet. • Saturated fats: <7% of total calorie intake
Salt	Choose and prepare foods with little or no salt. Aim to eat less than 1,500 milligrams of sodium per day (less than 1 teaspoon).
Sugar	Minimize sugary foods and drinks to fewer than 5 servings per week
Alcohol	If you drink alcohol, drink in moderation. That means one drink per day if you’re a woman and two drinks per day if you’re a man.

These guidelines will not only help you control your weight; they will also contribute to your heart health.
Source: American Heart Association. (2010, February). <http://www.americanheart.org/presenter.jhtml?identifier=851>

Most health experts believe that people in the United States eat too much fat and not enough fruits and vegetables (Heber, 2010). Eating foods low in saturated fats and cholesterol is not only good for the heart but can also contribute to weight loss. Taking in fewer calories results in lower weight. Eating fewer calories does not just mean eating smaller portions. It means switching to some lower-calorie foods—relying more on fresh, unsweetened fruits and vegetables (eating apples rather than apple pie), fish and poultry, and skim milk and cheese. It can mean cutting down on—or eliminating—butter, margarine, oils, and sugar. Most health profession-

als agree that the same foods that help control weight also reduce the risk of heart disease and some other illnesses (see Chapter 14).

Dieting plus exercise is more effective than dieting alone for shedding pounds and keeping them off. Exercise burns calories and builds muscle tissue, which metabolizes more calories than fatty tissue does (Heber, 2010).

Cognitive-behavioral methods have also provided many strategies for losing weight. Among them are the following:

- Establish calorie-intake goals and keep track of whether you are meeting them. Get a book that

shows how many calories are found in foods. Keep a diary of your calorie intake.

- Substitute low-calorie foods for high-calorie foods. Fill your stomach with celery rather than cheesecake and enchiladas. Eat planned low-calorie snacks instead of binge eating peanuts or ice cream.
- Take a 5-minute break between helpings. Ask yourself, “Am I still hungry?” If not, stop eating.
- Avoid temptations that have sidetracked you in the past. Shop at the mall with the Alfalfa Sprout Café, not the Cheesecake Factory. Plan your meal before entering a restaurant. (Avoid ogling that tempting full-color menu.) Attend to your own plate, not to the sumptuous dish at the next table. (Your salad probably looks greener to them, anyhow.) Shop from a list. Walk briskly through the supermarket, preferably after dinner when you’re no longer hungry. Don’t be sidetracked by pretty packages (fattening things may come in them). Don’t linger in the kitchen. Study, watch TV, or write letters elsewhere. Don’t bring fattening foods into the house. Prepare only enough food to keep within your calorie goals.

In general my children refuse to eat anything that hasn’t danced on television.

ERMA BOMBECK

- Exercise to burn more calories and increase your metabolic rate. Reach for your mate, not your plate (to coin a phrase). Take a brisk walk instead of eating an unplanned snack. Build exercise routines by adding a few minutes each week.
- Reward yourself for meeting calorie goals (but not with food). Imagine how great you’ll look in that new swimsuit next summer. Do not go to the latest movie unless you have met your weekly calorie goal. When you meet your weekly calorie goal, put cash in the bank toward a vacation or a new camera.
- Use imagery to help yourself lose weight. Tempted by a fattening dish? Imagine that it’s rotten, that you would be nauseated by it and have a sick taste in your mouth for the rest of the day.
- Mentally walk through solutions to problem situations. Consider what you will do when cake is handed out at the office party. Rehearse your next visit to relatives who tell you how painfully thin you look and try to stuff you with food. Imagine

Video Connections— Childhood Obesity



Why are so many children overweight? Does being overweight in childhood predict being overweight in adulthood?



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

how you will politely (but firmly) refuse seconds and thirds, despite their objections.

- Above all, if you slip from your plan for a day, don’t blow things out of proportion. Dieters are often tempted to binge, especially when they rigidly see themselves either as perfect successes or as complete failures or when they experience powerful emotions—either positive or negative. Consider the weekly or monthly trend, not just a single day. Credit yourself for the long-term trend. If you do binge, resume dieting the next day.

Losing weight—and keeping it off—is not easy, but it can be done. Making a commitment to losing weight and establishing a workable plan for doing so are two of the keys.

The Psychology of Motivation: The *Whys of Why*

1. What are motives, needs, drives, and incentives?

The psychology of motivation is concerned with why people behave in certain ways. Motives are hypothetical states within an organism that propel the organism toward goals. Physiological needs include those for oxygen and food. Psychological needs include those for achievement and self-esteem. Needs give rise to drives; for example, depletion of food gives rise to the hunger drive. An incentive is a desirable object, person, or situation that is viewed as capable of satisfying a need or as desirable for its own sake.

Theories of Motivation: Which Why Is Which?

2. What are species-specific behaviors?

According to the evolutionary perspective, organisms are born with preprogrammed tendencies—called instincts—to behave in certain ways in certain situations.

3. What is drive-reduction theory?

According to drive-reduction theory, we are motivated to engage in behavior that reduces drives. Primary drives such as hunger and thirst are based on the biological makeup of the organism. Acquired drives such as the drive for money are learned. We learn to do what reduces drives. The body has a tendency called homeostasis to maintain a steady state; food deprivation thus leads to the hunger drive and eating, which reduces hunger.

4. Are all motives aimed at the reduction of tension?

Apparently not. Stimulus motives aim to increase rather than decrease the amount of stimulation acting on the organism. Sensory-deprivation studies suggest that inactivity and lack of stimulation are aversive in humans. People and many lower animals have needs for stimulation, activity, exploration, and manipulation. Many psychologists believe that exploration is reinforcing in itself.

5. How does humanistic theory differ from other theories of motivation?

Instincts and drives are mainly defensive, aimed at survival and reproduction. Humanistic psychologists argue that people are self-aware and that behavior can be growth oriented; people are motivated to strive for self-actualization.

6. What is Maslow's hierarchy of needs?

Maslow hypothesized that people have a hierarchy of needs. Once lower-level needs such as physiological and safety needs are met, people strive to meet needs for love, esteem, and self-actualization.

Hunger: Do You Go by “Tummy-Time”?

7. What bodily mechanisms regulate the hunger drive?

Hunger is regulated by several internal factors, including stomach contractions, blood sugar level, receptors in the mouth and liver, and the hypothalamus. The ventromedial nucleus in the hypothalamus functions as a stop-eating center. Damage to the area leads to hyperphagia (being grossly overweight) in rats.

The lateral hypothalamus may function as a start-eating center. Chewing and swallowing provide some satiety.

8. What psychological factors are connected with the hunger drive?

External stimuli such as the aroma of food can trigger hunger. One can also experience hunger due to the time of day. (“If it’s lunchtime, I must be hungry.”)

9. What are eating disorders?

Eating disorders, including anorexia nervosa and bulimia nervosa, involve gross disturbances in normal patterns of eating. Anorexia is characterized by refusal to eat and extreme thinness. Bulimia is characterized by cycles of binge eating and purging, which frequently takes the form of vomiting. Women are more likely than men to develop these disorders.

10. What are the origins of eating disorders?

The major psychodynamic explanation of eating disorders is that a conflicted—usually adolescent—female is attempting to remain prepubescent. However, most psychologists look to cultural idealization of the slender female—and the pressure that such idealization places on young women—as the major contributor. Yet we also find that many females with eating disorders have a history of child sexual abuse and that eating disorders may have a genetic component—perhaps involving perfectionist personality traits that are expressed through patterns of eating.

Aggression: Of Australopithecines, Humans, Robins, and Testosterone

11. What have psychologists and other scientists learned about the biological and psychological origins of aggressive behavior?

Many lower animals show instinctive aggressive reactions. Electrical stimulation of part of the hypothalamus triggers stereotypical aggressive behaviors in many animals. Testosterone appears to affect the tendencies to dominate and control other people and is also involved in aggression. Freud believed that accumulating frustrations could trigger explosions but that catharsis would help prevent them. Cognitive psychologists assert that our behavior is influenced by our values, our interpretation of situations, and by choice. From the social-cognitive perspective, aggressive skills are mainly acquired by observation.

Achievement Motivation: “Just Do It”?

12. Why do some people strive to get ahead while others do not?

One reason may be that people who strive to get ahead have more achievement motivation than those who do not. McClelland studied achievement motivation by means of responses to TAT cards. People with high achievement motivation earn higher grades and more money than people of comparable ability but less achievement motivation. Academic achievement may be motivated by performance or learning goals. Performance goals are tangible rewards, such as getting into graduate school. Learning goals involve the enhancement of knowledge or skills.

Emotion: Adding Color to Life

13. Just what is an emotion?

An emotion is a state of feeling with physiological, cognitive, and behavioral components. Emotions motivate behavior and also serve as goals. Fear, for example, is connected with arousal of the sympathetic division of the autonomic nervous system, cognitions that one is in danger, and behavioral tendencies to escape.

14. Do people around the world express emotions in the same way?

According to Ekman, the expression of several basic emotions is recognized in cultures around the world. Darwin believed that universal recognition of facial expressions had survival value.

15. What factors contribute to happiness?

Happiness may have a genetic component, but environmental and attitudinal factors also make their contributions. Affluence helps, and so do social relationships, a sense of meaning, optimism, and self-esteem.

16. Can smiling give rise to feelings of goodwill? (Can frowning produce anger?)

Facial expressions might influence one's experience of emotion. The contraction of facial muscles might be influential.

17. How do the physiological, situational, and cognitive components of emotions interact to produce feelings and behavior?

According to the James–Lange theory, emotions are associated with specific patterns of arousal and action that are triggered by certain external events. The emotion follows the behavioral response. The Cannon–Bard theory proposes that processing of events by the brain gives rise simultaneously to feelings and bodily responses; that is, feelings accompany bodily responses. According to Schachter and Singer's theory of cognitive appraisal, emotions are associated with similar patterns of arousal. The emotion a person experiences reflects a person's appraisal of the situation. Research evidence suggests that patterns of arousal are more specific than suggested by the theory of cognitive appraisal but that cognitive appraisal plays a role in determining our responses to events.

18. How do lie detectors work?

Lie detectors—also called polygraphs—monitor indicators of sympathetic arousal: heart rate, blood pressure, respiration rate, and sweating while a person is being questioned. These responses are presumed to indicate the presence of emotions—anxiety and/or guilt—that might be caused by lying. Critics find polygraph testing to be unreliable.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

KEY TERMS

Acquired drives (p. 307)

Amygdala (p. 324)

Anorexia nervosa (p. 313)

Aphagic (p. 312)

Autonomic nervous system (p. 324)

Bulimia nervosa (p. 315)

Cannon–Bard theory of emotion (p. 330)

Drive (p. 306)

Drive-reduction theory (p. 307)

Eating disorders (p. 312)

Emotion (p. 324)

Extrinsic rewards (p. 323)

Facial-feedback hypothesis (p. 328)

Hierarchy of needs (p. 309)

Homeostasis (p. 307)

Hyperphagic (p. 311)

Incentive (p. 306)

Instinct (p. 307)

Intrinsic rewards (p. 324)

James–Lange theory of emotion (p. 329)

Lateral hypothalamus (p. 312)

Motivation (p. 306)

Motive (p. 306)

Need (p. 306)

Parasympathetic nervous system (p. 325)

Positive psychology (p. 326)

Primary drives (p. 307)

Satiety (p. 311)

Self-actualization (p. 308)

Set point (p. 334)

Stimulus motive (p. 308)

Sympathetic nervous system (p. 324)

Ventromedial nucleus (VMN) (p. 311)

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10

The Voyage Through the Life Span: Childhood



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MAJOR TOPICS

How Psychologists Study Human Development
Prenatal Development: The Beginning of Our Life Story In the New World
Physical Development: The Drama Continues
Cognitive Development: On the Edge of Reason?
Social and Emotional Development

FEATURES

Concept Review: Risks of Various Agents to the Embryo and Fetus
A Closer Look—Real Life: Postpartum Depression
A Closer Look—Diversity: Alleviating Protein-Energy Malnutrition (PEM)
A Closer Look—Research: Sudden Infant Death Syndrome (SIDS)
Controversy in Psychology: Is Development Continuous or Discontinuous?
Concept Review: Piaget's Stages of Cognitive Development
In Profile: Jean Piaget
In Profile: Lawrence Kohlberg
Life Connections: Day Care: Blessing, Headache, or Both?

TRUTH OR FICTION?

- T F** Fertilization takes place in the uterus.
- T F** Some longitudinal studies have tracked subjects for more than half a century.
- T F** Your heart started beating when you were only one fifth of an inch long and weighed a fraction of an ounce.
- T F** The same disease organism or chemical agent that can do serious damage to a 6-week-old embryo may have no effect on a 4-month-old fetus.
- T F** It is normal for women to feel depressed following childbirth.
- T F** More children die from sudden infant death syndrome (SIDS) than die from cancer, heart disease, pneumonia, child abuse, HIV/AIDS, cystic fibrosis, and muscular dystrophy combined.
- T F** Prior to 6 months or so of age, “out of sight” is literally “out of mind.”
- T F** Child abusers were frequently abused themselves as children.
- T F** Children who attend day-care programs are more aggressive than children who do not.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

We have a story to tell. An important story. A fascinating story. It is your story. It is about the remarkable voyage you have already taken through childhood and adolescence. It is about the unfolding of your adult life. Billions have made this voyage before. You have much in common with them. Yet you are unique, and things will happen to you; and because of you, things will happen that have never happened before.

Let’s watch as Ling and Patrick Chang begin such a story by conceiving a child. On a summerlike day in October, Ling and Patrick rush to their jobs as usual. While Ling, a trial attorney, is preparing a case to present in court, a very different drama is unfolding in her body. Hormones are causing a follicle (egg container) in one of her ovaries to ovulate—that is, to rupture and release an egg cell, or ovum. Ling, like other women, possessed from birth all the egg cells she will ever have. How this particular ovum was selected to ripen and be released this month is unknown. But in any case, Ling will be capable of becoming pregnant for only a couple of days following ovulation.

When it is released, the ovum begins a slow voyage down a 4-inch-long Fallopian tube to the uterus. Within this tube, one of Patrick’s sperm cells will unite with the egg. **Truth or Fiction Revisited:** Therefore, it is not true that fertilization takes place in the uterus. The fertilized ovum, or zygote, is 1/175th of an inch across—a tiny stage for the drama that is about to unfold.

Developmental psychologists are interested in studying the voyage of Patrick and Ling’s new child through the life span for several reasons. The discovery of early influences and developmental sequences helps psychologists understand adults. Psychologists are also interested in the effects of genetic factors, early interactions with parents and siblings and the school and community on traits such as aggression and intelligence.

Developmental psychologists seek to learn the causes of developmental abnormalities. For instance, should pregnant women abstain from smoking and drinking? (Yes.) Is it safe for a pregnant woman to take aspirin for a headache or tetracycline to ward off a bacterial invasion? (Perhaps not. Ask your obstetrician.) What factors contribute to child abuse? Some developmental psychologists focus on adult development. For example, what conflicts and disillusionments can we expect as we voyage through our 30s, 40s, and 50s? The information acquired by developmental psychologists can help us make decisions about how we rear our children and lead our own lives.

Let’s see how developmental psychologists go about their work. Then we will turn to prenatal developments—the changes that occur between conception and birth. They are spectacular, but they are literally “out of sight.”

— ■ —
*There is no cure for life or death
save to enjoy the interval.*

GEORGE SANTAYANA
— ■ —

HOW PSYCHOLOGISTS STUDY HUMAN DEVELOPMENT

Developmental psychologists use the types of research conducted by other psychologists—such as case studies, surveys, naturalistic observation, and experiments. But the processes of development occur over time, and researchers have devised additional strategies for comparing people of different ages. **Question 1: How do researchers study development over time?** In **longitudinal research**, the same people are observed repeatedly over time, and changes in development, such as gains in height or changes in approaches to problem solving, are recorded. In **cross-sectional research**, people of different ages are observed and compared. It is assumed that when a large number of people are chosen at random, the differences found in the older age groups reflect how the younger people will develop, given time.

Longitudinal Studies

Some ambitious longitudinal studies have followed the development of children and adults for more than half a century. One, the Fels Longitudinal Study, began in 1929. Children were observed twice a year in their homes and twice a year in the Fels Institute nursery school. From time to time, younger investigators dipped into the Fels pool of subjects, further testing, interviewing, and observing these individuals as they grew into adults. In this way, researchers have been able to observe, for example, the development of intelligence and of patterns of independence and dependence. They found, for example, that intelligence test scores at ages 3 and 18 were significantly related to intellectual and occupational status after the age of 26 (McCall, 1997). Results are still being gleaned from this study (e.g., Chumlea et al., 2009; C. Li et al., 2009).

Truth or Fiction Revisited: The Terman Studies of Genius, also begun in the 1920s, tracked subjects with high IQ scores, beginning as children, for more than half a century. It was found that male subjects, but not female subjects, went on to high achievements in the professional world. Why? Contemporary studies of women show that those with high intelligence generally match the achievements of men; therefore, women of the earlier era were most likely held back by traditional gender-role expectations.

Most longitudinal studies span months or a few years, not decades. Briefer longitudinal studies, for example, have found that the children of divorced parents undergo the most severe adjustment problems within a few months of the divorce. By 2 or 3 years afterward, many children regain their equilibrium, as indicated by improved academic performance, social behavior, and other measures (Hetherington et al., 1992).

Longitudinal studies have drawbacks. For example, it can be difficult to enlist volunteers to participate in a study that will last a lifetime. Many subjects fall out of touch as the years pass; others die. In addition, those who remain in the study tend to be more motivated than those who drop out. Researchers must also be patient. To compare 3-year-olds with 6-year-olds, they must wait 3 years. In the early stages of such a study, the idea of comparing 3-year-olds with 21-year-olds remains a distant dream. When the researchers themselves are middle-aged or older, they must hope that the candle of yearning for knowledge will be kept lit by a new generation of researchers.

Cross-Sectional Studies

Because of the drawbacks of longitudinal studies, most research that compares children of different ages is cross-sectional. That is, most investigators gather data on what the “typical” 6-month-old is doing by finding children who are 6 months old today. When they expand their research to the behavior of typical 12-month-olds, they seek another group of children and so on.

Nothing I've ever done has given me more joys and rewards than being a father to my children.

BILL COSBY

Longitudinal research The study of developmental processes by taking repeated measures of the same group of people at various stages of development.

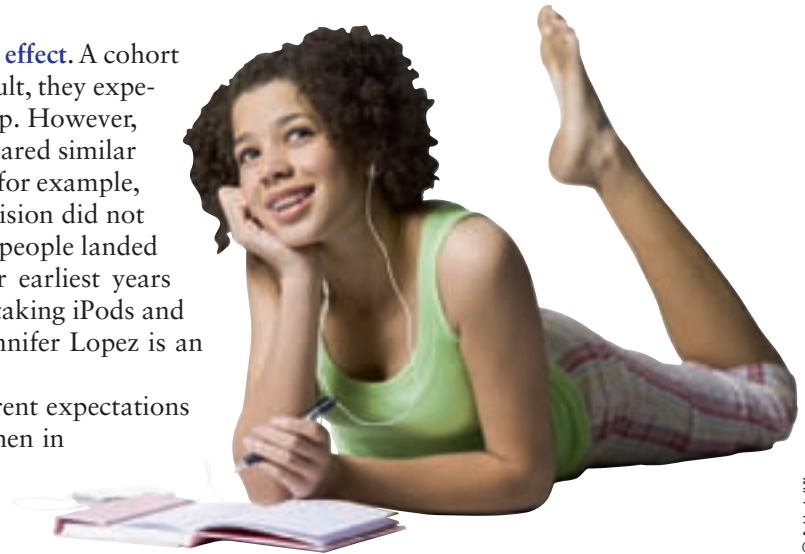
Cross-sectional research The study of developmental processes by taking measures of people of different age groups at the same time.

THE COHORT EFFECT

A major challenge to cross-sectional research is the **cohort effect**. A cohort is a group of people born at about the same time. As a result, they experience cultural and other events unique to their age group. However, children and adults of different ages probably have not shared similar cultural backgrounds. People who are 80 years old today, for example, grew up without TV. (Really, there was a time when television did not exist!) People who are 60 years old today grew up before people landed on the Moon. Nor did today's 50-year-olds spend their earliest years with *Sesame Street*. And today's children are growing up taking iPods and the Internet for granted. For today's children, in fact, Jennifer Lopez is an older woman.

Children of past generations also grew up with different expectations about gender roles and appropriate social behavior. Women in the Terman study generally chose motherhood over careers because of the times. Today's girls are growing up with female role models who are astronauts, government officials, and athletes. Moreover, today, the great majority of mothers are in the workforce, and their attitudes about women's roles have changed.

In brief, today's 80-year-olds are not today's 5-year-olds as seen 75 years later. The times change, and their influence on development also changes. In longitudinal studies, we know that we have the same individuals as they have developed over 5, 25, and even 50 years or more. In cross-sectional research, we can only hope that the groups will be comparable. Table 10.1 ■ contrasts longitudinal research and cross-sectional research.



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Is Listening to an iPod While Studying an Activity That Illustrates the Cohort Effect?

Children and adults of different ages experience cultural and other events unique to their age group. This is known as the cohort effect. For example, today's children—unlike their parents—are growing up taking video games, the Internet, and rap stars for granted.

Table 10.1 ■ A Comparison of Longitudinal Research and Cross-Sectional Research

	Longitudinal Research	Cross-Sectional Research
Description	Studies the same children repeatedly over time	Studies children of different ages at the same point in time
Advantages	Allows researchers to follow development over time Studies relationships between behavior at earlier and later ages	Can be completed in a short period of time No dropouts or practice effects
Disadvantages	Expensive Takes a long time to complete Subjects drop out, and dropouts may differ systematically from remaining subjects Practice effects may occur	Does not study development across time Cannot study the relationship between behavior displayed at earlier and later ages Is prey to the cohort effect (subjects from different age groups may not be comparable)

Cohort effect Similarities in behavior among peers that stem from the fact that group members are approximately the same age.

LearningConnections • HOW PSYCHOLOGISTS STUDY HUMAN DEVELOPMENT

ACTIVE REVIEW (1) In _____ research, the same people are observed repeatedly over time. (2) In _____ research, people of different ages are observed and compared. (3) The _____ effect defines similarities in behavior among peers that stem from the fact that group members are approximately the same age.

REFLECT AND RELATE How would you describe the cohort to which your parents belong? How does it differ from the cohort to which you belong?

CRITICAL THINKING Which type of research—longitudinal or cross-sectional—is less likely to be tainted by the cohort effect? Explain.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

PRENATAL DEVELOPMENT: THE BEGINNING OF OUR LIFE STORY

The most dramatic gains in height and weight occur during prenatal development. **Question 2: What developments occur from conception through birth?** Within 9 months, the newly conceived organism develops from a nearly microscopic cell to a **neonate** (newborn) about 20 inches long. Its weight increases a billionfold!

During the months following conception, the single cell formed by the union of sperm and egg—the **zygote**—multiplies, becoming two cells, then four, then eight, and so on. By the time the infant is ready to be born, it contains trillions of cells.

The zygote divides repeatedly as it proceeds on its 3- to 4-day voyage to the uterus. The ball-like mass of multiplying cells wanders about the uterus for another 3 to 4 days before beginning to implant in the uterine wall. Implantation takes another week or so. The period from conception to implantation is called the **germinal stage**, or the **period of the ovum**.

The **embryonic stage** lasts from implantation until about the 8th week of development. During this stage, the major body organ systems take form. As you can see from Figure 10.1 ■, the growth of the head precedes that of other parts of the body. The growth of the organs—heart, lungs, and so on—also precedes the growth of the extremities. The relatively early **maturation** of the brain and the organ systems allows them to participate in the nourishment and further development of the embryo. **Truth or Fiction Revisited:** During the 4th week, a primitive heart begins to beat and pump blood—in an organism that is one fifth of an inch long. The heart will continue to beat without rest every minute of every day for the better part of a century, perhaps longer.

By the end of the 2nd month, the head has become rounded and the facial features distinct—all in an embryo that is about 1 inch long and weighs 1/30th of an ounce. During the 2nd month, the nervous system begins to transmit messages. By 5 to 6 weeks, the embryo is only a quarter to half an inch long, yet nondescript sex organs have formed. By about the 7th week, the genetic code (XY or XX) begins to assert itself, causing the sex organs to differentiate. If a Y sex chromosome is present, testes form and begin to produce **androgens** (male sex hormones), which further masculinize the sex organs. In the absence of these hormones, the embryo develops sex organs that appear to be typical of the female regardless of its genetic code. However, apparently female individuals with a male (XY) genetic code would be sterile.

Neonate A newly born child, especially during the first month.

Zygote A fertilized ovum (egg cell).

Germinal stage The first stage of prenatal development, during which the dividing mass of cells has not become implanted in the uterine wall.

Period of the ovum Another term for the *germinal stage*.

Embryonic stage The baby from the 3rd through the 8th weeks following conception, during which time the major organ systems undergo rapid differentiation.

Maturation The process of development as guided by the unfolding of the genetic code.

Androgens Male sex hormones.

A Human Fetus at 12 Weeks By the end of the first trimester, the formation of all major organ systems is complete. Fingers and toes are fully formed, and the sex of the fetus can be determined visually.



© Claude Edelmann/Photo Researchers, Inc.

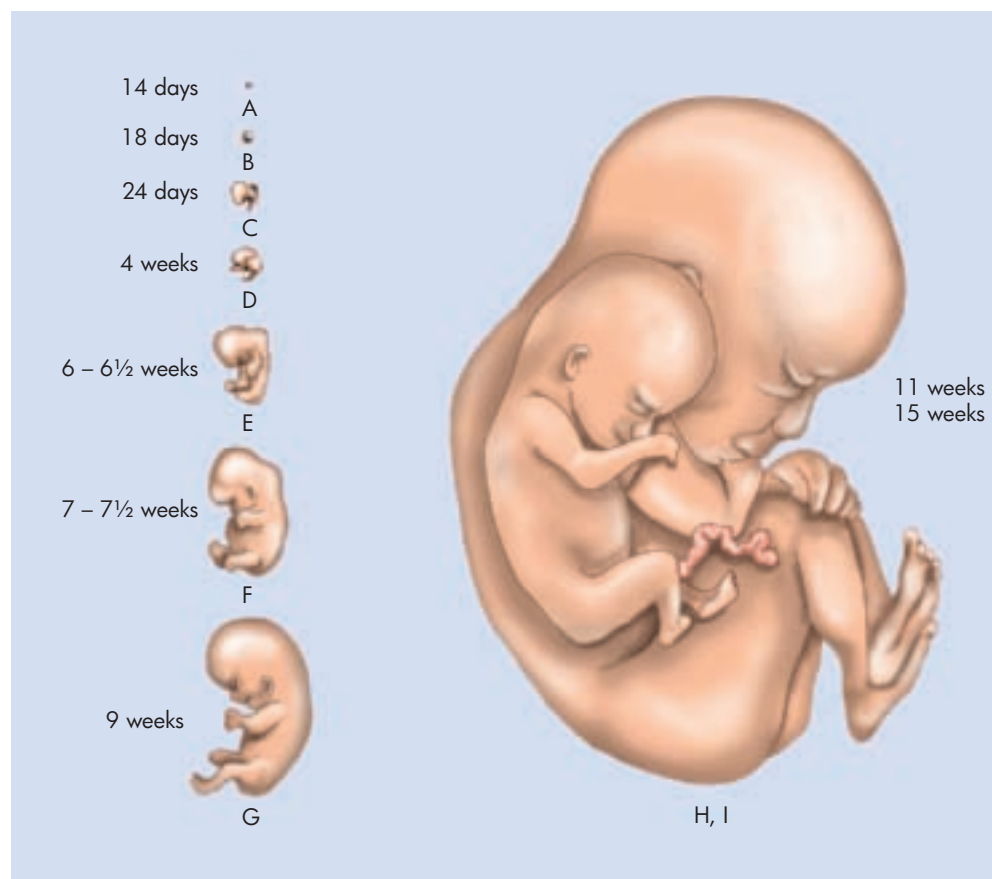


Figure 10.1 ■ Embryos and Fetuses at Various Stages of Development

As it develops, the embryo is suspended within a protective **amniotic sac** in the mother's uterus. The sac is surrounded by a clear membrane and contains amniotic fluid. The fluid is a sort of natural air bag, allowing the child to move or even jerk around without injury. It also helps maintain an even temperature.

From now until birth, the embryo exchanges nutrients and wastes with the mother through the **placenta**. The embryo is connected to the placenta by the **umbilical cord**. The placenta is connected to the mother by blood vessels in the uterine wall.

The **fetal stage** lasts from the beginning of the 3rd month until birth. By the end of the 3rd month, the major organ systems and the fingers and toes have formed. In the middle of the 4th month, the mother usually detects the first fetal movements. By the end of the 6th month, the fetus moves its limbs so vigorously that mothers often feel that they are being kicked. The fetus opens and shuts its eyes, sucks its thumb, alternates between periods of being awake and sleeping, and responds to light. It also turns somersaults, which can be perceived clearly by the mother.

During the last 3 months, the organ systems of the fetus continue to mature. The heart and lungs become increasingly capable of sustaining independent life. The fetus gains about 5½ pounds and doubles in length. Newborn boys average about 7½ pounds and newborn girls about 7 pounds.

Environmental Influences on Prenatal Development

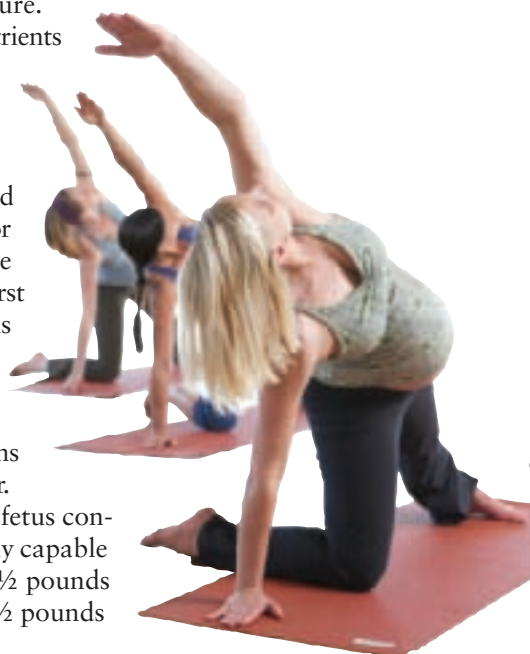
Yes, the fetus develops in a protective “bubble”—the amniotic sac. Nevertheless, the fetus is subject to many environmental hazards. For example, malnutrition in the

Amniotic sac A sac within the uterus that contains the embryo or fetus.

Placenta A membrane that permits the exchange of nutrients and waste products between the mother and her developing child but does not allow the maternal and fetal bloodstreams to mix.

Umbilical cord A tube between the mother and her developing child through which nutrients and waste products are conducted.

Fetal stage The baby from the 3rd month following conception through childbirth, during which time there is maturation of organ systems and dramatic gains in length and weight.



© Thomas Northcut/Retna/Getty Images

An Exercise Class for Pregnant Women Years ago, pregnant women were not expected to exert themselves. Today, it is recognized that exercise is healthful for pregnant women because it promotes fitness, which is beneficial during childbirth as well as at other times.

Stillbirth The birth of a dead fetus.

Teratogens Environmental influences or agents that can damage the embryo or fetus.

Critical period In prenatal development, a period during which an embryo is particularly vulnerable to a certain teratogen.

Syphilis A sexually transmitted bacterial infection that can attack major organ systems.

Congenital Present at birth; resulting from the prenatal environment.

HIV Human immunodeficiency virus, the virus that cripples the body's immune system and leads to the development of AIDS.

Rubella A viral infection that can cause retardation and heart disease in the embryo; also called *German measles*.

mother, especially during the last trimester when the fetus should be making rapid gains in weight, has been linked to low birthweight, prematurity, stunted growth, retardation of brain development, cognitive deficiencies, behavioral problems, and even cardiovascular disease (Giussani, 2006; Guerrini et al., 2007; Morton, 2006). On the other hand, maternal obesity is linked with a higher risk of **stillbirth** and neural tube defects (Fernandez-Twinn & Ozanne, 2006).

TERATOGENS AND HEALTH PROBLEMS OF THE MOTHER

Teratogens (the word derives from frightening roots meaning “giving birth to monsters”) are environmental agents that can harm the embryo or fetus. They include drugs that the mother ingests, such as thalidomide (connected with birth deformities) and alcohol, and substances that the mother's body produces, such as Rh-positive antibodies. Another class of teratogens is the heavy metals, such as lead and mercury, which are toxic to the embryo. Hormones help maintain pregnancy, but excessive quantities of hormones are harmful to the embryo. If the mother is exposed to radiation, that radiation can harm the embryo. Disease-causing organisms—called *pathogens*—such as bacteria and viruses, are also teratogens. When it comes to pathogens, bigger is better for the embryo; that is, larger pathogens are less likely to pass through the placenta and affect the embryo. But smaller pathogens sneak through, including those that cause mumps, syphilis, measles, and chicken pox. Some disorders, such as toxemia, are not transmitted to the embryo or fetus but adversely affect the environment in which it develops.

CRITICAL PERIODS OF VULNERABILITY

Question 3: Does it matter when, during pregnancy, a woman is exposed to a teratogen? Exposure to particular teratogens is most harmful during **critical periods** that correspond to the times when organs are developing (see Figure 10.2) ■ **Truth or**

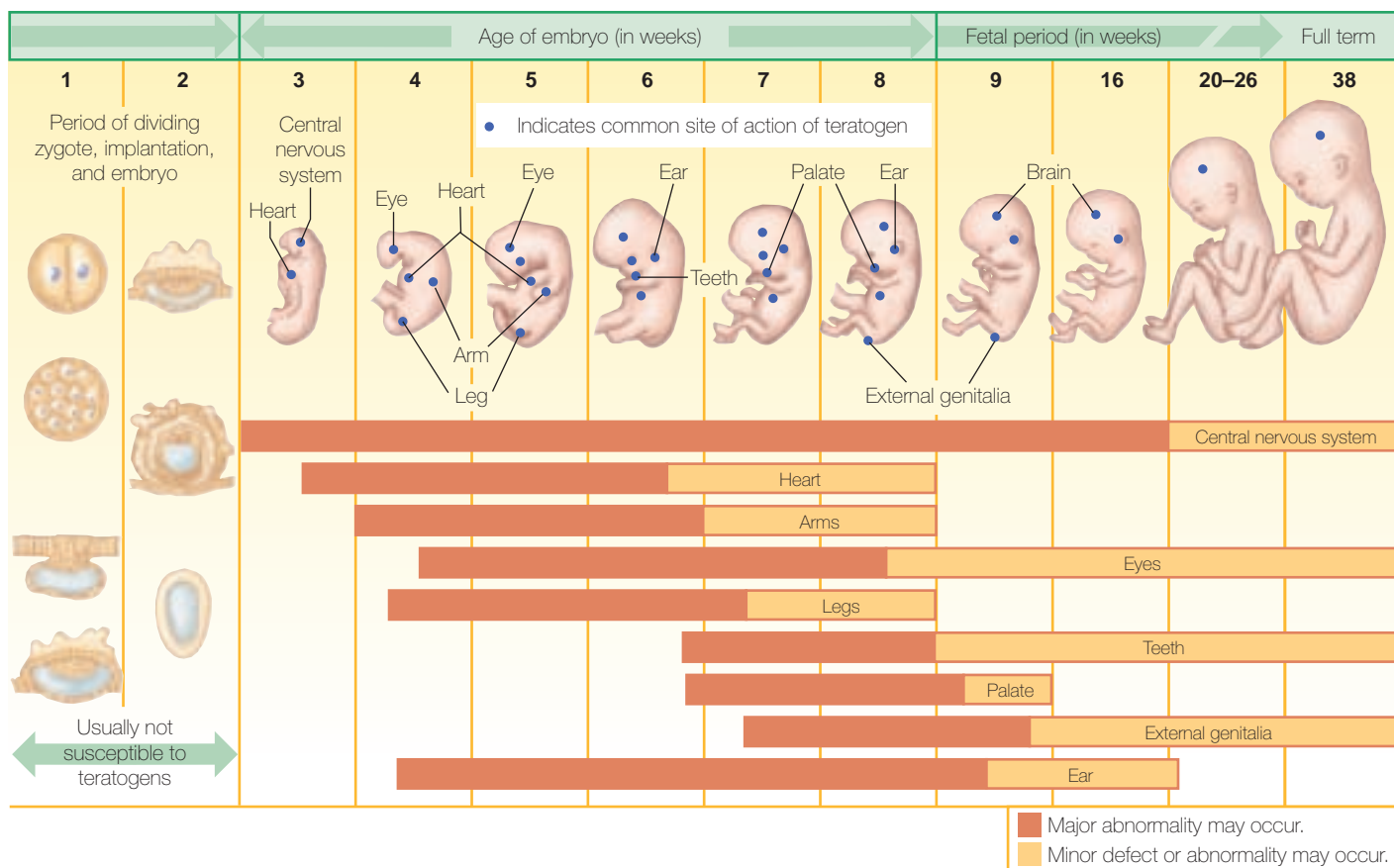


Figure 10.2 ■ Critical Periods in Prenatal Development Knowledge of the sequence of prenatal development allows one to understand why specific teratogens are most harmful during certain periods of prenatal development. Major structural abnormalities are most likely to occur when teratogens strike during the embryonic period.

Source: From RATHUS. *Childhood and Adolescence*, 4/e. Copyright © 2011 Cengage Learning.

Fiction Revisited: Therefore, the same disease organism or chemical agent that can cause serious damage to a 6-week-old embryo may have no effect on a 4-month-old fetus. Because the major organ systems differentiate during the embryonic stage, the embryo is generally more vulnerable to teratogens than the fetus.

EFFECTS OF MATERNAL HEALTH PROBLEMS **Question 4: What are the effects of maternal health problems on the embryo and fetus?**

Let's consider the effects of various health problems of the mother, beginning with sexually transmitted infections (STIs). The **syphilis** bacterium can cause miscarriage, stillbirth, or **congenital syphilis**. **HIV**, the virus that causes AIDS (acquired immunodeficiency syndrome), can be transmitted during childbirth and breast feeding. About one fourth of babies born to HIV-infected mothers become infected themselves (Coovadia, 2004). During childbirth, blood vessels in the mother and baby rupture, enabling an exchange of blood and transmission of HIV. HIV is also found in breast milk. An African study found that the probability of transmission of HIV through breast milk was about 1 in 6 (16.2%) (Nduati et al., 2000).

Although influenza (the flu) primarily infects the mother's respiratory system, it may play a causal role in the development of fetal brain abnormalities and lead to problems such as autism and schizophrenia (Brown, 2006; Smith et al., 2007). Maternal infection with **rubella** (the virus that causes German measles) can cause deafness, mental retardation, heart disease, or eye problems, including blindness in the child (Food and Drug Administration, 2004; Rubella, 2009). **Toxemia** (sometimes referred to as preeclampsia) is a life-threatening disease, characterized by high blood pressure, that may afflict women late in the second or early in the third trimester. Affected women often have **premature** or undersized babies. Toxemia is also a cause of pregnancy-related maternal deaths (Rumbold et al., 2006).

In **Rh incompatibility**, antibodies produced by the mother are transmitted to a fetus or newborn infant and cause brain damage or death. Rh incompatibility occurs when a woman who does not have this factor—and is thus Rh negative—is carrying an Rh-positive fetus, which can happen if the father is Rh positive. Rh incompatibility does not affect a first child because women will not have formed Rh antibodies. If an Rh-negative mother is injected with Rh immunoglobulin within 72 hours after delivery of an Rh-positive baby, she will not develop the antibodies. A fetus or newborn child at risk of Rh disease may receive a blood transfusion to remove the mother's antibodies.

EFFECTS OF PRESCRIPTION DRUGS TAKEN BY THE MOTHER

QUESTION 5: What are the effects of drugs taken by the mother on prenatal development? If a woman is pregnant or thinks she may be, it is advisable for her to consult her obstetrician before taking any drugs, including aspirin, not just prescription medications.

Accutane (also known as Isotretinoin, its generic name) is prescribed for difficult cases of acne. It works by reducing the size of the oil glands in the skin, thus also reducing the amount of acne-causing bacteria in the skin. However, Accutane is also connected with numerous abnormalities during the first trimester of pregnancy, affecting the eyes and ears, brain, heart, and immune system (Fisher et al., 2008; Peterka et al., 2007).

Thalidomide was marketed in the 1960s as a treatment for insomnia and nausea—not specifically for pregnant women. Within a few years, more than 10,000 babies with missing or stunted limbs were born as a result of their mothers using thalidomide during the 2nd month of pregnancy, when the limbs are undergoing rapid development (Ances, 2002). Thalidomide provides a dramatic example of critical periods of vulnerability to various teratogens (see Figure 10.2).

Several antibiotics may be harmful to the fetus. Tetracycline, which is frequently prescribed for bacterial infections, can lead to yellowed teeth and bone abnormalities (Teti & Zallone, 2009). Streptomycin is strongly implicated in hearing loss (Chaig et al., 2008; Hobbie et al., 2008; Steyger, 2008).

Women at risk for miscarriages have been prescribed hormones such as progesterin and DES to help maintain their pregnancies. **Progesterin** is chemically similar to male sex

Toxemia A life-threatening disease characterized by high blood pressure that can afflict pregnant women.

Premature Born before the end of the full term of gestation; also referred to as *preterm*.

Rh incompatibility A condition in which antibodies produced by the mother are transmitted to the child, possibly causing brain damage or death.

Thalidomide A sedative linked to birth defects, especially deformed or absent limbs.

Progesterin A hormone used to maintain pregnancy that can cause masculinization of the fetus.



© Corbis Photography/Heer

Medicines or Teratogens? What is safe for a pregnant woman to take? When in doubt, ask your obstetrician.

DES Abbreviation for diethylstilbestrol, an estrogen that has been linked to cancer in the reproductive organs of children of women who used it when pregnant.

Fetal alcohol syndrome (FAS) A cluster of symptoms caused by maternal drinking, in which the child shows developmental lags and characteristic facial features such as an underdeveloped upper jaw, flattened nose, and widely spaced eyes.

Fetal Alcohol Syndrome (FAS) The children of many mothers who drank alcohol during pregnancy exhibit FAS. This syndrome is characterized by developmental lags and such facial features as an underdeveloped upper jaw, a flattened nose, and widely spaced eyes.



© George Steinmetz

hormones and when taken by pregnant women can masculinize the external sex organs of female embryos. It has also been linked to aggressive behavior in females (Keenan & Soleymani, 2001; Molenda-Figueira et al., 2006). **DES** (diethylstilbestrol), a powerful estrogen, was given to many women during the 1940s and 1950s to help prevent miscarriage (Centers for Disease Control and Prevention, 2005a), but it has caused cervical and testicular cancer in some of the offspring.

Although pregnant women are often prescribed multivitamins to maintain their own health and to promote the development of their fetuses, too much of a good thing can be dangerous. High doses of vitamins A and D have been associated with central nervous system damage, small head size, and heart defects (National Institutes of Health, 2002).

EFFECTS OF ILLICIT DRUG TAKEN BY THE MOTHER Smoking marijuana during pregnancy apparently poses a number of risks for the fetus, including slower fetal growth (Hurd et al., 2005) and low birthweight (Visscher et al., 2003). Women who smoke more marijuana or who inhale more secondary marijuana smoke (that is, smoke from others who are smoking) place their fetuses at relatively greater risk. The babies of women who regularly used marijuana show increased tremors and startling, suggesting immature development of the nervous system (Huestis et al., 2002).

Research into the cognitive effects of maternal prenatal use of marijuana shows mixed results. Some studies suggest that cognitive skills, including learning and memory, may be impaired (Huizink & Mulder, 2006). Other studies find increased risk of hyperactivity, impulsivity, and problems in paying attention among children exposed prenatally to maternal use of marijuana (Goldschmidt et al., 2000; Wang et al., 2004).

Maternal addiction to heroin or methadone is linked to low birthweight, prematurity, and toxemia. These narcotics readily cross the placental membrane, and the fetuses of women who use them regularly can become addicted (Lejeune et al., 2006). Addicted newborns may be given the narcotic or a substitute shortly after birth so that they will not suffer serious withdrawal symptoms. They are then withdrawn gradually.

Pregnant women who use cocaine increase the risk of stillbirth, low birthweight, and birth defects. The infants are often excitable and irritable or lethargic (Schuetz et al., 2006). According to teacher reports, boys whose mothers used cocaine regularly were likely to be rated as hyperactive, to be indifferent to their environment, and to show deficits in cognitive skills (Delaney-Black et al., 2004).

EFFECTS OF ALCOHOL, NICOTINE, AND CAFFEINE Because alcohol passes through the placenta, drinking by a pregnant woman poses risks for the embryo and fetus. Heavy drinking can be lethal to the fetus and neonate. It is also connected with deficiencies and deformities in growth. Some children of heavy drinkers develop **fetal alcohol syndrome (FAS)** (Connor et al., 2006; Floyd et al., 2005). Babies with FAS are often smaller than normal, and so are their brains. There are distinct facial features: widely spaced eyes, an underdeveloped upper jaw, and a flattened nose. There may be malformation of the limbs, poor coordination, and cardiovascular problems. A number of psychological characteristics connected with FAS appear to reflect dysfunction of the brain: mental retardation, hyperactivity, distractibility, lessened verbal fluency, and learning disabilities (Connor et al., 2006; Guerrini et al., 2007). There are deficits in speech and hearing, practical reasoning, and visual-motor coordination (Connor et al., 2006).

Many pregnant women consume caffeine in the form of coffee, tea, soft drinks, chocolate, and nonprescription drugs. The findings of research on caffeine's effects on the developing fetus have been inconsistent. Some studies report no adverse findings, but others have found that pregnant women who take in a good deal of caffeine are more likely than nonusers to have a miscarriage or a low-birthweight baby (e.g., Cnattingius et al., 2000; Weng et al., 2008).

Cigarette smoke contains many ingredients, including the stimulant nicotine, the gas carbon monoxide, and hydrocarbons

(“tars”), which are carcinogens. Nicotine and carbon monoxide pass through the placenta and reach the fetus. Nicotine stimulates the fetus, but its long-term effects are uncertain. Carbon monoxide decreases the amount of oxygen available to the fetus. Oxygen deprivation is connected with cognitive and behavioral problems, including impaired motor development (Spencer, 2006). The cognitive difficulties include academic delays, learning disabilities, and mental retardation.

Pregnant women who smoke are likely to deliver smaller babies than are nonsmokers (Bernstein et al., 2005). In addition, their babies are more likely to be stillborn or to die soon after birth (Cnattingius, 2004). The combination of smoking and drinking alcohol places the child at greater risk of low birthweight than either practice alone (Spencer, 2006). Maternal smoking may also have long-term negative effects on development. Children whose mothers smoke during pregnancy are more likely to show short attention spans, hyperactivity, lower cognitive and language scores, and poor grades (Secker-Walker & Vacek, 2003). Secondhand smoke also holds dangers. Men who smoke are more likely to produce abnormal sperm. Babies of fathers who smoke have higher rates of birth defects and infant mortality, lower birthweights, and cardiovascular problems.

OTHER ENVIRONMENTAL HAZARDS

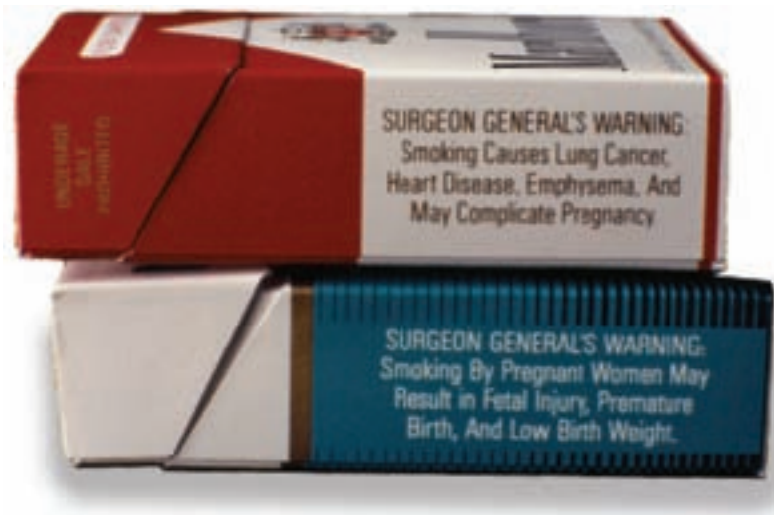
Mothers know when they are ingesting drugs, but there are many (many!) other substances in the environment that they may take in unknowingly. These are environmental hazards to which we are all exposed, and we refer to them collectively as pollution. **Question 6: What are the effects of environmental hazards during pregnancy?**

As noted earlier, prenatal exposure to heavy metals such as lead, mercury, and zinc threatens the development of children. Longitudinal research finds that newborns who have mildly elevated levels of lead in their umbilical cord blood show delayed mental development at 1 and 2 years of age (Heindel & Lawler, 2006). However, their cognitive functioning can improve if they are no longer exposed to lead in the home. The devastating effects of mercury on the fetus were first recognized among the Japanese who lived around Minimata Bay. Industrial waste containing mercury was dumped into the bay and accumulated in the fish that were a major food source for local residents. Children born to women who had eaten the fish during pregnancy often were profoundly retarded and neurologically damaged (Mayes & Ward, 2003). Prenatal exposure to even small amounts of mercury and other heavy metals such as cadmium and chromium can produce subtle deficits in cognitive functioning and physical health (Heindel & Lawler, 2006).

An unfortunate natural experiment involving the effects of prenatal exposure to polychlorinated biphenyls (PCBs) took place in Taiwan during the late 1970s, when a group of people accidentally ingested contaminated rice. Children born to mothers who ate the rice were followed through the age of 12 and were tested with instruments including the Bayley Scale for Infant Development, the Chinese version of the Stanford–Binet IQ Test, and two nonverbal intelligence tests. The children of mothers who ate the contaminated rice scored lower than the control children on each of these measures (Lai et al., 2009).

GENETIC COUNSELING AND PRENATAL TESTING

Researchers have enabled parents to detect genetic abnormalities that are responsible for hundreds of diseases. Genetic counselors, for example, can compile information about a couple’s genetic heritage to explore whether their children might develop genetic abnormalities. Couples who face a high risk of passing genetic defects to their children sometimes elect to adopt rather than conceive children of their own.



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Agent

Risks

Prescription Drugs*

Accutane (used to treat acne; repeated blood tests are required to show that one is not pregnant or encountering drug-related problems)

Stillbirth, malformation of limbs and organs.
Do not use during pregnancy.

Bendectin

Cleft palate, malformation of the heart. Do not use.

Carbamazepine (and other anticonvulsant drugs)

Spina bifida. Do not use.

Diethylstilbestrol (DES; once used to help maintain pregnancy)

Cancer of the cervix or testes.
(No longer available.)

Strong general anesthesia during labor (sedation that goes beyond normal medical practice)

Anoxia, asphyxiation, brain damage.
Can request local anesthesia instead.

Progestin (a synthetic version of the natural hormone progesterone, which is sometimes used to help maintain pregnancy)

Masculinization of the sex organs of female embryos, possible development of “masculine” aggressiveness. Ask obstetrician.

Streptomycin (an antibiotic)

Deafness. Ask obstetrician about alternatives.

Tetracycline (an antibiotic)

Malformed bones, yellow teeth. Ask obstetrician about alternatives.

Thalidomide (several uses, including sedation)

Malformed or missing limbs. Do not use.



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Other Drugs

Alcohol

Fetal death, low birth weight, addiction, academic and intellectual problems, hyperactivity, distractibility, fetal alcohol syndrome (FAS), including characteristic facial features. Best not to drink alcohol during pregnancy.



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Aspirin, ibuprofen

Bleeding, respiratory problems.
Ask obstetrician about alternatives.

Cigarette smoke (the stimulant nicotine and carbon monoxide are transmitted through the placenta)

Stimulates fetus (not necessarily a problem in itself), premature birth, low birth weight, fetal death, academic problems, hyperactivity, and short attention span. Best not to smoke during pregnancy.

Opiates—heroin, morphine, others

Low birth weight, premature birth, addiction, toxemia (preeclampsia).
Avoid during pregnancy.

CONCEPT REVIEW (Continued)

Marijuana

Tremors, startling, premature birth, birth defects, neurological problems. Avoid during pregnancy.

Caffeine (the stimulant found in coffee, tea, colas, chocolate)

Stimulates fetus (not necessarily a problem in itself); miscarriage and low birth weight are suspected. Ask obstetrician about latest information.



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Vitamins†

Vitamin A (high doses)

Cleft palate, damage to the eyes

Vitamin D (high doses)

Intellectual deficiency

Pathogens (Disease-causing agents)

HIV (the virus that causes AIDS)

Physical deformity and intellectual deficiency. Check with obstetrician about averting transmission to fetus and neonate.

Rubella (German measles)

Neurological impairment involving sensation and perception (vision, hearing), mental retardation, heart problems, cataracts.

Syphilis (a sexually transmitted infection caused by the *Treponema pallidum* bacterium)

Infant mortality, seizures, mental retardation, sensory impairment (vision, hearing), liver damage, malformation of bones and teeth. Possible to treat during pregnancy; ask obstetrician.

Environmental Hazards

Heavy metals (lead, mercury, zinc)

Intellectual deficiency, hyperactivity, stillbirth, problems in memory formation. Remain alert to your environment and adjust, if possible.

Paint fumes (heavy exposure)

Intellectual deficiency. Remain alert to your environment and adjust, if possible.

PCBs (polychlorinated biphenyls), dioxin, other insecticides and herbicides

Stillbirth, low birth weight, cognitive impairment, motor impairment. Remain alert to your environment and adjust, if possible.

X-rays

Deformation of organs. Ask obstetrician before having x-rays.

Biochemical Incompatibility with Mother

Rh antibodies

Infant mortality, brain damage. Mother can receive Rh immunoglobulin after delivery. Neonate may receive blood transfusion.

*Normally healthful, even life-saving drugs can be harmful to the embryo and fetus. Women should inform their physicians when they are pregnant, may be pregnant, or are planning to become pregnant.

†Adequate intake of vitamins is essential to the well-being of the mother and the embryo and fetus. Most obstetricians advise pregnant women to take vitamin supplements. However, too much of a good thing can be harmful. In brief, don't do "megavitamins." And when in doubt, ask your obstetrician.



Go to Psychology CourseMate at www.cengagebrain.com to access an interactive version of this Concept Review designed to help you test yourself on the topics presented here.

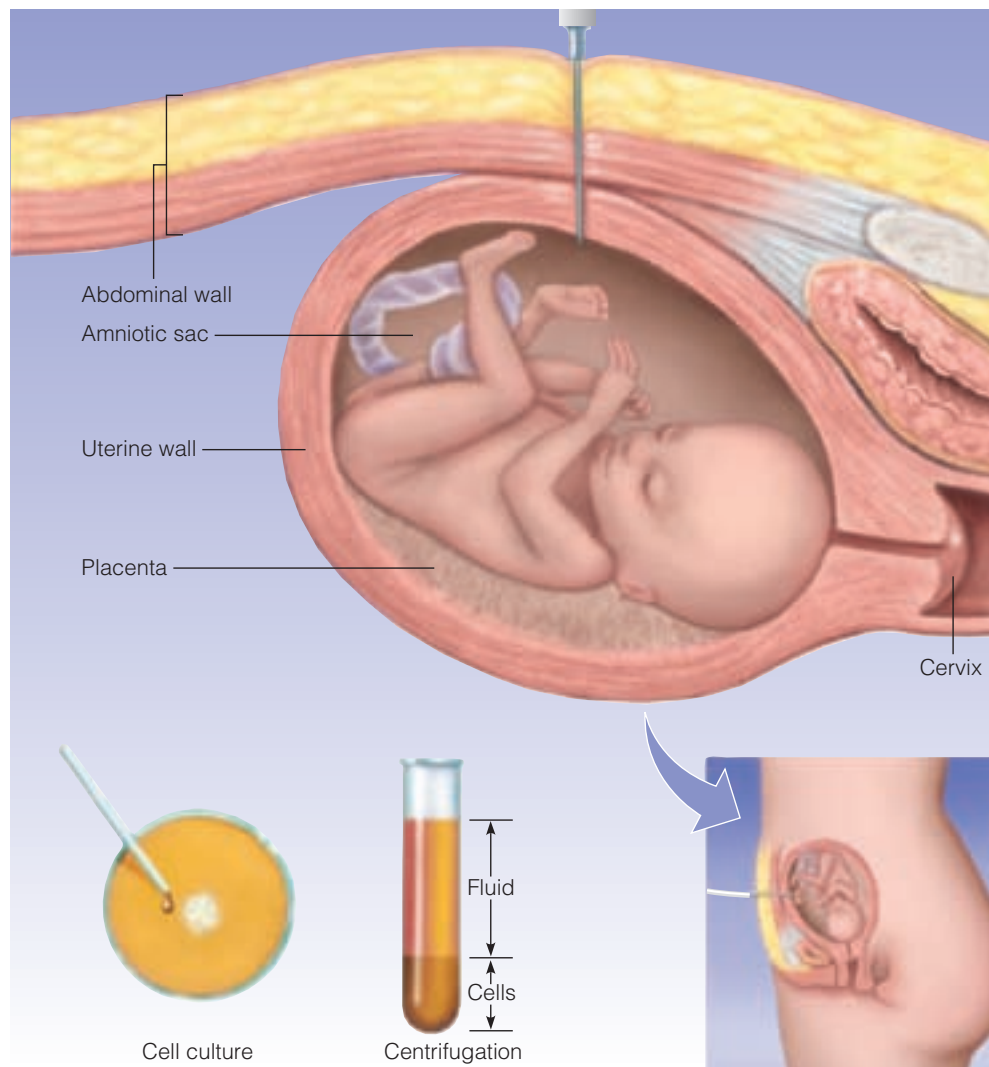


Figure 10.3 ■ Amniocentesis Amniocentesis allows prenatal identification of certain genetic and chromosomal disorders by examining genetic material sloughed off by the fetus into amniotic fluid. Amniocentesis also allows parents to learn the sex of their unborn child. Would you want to know?

Source: From RATHUS. *Childhood and Adolescence*, 4/e. Copyright © 2011 Cengage Learning.

Amniocentesis A procedure for drawing off and examining fetal cells in the amniotic fluid to determine the presence of various disorders in the fetus.

Chorionic villus sampling (CVS) A procedure for detecting disorders in the fetus based on the obtaining and examining of placental tissue.

Uterus The pear-shaped organ in which the embryo and fetus develop.

Ultrasound A method for generating an image of internal organs or a fetus by “bouncing” sound waves too high in pitch to hear off the organs or fetus.

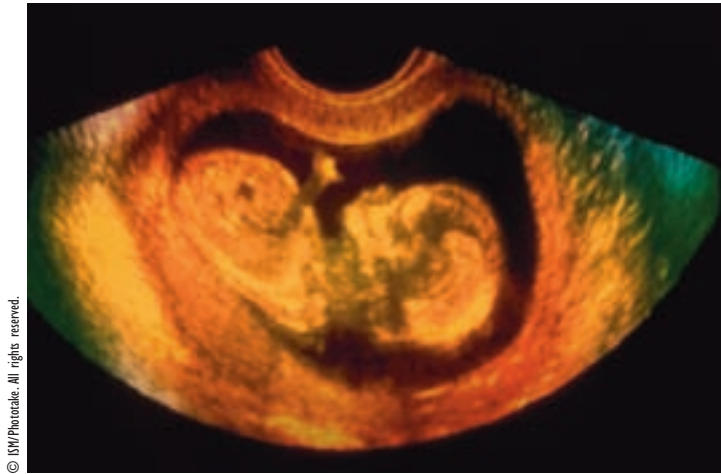
Alpha-fetoprotein (AFP) assay A blood test that detects the presence of spina bifida and related abnormalities in the fetus.

Prenatal testing can also indicate whether the embryo or fetus is carrying genetic abnormalities. Testing methods include amniocentesis, chorionic villus sampling, ultrasound, and blood tests.

Amniocentesis is usually performed on the mother at about 14–16 weeks after conception, although some physicians perform the procedure earlier (“early amniocentesis”). The health professional uses a syringe (needle) to withdraw fluid from the amniotic sac (see Figure 10.3) ■. The fluid contains cells that are sloughed off by the fetus. The cells are separated from the amniotic fluid, grown in a culture, and then examined microscopically for genetic and chromosomal abnormalities.

Amniocentesis has become routine among American women who become pregnant past the age of 35 because the chances of Down syndrome increase dramatically as women approach or pass the age of 40. Women carrying the children of aging fathers may also wish to have amniocentesis. It can detect the presence of well over 100 chromosomal and genetic abnormalities, including sickle-cell anemia, Tay-Sachs disease, muscular dystrophy, and Rh incompatibility. If the test reveals the presence of a serious disorder, the parents may decide to abort the fetus. Or they may decide to continue the pregnancy and prepare themselves to raise a child who has special needs.

Amniocentesis also permits parents to learn the sex of their unborn child through examination of the sex chromosomes, but most parents learn the sex of their baby earlier by means of ultrasound. Amniocentesis carries a risk of miscarriage (as many as 1 in 100 women who have the procedure will miscarry), so health professionals would not conduct it to learn the sex of the child.



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Figure 10.4 ■ Sonogram of a 5-Month-Old Fetus In the ultrasound technique, sound waves are bounced off the fetus and provide a picture, called a sonogram, that enables professionals to detect various abnormalities.

Chorionic villus sampling (CVS) is similar to amniocentesis but offers the advantage of diagnosing fetal abnormalities earlier. It is carried out between the 9th and 12th week of pregnancy. A small syringe is inserted through the vagina into the **uterus**. The syringe gently sucks out a few of the threadlike projections (villi) from the outer membrane that envelops the amniotic sac and fetus. Results are available within days of the procedure. It has not been used as frequently as amniocentesis because many studies have shown that CVS carries a slightly greater risk of miscarriage.

In **ultrasound**, health professionals use high-frequency sound waves to obtain information about the fetus. The sound waves are too high in frequency to be heard by the human ear. They are reflected by the fetus, and a computer can use the information to generate a picture, or “sonogram,” of the fetus (see Figure 10.4) ■. Ultrasound is used to track the growth of the fetus, to determine fetal age and sex, and to detect multiple pregnancies and structural abnormalities.

Parental blood tests can reveal the presence of recessive genes for a variety of disorders, such as sickle-cell anemia, Tay-Sachs disease, and cystic fibrosis. When both parents carry genes for these disorders, parents may wish to follow up with amniocentesis or CVS to see whether the disorders are present in the fetus. The **alpha-fetoprotein (AFP) assay** is used to detect neural tube defects such as spina bifida and certain chromosomal abnormalities, which elevate the AFP level in the mother’s blood.

Video Connections—Prenatal Assessment



During a routine prenatal visit, Dr. Cohen performs a detailed ultrasound on Eleanor Walsh, who is in her 4th month of pregnancy. For what reasons might a doctor recommend that a woman under age 35 have an amniocentesis? What are the risks involved in this procedure? How might the doctor and mother determine whether amniocentesis is the right choice during the course of the pregnancy?



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

LearningConnections • PRENATAL DEVELOPMENT: THE BEGINNING OF OUR LIFE STORY

ACTIVE REVIEW (4) It is possible to become pregnant for a day or so after _____. (5) A sperm cell combines with an ovum to form a(n) _____. (6) The zygote implants in the wall of the _____. (7) The embryo and fetus develop within a(n) _____ sac, which functions as a shock absorber, among other things. (8) The _____ permits the embryo to exchange nutrients and wastes with the mother. (9) The embryo and fetus are connected to the placenta by the _____. (10) Heavy maternal use of alcohol is linked to _____ alcohol syndrome (FAS). (11) Women who smoke cigarettes during pregnancy deprive their fetuses of _____, sometimes resulting in stillbirth and persistent academic problems. (12) Fetal exposure to the heavy metals lead and mercury can (slow or accelerate?) mental development.

REFLECT AND RELATE During the 4th month of pregnancy, most mothers begin to detect their baby’s movements and feel that their baby is “alive.” What is your view on when a baby is alive? What standard or standards do you use in forming your view?

CRITICAL THINKING Many researchers use terms like *zygote*, *embryo*, and *fetus* to refer to the human organism as it undergoes prenatal development. How do these terms differ in meaning from commonly used terms such as *baby* and *unborn child*?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

A CLOSER LOOK • REAL LIFE

POSTPARTUM DEPRESSION

Postpartum derives from roots meaning “after” and “birth.” The **postpartum period** refers to the weeks following delivery, but there is no specific limit. “Parting is such sweet sorrow,” Shakespeare has Juliet tell Romeo. The “parting” from the baby is also frequently a happy one. The long wait is over. Labor is finished, fingers and toes have been counted, and despite some local discomfort, the mother finds her “load” to be lightened—most literally. **Truth or Fiction Revisited:** However, it turns out that it is normal—statistically speaking—for women to feel depressed following childbirth (Gavin et al., 2005). According to the American Psychiatric Association (2000), about 70% of new mothers have periods of tearfulness, sadness, and irritability that the association refers to as the “baby blues” (p. 423).

Mood problems experienced during the postpartum period include the baby blues and more serious mood disorders (“postpartum-onset mood episodes”), which occasionally include “psychotic features” (American Psychiatric Association, 2000). The baby blues affect most women in the weeks after delivery (American Psychiatric Association, 2000). Researchers believe that the baby blues are so common because of hormonal changes that follow delivery (Kohl, 2004).

The baby blues last about 10 days and are generally not severe enough to impair the mother’s functioning. Don’t misunderstand; the baby blues are seriously discomfiting and not to be ignored, as in “Oh, you’re just experiencing what most women experience.” The point is that most women can handle the baby blues, even though they are pretty awful at times, partly because the women know that they are transient. A minority of women but perhaps as many as one in five to ten encounter the more serious mood disorder frequently referred to as postpartum depression (PPD). Postpartum depression begins about a month after delivery and may linger for weeks, even months. It is technically referred to as a major depressive disorder with postpartum onset. Like other major depressive disorders, it is characterized by serious sadness, feelings of hopelessness and helplessness, feelings of worthlessness, difficulty concentrating, loss of appetite, and insomnia. There can also be severe fluctuations in mood, with women sometimes feeling elated.

Many researchers have suggested that PPD is caused by the interactions of physiological (mainly hormonal) and psychological factors, including a sudden drop in estrogen (Kohl, 2004). Feelings of depression before getting pregnant or during pregnancy are a risk factor for PPD, as are concerns about all the life changes that motherhood creates, marital problems, and having a sick or

unwanted baby. But the focus today is on the physiological because there are major changes in body chemistry during and after pregnancy (Cohen et al., 2006).

According to the American Psychiatric Association (2000), postpartum mood episodes are accompanied by “psychotic features,” such as breaks with reality, in 1 woman in 500–1,000. Mothers with these features occasionally have delusional thoughts about the infant that place the infant at risk of injury or death. Some women experience delusions that the infant is possessed by the devil, and some experience a command to kill the infant that seems to be coming from the outside—perhaps from a commanding person or some kind of divine or evil spirit. Women with severe postpartum depression often have a history of psychological disorders or substance abuse (Comtois et al., 2008). Remember, too, that psychotic features are rare, and when they occur, they do not always place the baby at risk.

Women who experience milder forms of PPD usually profit from social support and a history of high self-esteem. They may benefit from counseling, even if counseling does little more than explain that many women encounter PPD and get over it. Drugs that increase estrogen levels or act as antidepressants may help. Most women get over PPD on their own, of course. At the very least, women should know that the problem is common and that it does not necessarily mean there is something wrong with them or that they are failing to live up to their obligations.



Brooke Shields Lobbies for Postpartum Depression Bill Actress Brooke Shields takes part in a press conference to encourage the passage of postpartum depression (PPD) legislation that would give new mothers access to help, education, and treatment, on Capitol Hill in Washington, D.C. Shields spoke of her own struggles with PPD after the birth of her daughter, Rowan.

IN THE NEW WORLD

Childhood begins with birth. When my children are enjoying themselves, I kid them and say, “Stop having fun. You’re a child, and childhood is the worst time of life.” I get a laugh because they know that childhood is supposed to be the best time of life—a time for play and learning and endless possibilities. For many children, it is that, but other children suffer from problems such as malnutrition, low self-esteem, and child abuse.

Let's chronicle the events of childhood. The most obvious aspects of child development are physical. Let's therefore begin with the physical development of newborn babies. Many newborns—technically known as neonates during the 1st month after birth—come into the world looking a bit fuzzy, but they make rapid adaptations to the world around them. In this section, we describe the characteristics of neonates. We begin with reflexes.

Reflexes: Entering the World Prewired

Soon after you were born, a doctor or nurse probably pressed her fingers against the palms of your hands. Although you would have had no idea what to do in response, most likely you grasped the fingers firmly—so firmly that you could have been lifted from your cradle!

Grasping at birth is inborn, an example of the importance of nature in human development. Grasping is one of the neonate's many reflexes. **Question 7: What are reflexes?** Reflexes are simple, inborn responses elicited by specific stimuli. They do not involve higher brain functions. Rather, they occur automatically—that is, without thinking about them.

Reflex A simple inborn response to a stimulus.

A CLOSER LOOK • DIVERSITY

ALLEVIATING PROTEIN-ENERGY MALNUTRITION (PEM)

Protein-energy malnutrition (PEM) is the severest form of malnutrition. Protein is essential for growth, and food energy translates as calories. Here are a few facts about PEM (World Health Organization, 2004):

- Protein-energy malnutrition affects one child in four around the world; 150 million children (27%) are underweight, and 182 million (33%) have stunted growth.
- More than 70% of children with PEM live in Asia, 26% live in Africa, and about 4% live in Latin America and the Caribbean.
- Children may encounter PEM before birth if their mother is malnourished.
- Malnutrition, also known as “the silent emergency,” has contributed to about 60% of the 11 million deaths of children each year.
- Infants and young children are most vulnerable to growth impairment as a result of PEM because of their high-protein and energy needs and their susceptibility to infection.
- Children with PEM suffer up to 160 days of illness per year.

In the condition known as *kwashiorkor*, the child may eat enough calories from starchy foods but does not take in enough protein. As a result, the body may metabolize its own reserves of protein, leading to enlargement of the stomach, swollen feet, development of a rash, and loss of hair (Ndekha, 2008). Irritability and lack of energy may follow.

The World Health Organization (2003) produced guidelines on the treatment of children with PEM. They include:

- Educating health workers on the extent and severity of PEM.
- Identifying children with severe malnutrition. Symptoms include hypoglycemia (shakiness resulting from low blood sugar levels), hypothermia, shock, dehydration, and severe anemia.



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Kwashiorkor For children with kwashiorkor, the enlargement of the stomach and other symptoms result from failure to take in adequate protein.

- Preparing appropriate feeding formulas and food supplements.
- Using antibiotics and other medicines to treat disease.
- Monitoring the child's intake of food and the child's waste products; preparing and using a weight chart.
- Monitoring the child's vital signs— pulse, respiration rate, and temperature—and being aware of signs of danger.
- Bathing the child.
- Involving mothers in care so that they can continue care at home, including feeding and play activities (for purposes of stimulation); providing mothers with comprehensive instructions at discharge.

The mortality rate of children with PEM can be as high as 50%, but with adequate care, the rates can be reduced to less than 5%. For more information, contact the Department of Nutrition for Health and Development, World Health Organization, 1211 Geneva 27, Switzerland (<http://www.who.int/nutrition/en/>).



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The Rooting Reflex

Newborn children do not know that it is necessary to eat to survive. Fortunately, they have reflexes that cause them to eat. For example, they automatically turn their head toward stimuli that prod or stroke the cheek, chin, or corner of the mouth (such as a nipple). This is termed **rooting**. They also automatically suck objects that touch their lips.

Neonates also withdraw from painful stimuli (the *withdrawal reflex*). They draw up their legs and arch their backs in response to sudden noises, bumps, or loss of support while being held. This is the *startle*, or *Moro, reflex*. They grasp objects that press against the palms of their hands (the *grasp*, or *palmar, reflex*). They fan their toes when the soles of their feet are stimulated (the *Babinski reflex*). Pediatricians assess babies' neural functioning by testing these reflexes.

Babies also breathe, sneeze, cough, yawn, and blink reflexively. And it is guaranteed that you will learn about the sphincter (anal muscle) reflex if you put on your best clothes and hold an undiapered neonate on your lap for a while.

Sensory Capabilities

In 1890, William James wrote that the neonate must sense the world “as one great blooming, buzzing confusion.” The neonate emerges from being literally suspended in a temperature-controlled environment to being—again, in James’s words—“assailed by eyes, ears, nose, skin, and entrails at once.” **Question 8: How well do neonates see, hear, and so on?** In this section, we describe the sensory capabilities of neonates, and we see that James, for all his eloquence, probably exaggerated their disorganization.

Neonates can see, but they tend to be nearsighted; that is, they focus better on nearby than distant objects (Kellman & Arterberry, 2006). They can visually detect movement, and many neonates can track movement the 1st day after birth. But even at birth, babies do not just passively respond to visual stimuli. Babies placed in the dark open their eyes wide and actively search the visual field (Kellman & Arterberry, 2006).

Fetuses respond to sound months before they are born, and normal neonates hear well unless their middle ears are clogged with amniotic fluid (Priner et al., 2003). Most neonates turn their heads toward unusual sounds, such as the shaking of a rattle. The sense of hearing may play a role in the formation of bonds of affection between neonates and their mothers that goes well beyond the soothing potential of the mothers’ voices. Research indicates that neonates prefer their mothers’ voices to those of other women, but they do not show similar preferences for the voices of their fathers (DeCasper & Prescott, 1984; M. S. Freeman et al., 1993). Neonates have already had several months of experience in the uterus, and for a good part of this time, they have been capable of sensing sounds. Because they are predominantly exposed to prenatal sounds produced by their mothers, learning appears to play a role in neonatal preferences. Neonates are particularly responsive to the sounds and rhythms of speech (Dehaene-Lambertz et al., 2004).

Neonates can discriminate distinct odors, such as those of onions and anise (licorice). Their nasal preferences are quite similar to those of older children and adults

Rooting The turning of an infant’s head toward a touch, such as by the mother’s nipple.

© 1–3: Rosenstein, D. S. & Oster, H. (1988). Differential Facial responses to four basic tastes in newborns. *Child Development*, 59, 1555–1568.



Facial Expressions Elicited by Sweet, Sour, and Bitter Solutions Neonates are sensitive to different tastes, as shown by their facial expressions when tasting (1) sweet, (2) sour, and (3) bitter solutions.

(Werner & Bernstein, 2001). When a cotton swab saturated with the odor of rotten eggs is passed beneath their noses, neonate infants spit, stick out their tongues, wrinkle their noses, and blink their eyes. However, they show smiles and licking motions when presented with the odors of chocolate, strawberry, vanilla, butter, bananas, and honey. Breast-fed 15-day-old infants also prefer their mother's axillary (underarm) odor to odors produced by other lactating women and by nonlactating women. Bottle-fed infants do not show this preference (Cernoch & Porter, 1985; Porter et al., 1992). The investigators explain this difference by suggesting that breast-fed infants may be more likely than bottle-fed infants to be exposed to their mother's axillary odor; that is, mothers of bottle-fed infants usually remain clothed.

Neonates are sensitive to different tastes, and their preferences, as suggested by their facial expressions in response to various fluids, appear similar to those of adults (Werner & Bernstein, 2001). Sweet solutions are met with smiles, licking, and eager sucking (Blass & Camp, 2003; Rosenstein & Oster, 1988).

The sense of touch is an extremely important avenue of learning and communication for babies. Not only do the skin senses provide information about the external world, but the sensations of skin against skin also appear to provide feelings of comfort and security that may be major factors in the formation of bonds of attachment between infants and their caregivers.

Sleeping and Waking

As adults, we spend about one third of our time sleeping.

Question 9: What patterns of sleep are found among neonates? Neonates greatly outdo us, spending two thirds of their time, or about 16 hours per day, in sleep. And in one of life's basic challenges to parents, neonates do not sleep their 16 hours consecutively. The typical infant has about six cycles of waking and sleeping in a 24-hour period. The longest nap typically approaches 4 1/2 hours, and the neonate is usually awake for a little more than 1 hour during each cycle. By the ages of about 6 months to a year, many infants begin to sleep through the night.

Neonates spend about half their sleeping time in REM sleep. As they develop, the percentage of sleeping time spent in REM sleep declines. By 6 months or so, REM sleep accounts for only about 30% of the baby's sleep. By 2–3 years, REM sleep drops off to about 20%–25% (Salzarulo & Ficca, 2002). There is also a dramatic falling off in the total number of hours spent in sleep as we develop (Salzarulo & Ficca, 2002). Figure 10.5 ■ shows that most of the drop-off can be attributed to less REM sleep.

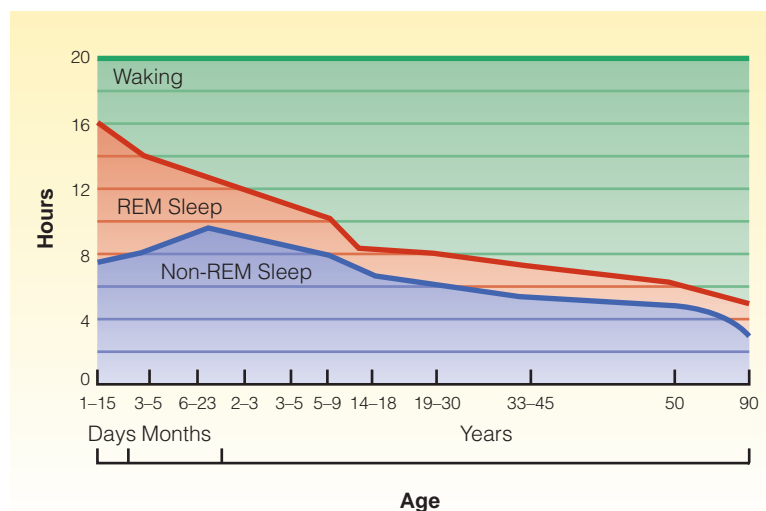


Figure 10.5 ■ REM Sleep and Non-REM Sleep Neonates spend nearly 50% of their time sleeping in rapid eye movement (REM) sleep. The percentage of time spent in REM sleep drops off to 20%–25% for 2- to 3-year-olds.

Source: From RATHUS. *Childhood and Adolescence*, 4/e. Copyright © 2011 Cengage Learning.

A CLOSER LOOK • RESEARCH

SUDDEN INFANT DEATH SYNDROME (SIDS)

Truth or Fiction Revisited: More children die from sudden infant death syndrome (SIDS) than die from cancer, heart disease, pneumonia, child abuse, HIV/AIDS, cystic fibrosis, and muscular dystrophy combined (Lipsitt, 2003). **Question 12: What is sudden infant death syndrome (SIDS)?** SIDS—also known as crib death—is a disorder of infancy that apparently strikes while the baby is sleeping. In the typical case, a baby goes to sleep, apparently in perfect health, and is found dead the next morning. There is no sign that the baby struggled or was in pain.

Sudden infant death syndrome is more common among the following (Vennemann et al., 2009a, 2009b; Webb et al., 2010):

- Babies aged 2–4 months
- Babies put to sleep in the prone position (on their stomachs) or on their sides
- Babies placed in beds with pillows or soft mattresses
- Babies sharing beds with one or more parents
- Babies placed with nonparental caregivers
- Premature and low-birthweight babies
- Male babies
- Babies in families of lower socioeconomic status
- Babies of teenage mothers
- Babies who are bottle fed
- Babies whose mothers smoked during or after pregnancy or whose mothers used narcotics during pregnancy

Perhaps the most compelling study to date on SIDS was led by health professionals at the Children’s Hospital Boston and published in *The Journal of the American Medical Association* (Paterson et al., 2006). The study focused on the medulla (see Figure 4.8), which is involved in basic functions such as breathing and sleep-and-wake cycles. Among other things, the medulla causes us to breathe if we are in need of oxygen.

The researchers compared the medullas of babies who had died from SIDS with those of babies who had died at the same age from other causes. They found that the medullas of the babies who died from SIDS were less sensitive to serotonin. The problem was particularly striking in the brains of the boys, which could account for the sex difference in the incidence of SIDS.

What should *you* do about SIDS? Check out the recommendations of the American Academy of Pediatrics.

RECOMMENDATIONS BY THE AMERICAN ACADEMY OF PEDIATRICS FOR PREVENTING SUDDEN INFANT DEATH SYNDROME

- Place infants for sleep in a supine position (wholly on the back) for every sleep period.
- Use a firm mattress or other sleep surface, preferably covered by a sheet.
- Keep soft objects such as pillows, comforters, quilts, and stuffed toys away from the infant’s sleeping environment. Bumper pads, if used, should be firm, thin, and well secured so they are less likely to cover the infant’s face.
- Avoid smoking during pregnancy.
- Use a separate but nearby sleeping environment, such as a crib, bassinet, or cradle, preferably in the same room as the parent.
- Consider using a pacifier at sleep time for the first year.
- Do not overheat the sleep environment.
- Do not use commercial devices marketed as reducing the risk of SIDS.
- Do not use home monitors for detecting sleep patterns prior to SIDS. (Monitors may be appropriate for other purposes; ask your obstetrician.)
- Encourage “kangaroo care”—the baby lying on your abdomen—when the infant is awake.

Source: Adapted from Task Force on SIDS (2005).

— ■ —
*There was never a child so lovely
but his mother was glad to get
him to sleep.*

RALPH WALDO EMERSON

— ■ —

What is the function of REM sleep in neonates? Research with humans and other animals, including kittens and rat pups, suggests that the brain requires a certain amount of activity to create the proteins that are involved in the development of neurons and synapses (Dang-Vu et al., 2006). In older children and adults, external sources of stimulation are provided by activity, a vast and shifting array of sensory impressions, and, perhaps, thought processes during the waking state. The neonate, however, spends its brief waking periods largely isolated from the kaleidoscope of events of the world outside. Perhaps the neonate compensates by spending relatively more time in REM sleep, which most closely parallels the waking state in terms of brain waves.

Crying

Question 10: Why do babies cry? Babies cry for reasons that seem simple enough: fatigue, hunger, thirst, and pain (Batchat, 2010; Zeifman, 2004). Should parents

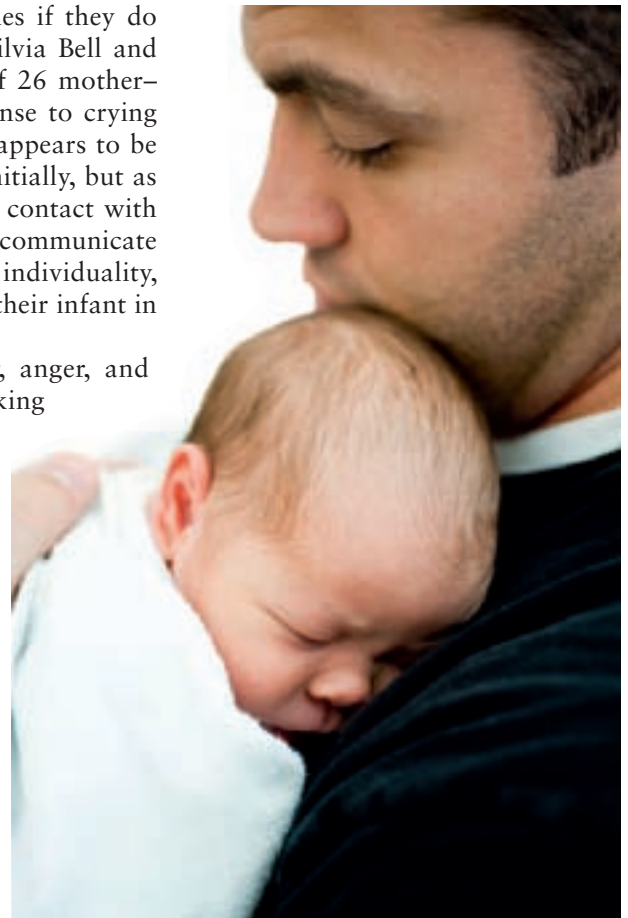
respond quickly when babies cry, or do they risk spoiling their babies if they do so? Let's consider some classic longitudinal research conducted by Silvia Bell and Mary Ainsworth (1972). The researchers followed the interactions of 26 mother–infant pairs and found that a consistent and prompt maternal response to crying is connected with general decreases in crying. Close physical contact appears to be the most helpful maternal response. Crying is apparently expressive initially, but as infants develop cognitively and learn that crying can lead to physical contact with a caregiver, it can become a form of communication. Crying may also communicate the identity of the crier across distance. Cries have multiple markers of individuality, and they may signal parents and other caregivers as to the location of their infant in a group.

Parents typically learn to distinguish cries that signify hunger, anger, and pain. A sudden, loud, insistent cry associated with flexing and kicking of the legs may indicate colic—that is, pain resulting from gas or other sources of distress in the digestive tract. The baby may seem to hold its breath for a few moments, then gasp and begin to cry again. Crying from colic can be severe and persistent—lasting for hours—although cries generally seem to settle into a pattern after a while (Barr et al., 2005a). Much to the relief of parents, colic tends to disappear by the 3rd to 6th month, as a baby's digestive system matures. Certain high-pitched cries, when prolonged, may signify health problems. They may indicate such problems as chromosomal abnormalities, infections, fetal malnutrition, and exposure to narcotics (Zeifman, 2004).

SOOTHING

Now that you are an expert on the causes and patterns of crying, you might want to ask **Question 11: What can I do to stop an infant from crying?** As noted by Bell and Ainsworth (1972), physical contact with the infant is soothing. Sucking also seems to function as a built-in tranquilizer. Sucking on a pacifier decreases crying and agitated movement in neonates who have not yet had the opportunity to feed (Field, 1999). Therefore, the soothing function of sucking need not be learned through experience. However, sucking (drinking) a sweet solution also appears to have a soothing effect (Stevens et al., 2005). (Can it be that even babies are programmed to enjoy “comfort food”?)

Parents find many other ways to soothe infants—patting, caressing and rocking, swaddling, and speaking to them in a soft voice. Parents then usually try to find the specific cause of the distress by offering a bottle or pacifier or checking the diaper. Fortunately, as infants mature and learn, crying tends to become replaced by less upsetting verbal requests for intervention. Among adults, of course, soothing techniques take very different forms—a bouquet of flowers or admission that one started the argument.



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Soothing How can a crying baby be soothed? Picking the baby up, talking to it quietly, patting, stroking, and rocking all seem to have calming effects.

LearningConnections • IN THE NEW WORLD

ACTIVE REVIEW (13) _____ are simple, unlearned, stereotypical responses elicited by specific stimuli. (14) Neonates tend to be (nearsighted or farsighted?). (15) Neonates show _____ when presented with the odors of chocolate, vanilla, and honey. (16) Neonates sleep for about _____ hours per day.

REFLECT AND RELATE Have you had experience with a newborn baby? How does your experience fit—or fail to fit—with the description of neonates in this section?

CRITICAL THINKING There is controversy over whether a caregiver should always attempt to soothe a crying baby, and how quickly the caregiver should come to the baby's aid. What is your view? Does the research support your view? Explain.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

PHYSICAL DEVELOPMENT: THE DRAMA CONTINUES

Physical development includes gains in height and weight, maturation of the nervous system, and development of bones, muscles, and organs. **Question 13: What physical developments occur during childhood?**

During infancy—the first 2 years of childhood—there are dramatic gains in height and weight. Babies usually double their birthweight in about 5 months and triple it by their first birthday (Kuczmarski et al., 2000). Their height increases by about 10 inches in the 1st year. Children grow another 4 to 6 inches during the 2nd year and gain some 4 to 7 pounds. After that, they gain about 2 to 3 inches a year until they reach the adolescent growth spurt. Weight gains also remain fairly even at about 4 to 6 pounds per year until the spurt begins. Let's look at some key areas of physical development that take place in childhood, starting with brain development.

Brain Development

Throughout childhood, the brain makes gains in size and weight. It forms neurons, a process that is completed by birth. The first major growth spurt of the brain occurs during the 4th and 5th months of prenatal development, as neurons proliferate. A second growth spurt occurs between the 25th week of prenatal development and the end of the 2nd year after birth. This spurt is due primarily to the proliferation of dendrites and axon terminals—parts of neurons that were discussed in Chapter 3 (see Figure 10.6) ■.

MYELINATION

Infants' abilities are related to myelination of neurons in parts of their brains. At birth, the parts of the brain involved in heartbeat and respiration, sleeping and arousal, and reflex activity are fairly well myelinated and functional. Myelination of motor pathways allows neonates to show reflexes, but otherwise, neonates' physical activity tends to be random and poorly organized. Development of intentional physical activity coincides with myelination. Myelination of the nerves to muscles is largely developed by the age of 2 years, although research using fMRI suggests that myelination continues into early adulthood and beyond (Wozniak & Lim, 2006). Although neonates respond to touch and can see and hear quite well, myelination progresses and the interconnections between the various areas of the cortex thicken, making children increasingly capable of complex sensorimotor activities, such as grasping what they see (Wozniak & Lim, 2006).

The brain develops more quickly than any other organ in early childhood. At 2 years of age, the brain already has attained 75% of its adult weight. By the age of 5, the brain has reached 90% of its adult weight, even though the total body weight of the 5-year-old is barely one third of what it will be as an adult (Tanner, 1989).

The increase in brain size is due in part to myelination. Completion of the myelination of the neural pathways that link the cerebellum to the cerebral cortex facilitates the development of fine motor skills (Dorfberger et al., 2009; Nelson & Luciana, 2001). As myelination of the cerebellum progresses, the child's balance and coordination improve.

Brain development is also linked to improvements in the ability to attend to and process visual information—skills that are critical in learning to read (Franceschini et al., 2007). The parts of the brain that enable the child to sustain attention and screen out distractions become increasingly myelinated between the ages of about 4 and 7 (Nelson & Luciana, 2001), enabling most children at these ages to focus on schoolwork (Scherf et al., 2009).

Although the brain undergoes its most dramatic growth during prenatal development and infancy, myelination of axons continues to occur during middle childhood and, apparently, into young adulthood. The frontal part of the brain is most highly

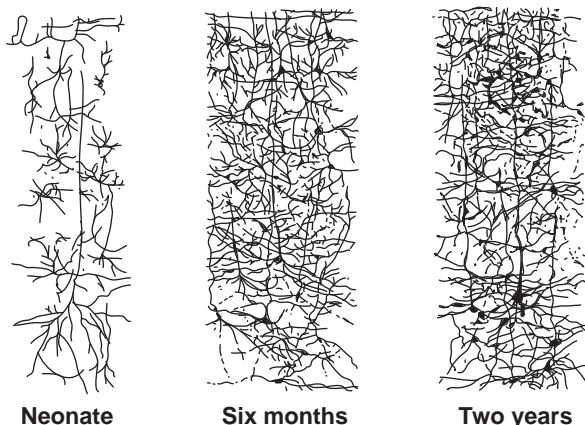


Figure 10.6 ■ Increase in Neural Connections in the Brain A major growth spurt in the brain occurs between the 25th week of prenatal development and the end of the 2nd year after birth. This growth spurt is due primarily to the proliferation of dendrites and axon terminals.

Source: Conel (1959)

involved in the so-called executive functions of planning and self-regulation. And it is here that dramatic developments take place in middle childhood (Bell et al., 2007). Executive functioning has several aspects: control of attention, cognitive flexibility, goal setting, logical thinking, and problem solving. Executive functioning appears to undergo an important period of development during the ages of 7 to 9 and to be relatively mature by about the age of 12—setting the stage for the cognitive advances of adolescence (Anderson, 2002; Ferrer et al., 2009).

NATURE AND NURTURE IN THE DEVELOPMENT OF THE BRAIN

Development of the areas of the brain that control sensation and movement begins as a result of maturation, but sensory stimulation and physical activity during early infancy also spur their development. Sensory stimulation does not mean computer programs for infants, Baby Mozart, and electronic toys; it can refer to social interaction with caregivers—being held and spoken to and the like. **Question 14: How do nature and nurture affect the development of the brain?** Therefore, experience interacts with the unfolding of the genetic code to produce the brain—and intellectual functioning—as seen by a snapshot at a given point in time (N. A. Fox & Rutter, 2010; S. E. Fox et al., 2010).

Research with animals shows how sensory stimulation sparks growth of the cortex. Researchers have provided complex environmental exposure—in some cases, rat “amusement parks” with toys such as ladders, platforms, and boxes—to demonstrate the effects of enriched environments. In these studies, rats exposed to more complex environments develop heavier brains with more synapses per neuron (Briones et al., 2004). On the other hand, animals reared in darkness show shrinkage of the visual cortex, impaired vision, and impaired visual-motor coordination (Klintsova & Greenough, 1999). If they don’t use it, they lose it. **Question 15: What are some key motor and perceptual developments during childhood?**

Motor Development

The motor development of the child—that is, the progression from simple acts like lifting the head to running around—offers psychologists a wondrous laboratory for sorting out genetic and environmental influences on development. The essential role of maturation in areas such as physical development (for example, gains in height and weight and the effects of puberty), language development, and motor development is clear. But even in these areas, environmental factors cannot be ignored. Individuals may have certain genetic potentials for body size and growth rates, but these potentials are not reached unless environmental factors such as nutrition, exposure to relatively clean air and water, and so on are also available (W. H. Brown et al., 2009; Spittle et al., 2009).

Motor development provides some of the most fascinating changes in infants, in part because so much seems to happen so quickly during the 1st year. Children gain the capacity to move about through a sequence of activities that includes rolling over, sitting up, crawling, creeping, walking, and running. The ages at which infants first engage in these activities vary, but the sequence generally remains the same (see Figure 10.7) ■. Some children skip a step. For example, an infant may walk without ever having crawled. But by and large, the sequence remains intact. Invariant sequences are usually interpreted as reflecting the unfolding of the genetic code (maturation).

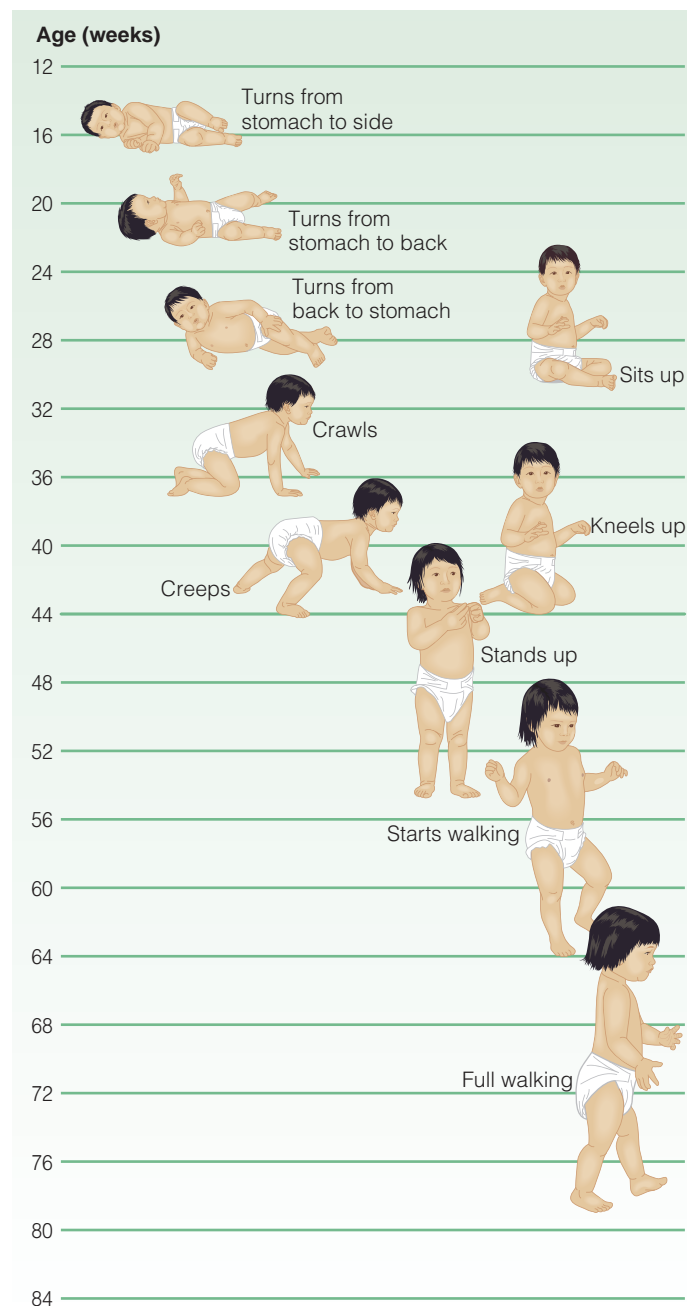


Figure 10.7 ■ Motor Development in Infancy Motor development proceeds in an orderly sequence, but there is considerable variation in the timing of the marker events shown in this figure. An infant who is a bit behind will most likely develop without problems, and a precocious infant will not necessarily become a rocket scientist.

Source: From RATHUS. *Childhood and Adolescence*, 4/e. Copyright © 2011 Cengage Learning.

CONTROVERSY IN PSYCHOLOGY IS DEVELOPMENT CONTINUOUS OR DISCONTINUOUS?

Do developmental changes tend to occur gradually (continuously)? Or do they tend to occur in major leaps (discontinuously) that dramatically alter our bodies and behavior? **Question 16: Does development occur gradually or in stages?**

John B. Watson and other behaviorists viewed development as a mainly continuous process in which the effects of learning mount gradually with no major sudden changes. Maturation theorists, however, argue that people are prewired or preset to change dramatically at certain times of life. Rapid qualitative changes can be ushered in during new stages of development. They point out that the environment, even when enriched, profits us little until we are ready, or mature enough, to develop in a certain direction. For example, newborn babies do not imitate their parents' speech, even when the parents speak clearly and deliberately. Nor does aided practice in "walking" during the first few months after birth

significantly accelerate the date when the child can walk on his or her own.

Stage theorists, such as Jean Piaget—whose theory of cognitive development we discuss next—and Sigmund Freud, saw development as discontinuous. Both theorists saw biological changes as providing the potential for psychological changes. Piaget's research centered on the ways in which maturation of the nervous system permits cognitive advances. Freud focused on the ways in which sexual development might provide the basis for personality development.

Certain aspects of physical development do occur in stages. For example, many of the changes that occur during prenatal development are discontinuous. For several days, the dividing mass of cells that becomes the baby travels through the Fallopian tube and the uterus—literally unattached to the mother. Then it becomes implanted in the uterine wall, and a whole new way of obtaining nourishment begins. Similarly, organs

develop so rapidly that the fetus looks clearly human before the end of the first trimester. The changes from the age of 2 to the onset of puberty (that is, the period of development during which reproduction becomes possible) are continuous, with children gradually growing larger. Then a new stage of development begins with the adolescent growth spurt. The spurt is triggered by hormones and characterized by rapid changes in structure and function (as in the development of the sex organs) as well as size.

Psychologists disagree more strongly on whether aspects of development such as cognition, attachment, and gender typing occur in stages. But as we see next, Jean Piaget believed that cognitive development was discontinuous and consisted of four stages of development. In this chapter, we will also see that Lawrence Kohlberg's theory of moral development consists of three levels with two stages within each level. Erik Erikson's theory of psychosocial development consists of eight stages.

Perceptual Development: On Not Going off the Deep End

Fixation time The amount of time spent looking at a visual stimulus.

The visual preferences of infants are measured by the amount of time, termed **fixation time**, they spend looking at one stimulus instead of another. In classic research by Robert Fantz (1961), 2-month-old infants preferred visual stimuli that resembled the human face to other patterns such as newsprint, a bull's-eye, and featureless red, white, and yellow disks. At this age, the complexity of facelike patterns may be more important than their content. For example, babies have been shown facelike patterns that differ either in the number of elements they contain or the degree to which they are organized to match the human face. Babies 5 to 10 weeks old fixate longer on patterns with high numbers of elements. The organization of the elements—that is, the degree to which they resemble the face—is less important. By 15 to 20 weeks, the organization of the pattern also matters. At that age, babies dwell longer on facelike patterns (e.g., Haaf et al., 1983). Infants thus seem to have an inborn preference for complex visual stimuli. However, preference for faces as opposed to other equally complex stimuli may not emerge until infants have had experience with people.

Classic research has shown that infants tend to respond to cues for depth by the time they are able to crawl (at about 6 to 8 months). Most also have the good sense to avoid crawling off ledges and tabletops into open space (Campos et al., 1978). In the classic "visual cliff" experiment run by Walk and Gibson (1961), an 8-month-old infant crawls freely above the portion of the glass with a checkerboard pattern immediately beneath it. But the infant hesitates to crawl over the portion of the glass beneath which the checkerboard has been lowered a few feet. Because the glass would support the infant, this is a visual cliff, not an actual cliff.

Video Connections—The Visual Cliff



This young explorer has the good sense not to crawl out onto a (visually) unsupported surface. Do infants have to experience some of life's "bumps" before they avoid "going off the deep end," or does fear of heights "mature" at about the same time infants gain the ability to move around?



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

ACTIVE REVIEW (17) Babies usually _____ their birth-weight in about 5 months and _____ it by their first birthday. (18) Development of intentional physical activity coincides with _____ of the brain. (19) Executive functioning appears to be relatively mature by about the age of _____. (20) Rats exposed to complex environments develop heavier brains with more _____ per neuron. (21) The sequences of motor development are (variable or invariant?). (22) Infants seem to have an inborn preference for (simple or complex?) visual stimuli.

REFLECT AND RELATE Do you seek complex intellectual undertakings or prefer the simpler life? What does research with rats suggest about the possible outcomes of your preferences for the development of your brain?

CRITICAL THINKING How do psychologists demonstrate the role of nature in motor development?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

COGNITIVE DEVELOPMENT: ON THE EDGE OF REASON?

This section explores the ways children mentally represent and think about the world—that is, their *cognitive development*. Because cognitive functioning develops over many years, young children have ideas about the world that differ considerably from those of adults. Many of these ideas are charming but illogical—at least to adults. Let's consider three views of cognitive development. We begin with Jean Piaget's stage theory of cognitive development. Next we turn to the views of Russian psychologist Lev Semyonovich Vygotsky (1896–1934), whose approach is quite different from Piaget's but is enjoying a rebirth in popularity. Then we focus on Lawrence Kohlberg's theory of moral development.

Jean Piaget's Cognitive–Developmental Theory

Swiss biologist and psychologist Jean Piaget contributed significantly to our understanding of children's cognitive development. **Question 17: What are Jean Piaget's views of cognitive development?** Piaget hypothesized that children's cognitive processes develop in an orderly sequence of stages. Although some children may be more advanced than others at particular ages, the developmental sequence remains the same. Piaget (1963) identified four major stages of cognitive development: sensorimotor, pre-operational, concrete-operational, and formal-operational (see the Concept Review on Piaget's Stages of Cognitive Development).

ASSIMILATION AND ACCOMMODATION

Piaget described human thought, or intelligence, in terms of two basic concepts: assimilation and accommodation. **Assimilation** means responding to a new stimulus through a reflex or existing habit. Infants, for example, usually try to place new objects in their mouth to suck, feel, or explore. Piaget would say that the child is assimilating a new toy to the sucking schema. A **schema** is a pattern of action or a mental structure involved in acquiring or organizing knowledge.

Piaget regarded children as natural physicists who seek to learn about and control their world. In the Piagetian view, children who squish their food and laugh enthusiastically are often acting as budding scientists. In addition to enjoying the responses of their parents, they are studying the texture and consistency of their food. (Parents, of course, often wish their children would practice these experiments in the laboratory, not the dining room.)

— ■ —
A child of five would understand this. Send someone to fetch a child of five.





GROUCHO MARX

— ■ —

Assimilation According to Piaget, the inclusion of a new event into an existing schema.

Schema According to Piaget, a hypothetical mental structure that permits the classification and organization of new information.

CONCEPT REVIEW PIAGET'S STAGES OF COGNITIVE DEVELOPMENT

Stage	Approximate Age	Comments	
Sensorimotor	Birth–2 years	At first, the child lacks language and does not use symbols or mental representations of objects. In time, reflexive responding ends, and intentional behavior begins. The child develops the object concept and acquires the basics of language.	 © 2004 George S. Jimbel
Preoperational	2–7 years	The child begins to represent the world mentally, but thought is egocentric. The child does not focus on two aspects of a situation at once and therefore lacks conservation. The child shows animism, artificialism, and objective responsibility for wrongdoing.	
Concrete-operational	7–12 years	The child develops conservation concepts, can adopt the viewpoint of others, can classify objects in series, and shows comprehension of basic relational concepts (such as one object being larger or heavier than another).	
Formal-operational	12 years and older	Mature, adult thought emerges. Thinking is characterized by deductive logic, consideration of various possibilities (mental trial and error), abstract thought, and the formation and testing of hypotheses.	



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Accommodation is the creation of new ways of responding to objects or looking at the world. With accommodation, children transform existing schemas—action patterns or ways of organizing knowledge—to incorporate new events. Children (and adults) accommodate to objects and situations that cannot be integrated into existing schemas. (For example, children who study biology learn that whales cannot be assimilated into the “fish” schema. They accommodate by constructing new schemas, such as “mammals without legs that live in the sea.”) The ability to accommodate to novel stimuli advances as a result of maturation and experience.

Most of the time, newborn children assimilate environmental stimuli according to reflexive schemas, although adjusting the mouth to contain the nipple is a primitive kind of accommodation. Reflexive behavior, to Piaget, is not “true” intelligence. True intelligence involves adapting to the world through a smooth, fluid balancing of the processes of assimilation and accommodation. Let’s now apply these concepts to the stages of cognitive development.

Accommodation According to Piaget, the modification of schemas so that information inconsistent with existing schemas can be integrated or understood.

In Profile

Jean Piaget (1896–1980) was offered the curatorship of a museum in Geneva, but he had to turn it down. After all, he was only 11 at the time. Piaget's first intellectual love was biology, and he published his first scientific article at the age of 10. He then became a laboratory assistant to the director of a museum of natural history and engaged in research on mollusks (oysters, clams, snails, and such). The director soon died, and Piaget published the research findings himself. On the basis of these papers, he was offered the curatorship.

During adolescence, Piaget studied philosophy, logic, and mathematics, but he earned his Ph.D. in biology. In 1920, he obtained a job at the Binet Institute in Paris, where work on intelligence tests was being conducted. His first task was to adapt



JEAN PIAGET

© Farrell Getman/Corbis

English verbal reasoning items for use with French children. To do so, he had to try out the items on children in various age groups and see whether they could arrive at correct answers. The task was boring until Piaget became intrigued by the children's wrong answers. Another investigator might have shrugged them off, but Piaget found meaningful patterns in the children's mistakes. The wrong answers reflected consistent, if illogical, cognitive processes. Piaget's observations led to his influential theory of cognitive development.

Piaget's original texts are difficult to read—even when translated into English. In fact, Piaget once remarked that he had the advantage of not having to read Piaget!



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Jean Piaget.

THE SENSORIMOTOR STAGE

The newborn infant is capable of assimilating novel stimuli only to existing reflexes (or ready-made schemas) such as the rooting and sucking reflexes. But by the time an infant reaches the age of 1 month, he or she already shows purposeful behavior by repeating behavior patterns that are pleasurable, such as sucking his or her hand. During the 1st month or so, an infant apparently does not connect stimuli perceived through different senses. Reflexive turning toward sources of auditory and olfactory stimulation cannot be considered purposeful searching. But within the first few months, the infant begins to coordinate vision with grasping to look at the object being held or touched.

A 3- or 4-month-old infant may be fascinated by his or her own hands and legs. The infant may become absorbed in watching him- or herself open and close the fists. The infant becomes increasingly interested in acting on the environment to make interesting results (such as the sound of a rattle) last longer or recur. Behavior becomes increasingly intentional and purposeful. Between 4 and 8 months of age, the infant explores cause-and-effect relationships such as the thump that can be made by tossing an object or the way kicking can cause a hanging toy to bounce.

Truth or Fiction Revisited: It is true that “out of sight” is literally “out of mind” prior to the age of 6 months or so. For most infants younger than 6 months, objects are not yet represented mentally. For this reason, as you can see in Figure 10.8 ■, a child makes no effort to search for an object that has been removed or placed behind a screen. By the age of 8 to 12 months, however, infants realize that objects removed from sight still exist and attempt to find them. In this way, they show what is known as **object permanence**, thereby making it possible to play peekaboo.

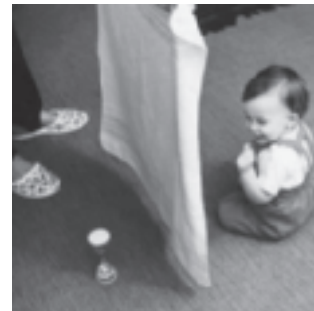
Between 1 and 2 years of age, children begin to show an interest in how things are constructed. Possibly for this reason, they persistently touch and finger their parents' faces and their own. Toward the end of the 2nd year, children begin to engage in mental trial and error before they try out overt behaviors. For instance, when they look for an object you have removed, they will no longer begin their search in the last place they saw it. Rather, they may follow you, assuming you are carrying the object even though it is not visible. It is as though they are anticipating failure in searching for the object in the place they last saw it.

Because the first stage of development is dominated by learning to coordinate perception of the self and of the environment with motor (muscular) activity, Piaget termed it the **sensorimotor stage**. This stage comes to a close with the acquisition of language basics at about age 2.

Object permanence Recognition that objects removed from sight still exist, as demonstrated in young children by continued pursuit.

Sensorimotor stage The first of Piaget's stages of cognitive development, characterized by coordination of sensory information and motor activity, early exploration of the environment, and lack of language.

Figure 10.8 ■ Development of Object Permanence To the infant who is in the early part of the sensorimotor stage, out of sight is truly out of mind. Once a sheet of paper is placed between the infant and the toy monkey (top two photos), the infant loses all interest in the toy. From evidence of this sort, Piaget concluded that the toy is not mentally represented. The bottom series of photos shows a child in a later part of the sensorimotor stage. This child does mentally represent objects and pushes through a towel to reach an object that has been screened from sight.



© 2004 George S. Zimbel

Video Connections—Piaget's Sensorimotor Stage



Nine-month-old Hayden has learned that he can move the large toy (the obstacle) to retrieve the preferred toy beneath it.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

Preoperational stage The second of Piaget's stages, characterized by illogical use of words and symbols, spotty logic, and egocentrism.

Egocentrism According to Piaget, the assumption that others view the world as one does oneself.

Animism The belief that inanimate objects move because of will or spirit.

Artificialism The belief that natural objects have been created by human beings.

THE PREOPERATIONAL STAGE

The **preoperational stage** is characterized by the use of words and symbols to represent objects and relationships among them. But be warned—any resemblance between the logic of 2- to 7-year-old children and your own logic is very often purely coincidental. Children may use the same words that adults use, but this does not mean their views of the world are similar to adults'. Preoperational children tend to think one-dimensionally—to focus on one aspect of a problem or situation at a time.

One consequence of one-dimensional thinking is **egocentrism**. Preoperational children cannot understand that other people do not see things the same way they do. When my daughter Allyn was 2½, I asked her to tell me about a trip to the store with her mother. "You tell me," she replied. Upon questioning, it seemed she did not understand that I could not see the world through her eyes.

To egocentric preoperational children, all the world's a stage that has been erected to meet their needs and amuse them. When asked, "Why does the sun shine?" they may say, "To keep me warm." If asked, "Why is the sky blue?" they may respond, "Cause blue's my favorite color." Preoperational children also show **animism**. They attribute life and consciousness to physical objects like the sun and the moon. In addition, they show **artificialism**.

They believe that environmental events like rain and thunder are human inventions. Asked why the sky is blue, 4-year-olds may answer, "Cause Mommy painted it." Examples of egocentrism, animism, and artificialism appear in Table 10.2 ■.

To gain further insight into preoperational thinking, find a 3- or 4-year-old and try these mini-experiments:

- Pour water from a tall, thin glass into a short, wide glass. Now ask the child whether the short, wide glass contains more, less, or the same amount of water that was in the tall, thin glass. If the child says that they hold the same amount of water (with possible minor exceptions for spillage and evaporation), the child is correct. But if the child errs, why do you think this happens?
- Now flatten a ball of clay into a pancake, and ask the child whether you wind up with more, less, or the same amount of clay. If the child errs again, why do you think this happens?

Table 10.2 ■ Examples of Preoperational Thought

Type of Thought	Sample Questions	Typical Answers
Egocentrism —seeing oneself as the center of things; not viewing things from the perspectives of other people	Why does it get dark out? Why does the sun shine? Why is there snow? Why is grass green? What are TV sets for?	So I can go to sleep. To keep me warm. For me to play in. Because that's my favorite color. To watch my favorite shows and cartoons.
Animism —attributing life and consciousness to physical objects	Why do trees have leaves? Why do stars twinkle? Why does the sun move in the sky? Where do boats go at night?	To keep them warm. Because they're happy and cheerful. To follow children and hear what they say. They sleep like we do.
Artificialism —assuming that environmental events are human inventions	What makes it rain? Why is the sky blue? What is the wind? What causes thunder? How does a baby get in Mommy's tummy?	Someone emptying a watering can. Somebody painted it. A man blowing. A man grumbling. Just make it first. (How?) You put some eyes on it, then put on the head.

To arrive at the correct answers to these questions, children must understand the law of **conservation**. This law holds that basic properties of substances such as mass, weight, and volume remain the same—that is, are *conserved*—when one changes superficial properties such as their shape or arrangement.

Conservation requires the ability to think about, or **center** on, two aspects of a situation at once, such as height and width. Conserving the mass, weight, or volume of a substance requires the recognition that a change in one dimension can compensate for a change in another. But the preoperational boy in Figure 10.9 ■ focuses on only one dimension at a time. First, he is shown two short, wide glasses of water and agrees that they contain the same amount of water. Then, while he watches, water is poured from a short, wide glass into a tall, thin glass. Now he is asked which glass contains more water. After mulling over the problem, he points to the tall, thin glass. Why? Because when he looks at the glasses, he is “overwhelmed” by the fact that the thinner glass is taller. The preoperational child focuses on the most apparent dimension of the situation—in this case, the greater height of the thinner glass. He does not realize that the increased width of the squat glass compensates for the decreased height. By the way, if you ask him whether any water has been added or taken away in the pouring process, he readily says no. But if you then repeat the question about which glass contains *more* water, he again points to the taller glass. If all this sounds rather illogical, that is because it is illogical—or in Piaget’s terms, preoperational.

Piaget (1932) found that the moral judgment of preoperational children is also one-dimensional. The 5-year-olds he observed tended to be slaves to rules and authority. When you ask them why something should be done in a certain way, they may insist, “Because that’s the way to do it!” or “Because my Mommy says so!” Right is right and wrong is wrong. Why? “Because!”—that’s why.

According to most older children and adults, an act is a crime only when there is criminal intent. Accidents may be hurtful, but the perpetrators are usually seen as blameless. But in the court of the one-dimensional, preoperational child, there is **objective responsibility**. People are sentenced (and harshly!) on the basis of the amount of damage they have done, not because of their motives or intentions. To demonstrate objective responsibility, Piaget would tell children stories and ask

Conservation According to Piaget, recognition that basic properties of substances such as weight and mass remain the same when superficial features change.

Center According to Piaget, to focus one’s attention.

Objective responsibility According to Piaget, the assignment of blame according to the amount of damage done rather than the motives of the actor.

Figure 10.9 ■ Conservation (a) The boy in this illustration agreed that the amount of water in two identical containers is equal. (b) He then watched as water from one container was poured into a tall, thin container. (c) When asked whether the amounts of water in the two containers are now the same, he says no.

Source: From RATHUS. *Childhood and Adolescence*, 4/e. Copyright © 2011 Cengage Learning.



them which character was naughtier and why. John, for instance, accidentally breaks 15 cups when he opens a cabinet door. Henry breaks 1 cup when he sneaks into a kitchen cabinet to find forbidden jam. The preoperational child usually judges John to be naughtier. Why? Because he broke more cups.

THE CONCRETE-OPERATIONAL STAGE

By about age 7, the typical child is entering the **concrete-operational stage**. In this stage, which lasts until about age 12, children show the beginnings of the capacity for adult logic. However, their logical thoughts, or *operations*, generally involve tangible objects rather than abstract ideas. Concrete-operational children are capable of **decentration**; they can center on two dimensions of a problem at once. This attainment has implications for moral judgments, conservation, and other intellectual undertakings.

Children now show **subjective moral judgment**. When assigning guilt, they center on the motives of wrongdoers as well as on the amount of damage done. Concrete-operational children judge Henry more harshly than John because John's misdeed was an accident.

Concrete-operational children understand the laws of conservation. The boy in Figure 10.9, now a few years older, would say that the tall glass still contains the same amount of water. If asked why, he might reply, "Because you can pour it back into the other one." Such an answer also suggests awareness of the concept of **reversibility**—the recognition that many processes can be reversed or undone so that things are restored to their previous condition. Centering simultaneously on the height and the width of the glasses, the boy recognizes that the loss in width compensates for the gain in height.

Children in this stage are less egocentric. They are able to take on the roles of others and to view the world, and themselves, from other people's perspectives. They recognize that people see things in different ways because of different situations and different sets of values.

During the concrete-operational stage, children's own sets of values begin to emerge and acquire stability. Children come to understand that feelings of love between them and their parents can endure even when someone feels angry or disappointed at a particular moment. (We continue our discussion of Piaget's theory—his stage of *formal operations*—in the following chapter's section on adolescence.)

EVALUATION OF PIAGET'S THEORY

A number of questions have been raised concerning the accuracy of Piaget's views. Among them are these:

- *Was Piaget's timing accurate?* Some critics argue that Piaget's methods led him to underestimate children's abilities (Bjorklund, 2000; Meltzoff & Gopnik, 1997). Other researchers using different methods have found, for example, that preschoolers are less egocentric and that children are capable of conservation at earlier ages than Piaget thought.
- *Does cognitive development occur in stages?* Cognitive events such as egocentrism and conservation appear to develop more continuously than Piaget thought—that is, they may not occur in stages (Bjorklund, 2000; Flavell, 2000). Although cognitive developments appear to build on previous cognitive developments, the process may be more gradual than stagelike.
- *Are developmental sequences always the same?* Here, Piaget's views have fared better. It seems there is no variation in the sequence in which cognitive developments occur.

In sum, Piaget's theoretical edifice has been rocked, but it has not been reduced to rubble. Psychologist Andrew Meltzoff believes that "Piaget's theories were critical for getting the field of [cognitive development] off the ground, . . . but it's time to move on" (1997, p. 9). Some psychologists are moving on to *information processing*. That is, they view children (and adults) as akin to computer systems. Children, like computers, obtain information (receive "input") from their environment, store it, retrieve, manipulate it (think about it), and then respond to it overtly in terms of their behavior (produce "output") (Bjorklund, 2000). One goal of the information-processing approach is to learn just how children do these things, how their "mental programs" develop. Critical issues involve children's

Concrete-operational stage Piaget's third stage, characterized by logical thought concerning tangible objects, conservation, and subjective morality.

Decentration Simultaneous focusing on more than one dimension of a problem so that flexible, reversible thought becomes possible.

Subjective moral judgment According to Piaget, moral judgment that is based on the motives of the perpetrator.

Reversibility According to Piaget, recognition that processes can be undone, and things can be made as they were.

Zone of proximal development (ZPD) Vygotsky's term for the situation in which a child carries out tasks with the help of someone who is more skilled, frequently an adult who represents the culture in which the child develops.

Scaffolding Vygotsky's term for temporary cognitive structures or methods of solving problems that help the child as he or she learns to function independently.

capacity for memory and their use of cognitive strategies, such as the ways they focus their attention. The future of cognitive development remains to be written.

Now let's consider the views of Vygotsky. Unlike Piaget, Vygotsky is not a stage theorist. Instead, he sees the transmission of knowledge from generation to generation as cumulative and focuses on the ways that children's interactions with their elders enhance their cognitive development.

Lev Vygotsky's Sociocultural Theory

The term *sociocultural theory* has different meanings in psychology. In Chapter 1, we saw that the term can refer to the roles of factors such as ethnicity and gender in behavior and mental processes. But Vygotsky's sociocultural theory focuses instead on the ways children's cognitive development is influenced by the culture in which they are reared and the individuals who help transmit information about that culture.

Vygotsky's (1978) theory focuses on the transmission of information and cognitive skills from generation to generation. The transmission of skills involves teaching and learning, but Vygotsky is no behaviorist. He does not view learning as a mechanical process that can be described in terms of the conditioning of units of behavior. Rather, he focuses more generally on how the child's social interaction with adults, largely in the home, organizes a child's learning experiences in such a way that the child can obtain cognitive skills—such as computation or reading skills—and use them to acquire information. Like Piaget, Vygotsky sees the child's functioning as adaptive (Piaget & Smith, 2000), and the child adapts to his or her social and cultural interactions.

Question 18: What are the key concepts of Vygotsky's theory of cognitive development? Key concepts in Vygotsky's theory include the *zone of proximal development* and *scaffolding*. The word *proximal* means “nearby” or “close,” as in the words *approximate* and *proximity*. The **zone of proximal development (ZPD)** refers to a range of tasks that a child can carry out with the help of someone who is more skilled (Haenen, 2001). The “zone” refers to the relationship between the child's own abilities and what she or he can do with help from others. Adults or older children best guide the child through this zone by gearing their assistance to the child's capabilities (Flavell et al., 2002).

Within the zone, we find an apprenticeship in which the child works with, and learns from, others (Meijer & Elshout, 2001). When learning with others, the child tends to internalize—or bring inward—the conversations and explanations that help him or her gain skills (Ash, 2004; Umek et al., 2005). Children not only learn the meanings of words from teachers; they also learn ways of talking to themselves about solving problems within a cultural context (Murata & Fuson, 2006). Outer speech becomes inner speech. What was the teacher's becomes the child's. What was a social and cultural context becomes embedded within the child—thus the term *sociocultural theory*.

A *scaffold* is a temporary skeletal structure that enables workers to fabricate a building, bridge, or other more permanent structure. Cognitive **scaffolding** refers to the temporary support provided by a parent or teacher to a child who is learning to perform a task. The amount of guidance decreases as the child becomes more skilled and self-sufficient. In Vygotsky's theory, teachers and parents provide children with problem-solving methods that serve as cognitive scaffolding while the child gains the ability to function independently. A child's instructors may offer advice on sounding out letters and words that provides a temporary support until reading “clicks” and the child no longer needs the device. Children may be offered scaffolding that enables them to use their fingers or their toes to do simple calculations. Eventually, the scaffolding is removed, and the cognitive structures stand alone.



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Lev Semyonovich Vygotsky



© Brand X Pictures/Jupiterimages

Scaffolding According to Vygotsky's theory, teachers and parents provide children with problem-solving methods that serve as cognitive scaffolding.



© Brand X Pictures/Jupiterimages

Children at first view the value of education in terms of their parents' verbalizations about school success (Bigelow, 2001). Vygotsky's theory points out that children's attitudes toward schooling are embedded within the parent-child relationship. But a Puerto Rican study found that students also use scaffolding when they are explaining to one another how they can improve school projects, such as essay assignments (De Guerrero & Villamil, 2000).

Piaget's focus was largely maturational. It assumed that maturation of the brain allowed the child to experience new levels of insights and suddenly develop new kinds of problem solving. Vygotsky focused on the processes in the teacher-learner relationship. To Vygotsky, cognitive development was about culture and social interaction (Montero & De Dios, 2006; Norton & D'Ambrosio, 2008). Let's now turn to another aspect of cognitive development—the ways children (and adults) arrive at judgments as to what is right and what is wrong.

Lawrence Kohlberg's Theory of Moral Development

Question 19: How do children reason about right and wrong, according to Kohlberg? Cognitive-developmental theorist Lawrence Kohlberg used the following tale in his research into children's moral reasoning:

In Europe a woman was near death from a special kind of cancer. There was one drug that the doctors thought might save her. It was a form of radium that a druggist in the same town had recently discovered. The drug was expensive to make, but the druggist was charging ten times what the drug cost him to make. He paid \$200 for the radium and charged \$2,000 for a small dose of the drug. The sick woman's husband, Heinz, went to everyone he knew to borrow the money, but he could only get together about \$1,000, which was half of what it cost. He told the druggist that his wife was dying and asked him to sell it cheaper or let him pay later. But the druggist said: "No, I discovered the drug, and I'm going to make money from it." So Heinz got desperate and broke into the man's store to steal the drug for his wife.

—Kohlberg, 1969, p. 19

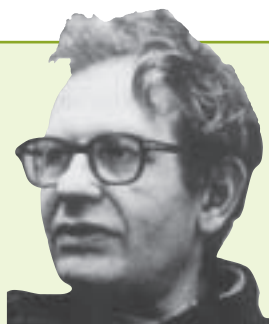
Heinz is caught in a moral dilemma. In such dilemmas, a legal or social rule (in this case, the law that forbids stealing) is pitted against a strong human need (his desire to save his wife). Children and adults arrive at yes or no answers for different reasons. According to Kohlberg, the reasons can be classified according to the level of moral development they reflect.

As a stage theorist, Kohlberg argues that the stages of moral reasoning follow a specific sequence (see Table 10.3) ■. Children progress at different rates, and not all children (or adults) reach the highest stage. But the sequence is always the same: Children must go through stage 1 before they enter stage 2 and so on. According to Kohlberg, there are three levels of moral development and two stages within each level.

When it comes to the dilemma of Heinz, Kohlberg believed that people could justify Heinz's stealing the drug or his decision not to steal it by the reasoning of any level or stage of moral development. Thus, Kohlberg was not as interested in the eventual yes or no as he was in *how a person reasoned* to arrive at yes or no.

In Profile

His car was found parked beside Boston Harbor. Three months later, his body washed up onto the shore. He had discussed the moral dilemma posed by suicide with a friend, and perhaps Lawrence Kohlberg (1927–1987) had taken his own life. He was suffering from a painful parasitic intestinal disease that he had acquired 40 years earlier when he was imprisoned for smuggling Jewish refugees from Europe past the British blockade into Israel. There had also been recent disappointments in his work.



LAWRENCE KOHLBERG

© Courtesy of Harvard University Archives

Kohlberg was born into a wealthy family in suburban New York. He graduated from Phillips Academy as World War II came to an end. Rather than go on immediately to college, he became a merchant mariner and helped save people who had been displaced by the war. Between high school and college, Kohlberg had already decided that one must attend more to one's own conscience than to law and authority figures in determining what was right and wrong.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Lawrence Kohlberg.

Table 10.3 ■ Kohlberg’s Levels and Stages of Moral Development

	Stage of Development	Examples of Moral Reasoning That Support Heinz’s Stealing the Drug	Examples of Moral Reasoning That Oppose Heinz’s Stealing the Drug
Level I: Preconventional	STAGE 1: Judgments guided by obedience and the prospect of punishment (the consequences of the behavior)	It isn't wrong to take the drug. Heinz did try to pay the druggist for it, and it's only worth \$200, not \$2,000.	Taking things without paying is wrong because it's against the law. Heinz will get caught and go to jail.
	STAGE 2: Naively egoistic, instrumental orientation (things are right when they satisfy people's needs)	Heinz ought to take the drug because his wife really needs it. He can always pay the druggist back.	Heinz shouldn't take the drug. If he gets caught and winds up in jail, it won't do his wife any good.
Level II: Conventional	STAGE 3: Good-boy orientation (moral behavior helps others and is socially approved)	Stealing is a crime, so it's bad, but Heinz should take the drug to save his wife or else people would blame him for letting her die.	Stealing is a crime. Heinz shouldn't just take the drug, because his family will be dishonored and they will blame him.
	STAGE 4: Law-and-order orientation (moral behavior is doing one's duty and showing respect for authority)	Heinz must take the drug to do his duty to save his wife. Eventually, he has to pay the druggist for it, however.	If everyone took the law into his or her own hands, civilization would fall apart, so Heinz shouldn't steal the drug.
Level III: Postconventional	STAGE 5: Contractual, legalistic orientation (one must weigh pressing human needs against society's need to maintain social order)	This thing is complicated because society has a right to maintain law and order, but Heinz has to take the drug to save his wife.	I can see why Heinz feels he has to take the drug, but laws exist for the benefit of society as a whole and can't simply be cast aside.
	STAGE 6: Universal ethical principles orientation (people must follow universal ethical principles and their own conscience, even if it means breaking the law)	In this case, the law comes into conflict with the principle of the sanctity of human life. Heinz must take the drug because his wife's life is more important than the law.	If Heinz truly believes that stealing the drug is worse than letting his wife die, he should not take it. People have to make sacrifices to do what they think is right.

THE PRECONVENTIONAL LEVEL

The **preconventional level** applies to most children through about the age of 9. Children at this level base their moral judgments on the consequences of behavior. For instance, stage 1 is oriented toward obedience and punishment. Good behavior is obedient and allows one to avoid punishment. However, a child in stage 1 can decide that Heinz should or should not steal the drug.

In stage 2, good behavior allows people to satisfy their needs and those of others. (Heinz’s wife needs the drug; therefore, stealing the drug—the only way of obtaining it—is not wrong. But there is also a stage 2 reason for not stealing the drug: Stealing could lead to Heinz being punished.)

THE CONVENTIONAL LEVEL

In the **conventional level** of moral reasoning, right and wrong are judged by conformity to conventional (familial, religious, societal) standards of right and wrong. According to the stage 3, “good-boy orientation,” moral behavior is that which meets the needs and expectations of others. Moral behavior is what is “normal”—what the majority does. (Heinz should steal the drug because that is what a “good husband” would do. It is “natural” or “normal” to try to help one’s wife. Or Heinz should *not* steal the drug because “good people do not steal.”)

In stage 4, moral judgments are based on rules that maintain the social order. Showing respect for authority and doing one’s duty are valued highly. (Heinz *must* steal the drug; it would be his fault if he let his wife die. He would pay the druggist later, when he had the money.) Many people do not mature beyond the conventional level.

THE POSTCONVENTIONAL LEVEL

Postconventional moral reasoning is more complex and focuses on dilemmas in which individual needs are pitted against the need to maintain the social order and on personal conscience. We discuss the postconventional level in the section on adolescence in Chapter 11.

Preconventional level According to Kohlberg, a period during which moral judgments are based largely on expectation of rewards or punishments.

Conventional level According to Kohlberg, a period during which moral judgments largely reflect social conventions; a “law and order” approach to morality.

ACTIVE REVIEW (23) Piaget saw intelligence as including _____ (responding to events according to existing schemas) and accommodation. (24) Object permanence develops during the _____ period of cognitive development. (25) The _____-operational period is characterized by conservation and reversibility. (26) Vygotsky used the concepts of scaffolding and the _____ of proximal development to explain cognitive development. (27) Kohlberg hypothesizes that moral reasoning develops through (how many?) _____ levels and two stages within each level.

REFLECT AND RELATE Remember the experiment with the child and the water reported on page 367? After you have tried that experiment, try a mini-experiment in the

conservation of number. Make two rows of five pennies each. In the first row, place the pennies about half an inch apart. In the second row, place the pennies 2 to 3 inches apart. Ask a 4- to 5-year-old child which row has more pennies. What do you think the child will say? Why?

CRITICAL THINKING Agree or disagree with the following statement and support your answer: People with “conventional” moral views are functioning at a lower cognitive level than people with postconventional moral views.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

SOCIAL AND EMOTIONAL DEVELOPMENT

We find delight in the beauty and happiness of children that makes the heart too big for the body.

RALPH WALDO EMERSON

Social relationships are crucial to us as children. When we are infants, our very survival depends on them. Later in life, they contribute to our feelings of happiness and satisfaction. In this section, we discuss many aspects of social development, including Erikson’s theory of psychosocial development, attachment, styles of parenting, and child abuse.

Erik Erikson’s Stages of Psychosocial Development

According to Erik Erikson, we undergo several stages of psychosocial development (see Table 10.4) ■ **Question 20: What are the stages of psychosocial development during childhood, according to Erikson?** During Erikson’s first stage, **trust versus mistrust**, we depend on our primary caregivers (usually our parents) and come to expect that our environments will—or will not—meet our needs. Toddlers through about the age of 3 are said to be in the stage of **autonomy versus shame and doubt**. During this period, their relationships with parents and friends can encourage the development of self-direction and initiative or feelings of shame and guilt. Children in this stage need to develop feelings of self-control over physical functions—such as toileting—and a sense

Table 10.4 ■ Erikson’s Stages of Psychosocial Development

Time Period	Life Crisis	The Developmental Task
Infancy (0–1)	Trust versus mistrust	Coming to trust the mother and the environment—to associate surroundings with feelings of inner goodness
Early childhood (1–3)	Autonomy versus shame and doubt	Developing the wish to make choices and the self-control to exercise choice
Preschool years (4–5)	Initiative versus guilt	Adding planning and “attacking” to choice, becoming active and on the move
Elementary school years (6–12)	Industry versus inferiority	Becoming eagerly absorbed in skills, tasks, and productivity; mastering the fundamentals of technology
Adolescence	Identity versus role diffusion	Connecting skills and social roles to formation of career objectives; developing a sense of who one is and what one stands for
Young adulthood	Intimacy versus isolation	Committing the self to another; engaging in sexual love
Middle adulthood	Generativity versus stagnation	Needing to be needed; guiding and encouraging the younger generation; being creative
Late adulthood	Integrity versus despair	Accepting the time and place of one’s life cycle; achieving wisdom and dignity

of independence from parents. One of the ways that many children demonstrate their growing autonomy, much to the dismay of their parents, is by refusing to comply with parental requests or commands. Erikson believed that children are in the stage of **initiative versus guilt** through about the age of 5, in which they begin to assert control over the environment and strive to master adult skills. Erikson labeled the years of about 6 to 12 the stage of **industry versus inferiority**, during which children meet academic and social challenges in school. A positive outcome contributes to a sense of industry, whereas setbacks can lead to feelings of inferiority. In Chapter 11, we will see that Erikson's theory includes four more stages and straddles the life span.

Attachment: Ties That Bind

At the age of 2, my daughter Allyn almost succeeded in preventing me from finishing a book. When I locked myself into my study, she positioned herself outside the door and called, "Daddy, oh Daddy." At other times, she would bang on the door or cry outside. When I would give in (several times a day) and open the door, she would run in and say, "I want you to pick up me" and hold out her arms or climb into my lap. Although we were separate human beings, it was as though she were very much *attached* to me. **Question 21: How do feelings of attachment develop?** What kinds of experiences affect attachment?

Psychologist Mary D. Salter Ainsworth (1913–1999) defined **attachment** as an emotional tie that is formed between one animal or person and another specific individual. Attachment keeps organisms together—it is vital to the survival of the infant—and it tends to endure. The behaviors that define attachment include (a) attempts to maintain contact or nearness and (a) displays of anxiety when separated. Babies and children try to maintain contact with caregivers to whom they are attached. They engage in eye contact, pull and tug at them, ask to be picked up, and may even jump in front of them in such a way that they will be "run over" if they are not picked up!

THE STRANGE SITUATION AND PATTERNS OF ATTACHMENT

The ways infants behave in strange situations are connected with their bonds of attachment with their caregivers. Given this fact, Ainsworth and her colleagues (1978) innovated the *strange situation method* to learn how infants respond to separations and reunions with a caregiver (usually the mother) and a stranger. Using this method, Ainsworth and her colleagues (1978) identified three major types of attachment: secure attachment and two types of insecure attachment.

1. **Secure attachment.** Securely attached infants mildly protest their mother's departure, seek interaction upon reunion, and are readily comforted by her.
2. **Avoidant attachment.** Infants who show avoidant attachment are least distressed by their mother's departure. They play by themselves without fuss and ignore their mothers when they return.
3. **Ambivalent/resistant attachment.** Infants with ambivalent/resistant attachment are the most emotional. They show signs of severe distress when their mother leaves and show ambivalence by alternatively clinging to and pushing their mother away when she returns.

Attachment is connected with the quality of care that infants receive. The parents of securely attached children are more likely to be affectionate and reliable caregivers (Posada et al., 2002). A wealth of research literature speaks of the benefits of secure attachment. Securely attached children are happier, more sociable with unfamiliar adults, and more cooperative with parents; they get along better with peers and are better adjusted in school than insecurely attached children (Belsky, 2006a; Spieker et al., 2003). Insecure attachment in infancy predicts psychological disorders during adolescence (Lee & Hankin, 2009; Sroufe, 1998; Steele, 2005).

STAGES OF ATTACHMENT

Ainsworth also studied phases in the development of attachment. She and her colleagues observed infants in many societies, including the African country of Uganda. She noted the efforts of infants to maintain contact with the mother, their protests when

Image not available due
to copyright restrictions

Trust versus mistrust Erikson's first stage of psychosexual development, during which children do—or do not—come to trust that primary caregivers and the environment will meet their needs.

Autonomy versus shame and doubt Erikson's second stage, during which children seek to develop control over physical functions and achieve a sense of independence.

Initiative versus guilt Erikson's third stage, during which children begin to assert control over the environment and obtain a sense of purpose. Children who try to exert too much power may run afoul of caregivers and develop feelings of guilt.

Industry versus inferiority The fourth stage in Erikson's theory, in which children confront new academic and social challenges in the school setting, leading successful children to develop a sense of competence, and children who fall short to develop feelings of inferiority.

Attachment The enduring affectional tie that binds one person to another.

separated from her, and their use of her as a base for exploring their environment. At first, infants show **indiscriminate attachment**. That is, they prefer being held or being with someone to being alone, but they show no preferences for particular people. Specific attachment to the primary caregiver begins to develop at about 4 months of age and becomes intense by about 7 months.

From studies such as these, Ainsworth identified three stages of attachment:

1. The **initial-preattachment phase**, which lasts from birth to about 3 months and is characterized by indiscriminate attachment.
2. The **attachment-in-the-making phase**, which occurs at about 3 or 4 months and is characterized by preference for familiar figures.
3. The **clear-cut-attachment phase**, which occurs at about 6 or 7 months and is characterized by intensified dependence on the primary caregiver.

John Bowlby (1988), a colleague of Mary Ainsworth, believed that attachment is also characterized by fear of strangers (“stranger anxiety”). That is, at about 8 to 10 months of age, children may cry and cling to their parents when strangers try to befriend them. But not all children develop fear of strangers. It therefore does not seem necessary to include fear of strangers as an essential part of the process of attachment.

THEORETICAL VIEWS OF ATTACHMENT

Early in the 20th century, behaviorists argued that attachment behaviors are learned through experience. Caregivers feed their infants and tend to their other physiological needs. Thus, infants associate their caregivers with gratification of needs and learn to approach them to meet their needs. The feelings of gratification associated with the meeting of basic needs generalize into feelings of security when the caregiver is present.

Classic research by psychologist Harry F. Harlow suggests that skin contact may be more important than learning experiences. Harlow noted that infant rhesus monkeys reared without mothers or companions became attached to pieces of cloth in their cages. They maintained contact with them and showed distress when separated from them. Harlow (1959) conducted a series of experiments to find out why.

In one study, Harlow placed infant rhesus monkeys in cages with two surrogate mothers, as shown in Figure 10.10 ■. One “mother” was made of wire mesh from which a baby bottle was extended. The other surrogate mother was made of soft, cuddly terry cloth. The infant monkeys spent most of their time clinging to the cloth mother, even though “she” did not gratify their need for food. Harlow concluded that monkeys—and perhaps humans—have an inborn need for **contact comfort** that is as basic as the need

Indiscriminate attachment Showing attachment behaviors toward any person.

Initial-preattachment phase The first phase in forming bonds of attachment, characterized by indiscriminate attachment.

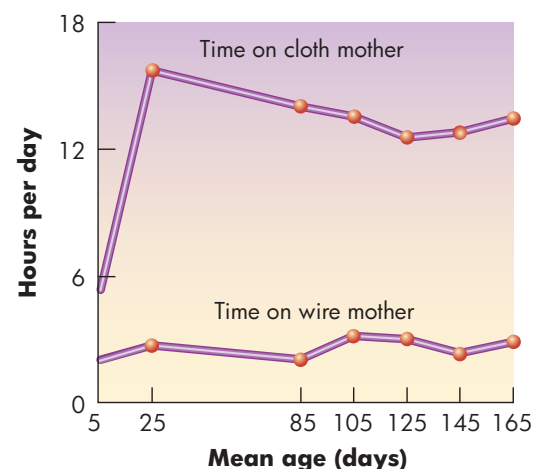
Attachment-in-the-making phase The second phase in forming bonds of attachment, characterized by preference for familiar figures.

Clear-cut-attachment phase The third phase in forming bonds of attachment, characterized by intensified dependence on the primary caregiver.

Contact comfort A hypothesized primary drive to seek physical comfort through contact with another.



Figure 10.10 ■ Attachment in Infant Monkeys Although this rhesus monkey infant is fed by the wire “mother,” it spends most of its time clinging to the soft, cuddly, terry cloth “mother.” It knows where to get a meal, but contact comfort is apparently more important than food in the development of attachment in infant monkeys (and infant humans?).



for food. Gratification of the need for contact comfort, rather than food, might be why infant monkeys (and humans) cling to their mothers.

Harlow and Zimmermann (1959) found that a surrogate mother made of terry cloth could also serve as a comforting base from which an infant monkey could explore its environment (see Figure 10.11) ■. Toys such as stuffed bears and oversized wooden insects were placed in cages with infant rhesus monkeys and their surrogate mothers. When the infants were alone or had wire surrogate mothers for companions, they cowered in fear as long as the “bear monster” or “insect monster” was present. But when the terry cloth mothers were present, the infants clung to them for a while and then explored the intruding “monster.” With human infants, too, the bonds of mother–infant attachment appear to provide a secure base from which infants feel encouraged to express their curiosity.

Other researchers, such as ethologist Konrad Lorenz, note that for many animals, attachment is an instinct—inborn. **Ethologists** study the behavioral characteristics of various species of animals. Attachment, like other instincts, is theorized to occur in the presence of a specific stimulus and during a **critical period** of life—that is, a period during which the animal is sensitive to the stimulus.

Some animals become attached to the first moving object they encounter. The unwritten rule seems to be, “If it moves, it must be Mother.” It is as if the image of the moving object becomes “imprinted” on the young animal. The formation of an attachment in this manner is therefore called **imprinting**.

Lorenz (1981) became well known when pictures of his “family” of goslings were made public (see Figure 10.12) ■. How did Lorenz acquire his following? He was present when the goslings hatched and during their critical period, and he allowed them to follow him. The critical period for geese and some other animals is bounded, at the younger end, by the age at which they first walk and, at the older end, by the age at which they develop fear of strangers. The goslings followed Lorenz persistently, ran to him when they were frightened, honked with distress at his departure, and tried to overcome barriers between them. If you substitute crying for honking, it all sounds rather human.

Ainsworth and Bowlby (1991) consider attachment to be instinctive—that is, a process that is inborn—in humans. However, among humans, attachment is relatively less mechanical—less likely to be related to issues such as locomotion and fear of strangers (which is not experienced by all humans). Moreover, as shown when people adopt children who are in early childhood or older, a “critical period” with humans would be quite extended. That is, children are not limited to developing strong attachments in infancy, and parents are not limited to developing attachments to some specified amount of time following childbirth.

Another issue in social and emotional development is parenting styles. Parental behavior not only contributes to the development of attachment but also to the development of self-esteem, self-reliance, achievement motivation, and competence.

Parenting Styles: Strictly Speaking?

Many psychologists have studied the relationships between parenting styles and the personality development of the child. **Question 22: What types of parental behavior are connected with outcomes such as self-esteem, achievement**



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Figure 10.11 ■ Security With its terry cloth surrogate mother nearby, this infant rhesus monkey apparently feels secure enough to explore the “bear monster” placed in its cage. But infants with wire surrogate mothers or no mother all cower in a corner when such monsters are introduced.

Ethologist A scientist who studies the characteristic behavior patterns of species of animals.

Critical period In the development of attachment, a period of time when an instinctive response can be elicited by a particular stimulus.

Imprinting A process occurring during a critical period in the development of an organism, in which that organism responds to a stimulus in a manner that will afterward be difficult to modify.

Figure 10.12 ■ Konrad Lorenz and His Family of Geese Lorenz may not look like Mommy to you, but these goslings became attached to him because he was the first moving object they perceived and followed after they hatched. This type of attachment process is termed imprinting.



© Nina Leary/Time Life Pictures/Getty Images

I don't think my parents liked
me. They put a live teddy bear
in my crib.

WOODY ALLEN

Children begin by loving their
parents; as they grow older they
judge them; sometimes they
forgive them.

OSCAR WILDE

Instrumental competence Ability to manipulate one's environment to achieve one's goals.

Authoritative parents Parents who are strict and warm. Authoritative parents demand mature behavior but use reason rather than force in discipline.

Authoritarian parents Parents who are rigid in their rules and who demand obedience for the sake of obedience.

Permissive parents Parents who impose few, if any, rules and who do not supervise their children closely.

Uninvolved parents Parents who generally leave their children to themselves.

Table 10.5 ■ Parenting Styles

Style of Parenting	Restrictiveness	Parental Behavior		
		Demands for Mature Behavior	Communication	Warmth and Support
Authoritative	High (use of reasoning)	High	High	High
Authoritarian	High (use of force)	Moderate	Low	Low
Permissive	Low (easygoing)	Low	Low	High
Uninvolved	Low (uninvolved)	Low	Low	Low

Note: Research suggests that the children of authoritative parents develop as the most competent.

motivation, and independence in children? Diana Baumrind (1989, 2005) and her colleagues have been particularly interested in the connections between parental behavior and the development of *instrumental competence* in their children. **Instrumental competence** refers to the ability to manipulate the environment to achieve one's goals. Baumrind has largely focused on four aspects of parental behavior: (a) strictness; (b) demands for the child to achieve intellectual, emotional, and social maturity; (c) communication ability; and (d) warmth and involvement. She labeled the three most important parenting styles as *authoritative*, *authoritarian*, and *permissive*. Other researchers have identified and studied the *uninvolved* style. The four parenting styles are:

- **Authoritative parents.** The parents of the most competent children rate high in all four areas of behavior (see Table 10.5) ■. They are strict (restrictive) and demand mature behavior. However, they temper their strictness and demands with willingness to reason with their children and with love and support. They expect a lot, but they explain why and offer help. Baumrind labeled these parents **authoritative parents** to suggest that they know what they want but also love and respect their children.
- **Authoritarian parents.** **Authoritarian parents** view obedience as a virtue to be pursued for its own sake. They have strict guidelines about what is right and wrong, and they demand that their children follow those guidelines. Both authoritative and authoritarian parents adhere to strict standards of conduct. However, authoritative parents explain their demands and are supportive, whereas authoritarian parents rely on force and communicate poorly with their children. Authoritarian parents do not respect their children's points of view, and they may be cold and rejecting. When their children ask them why they should behave in a certain way, authoritarian parents often answer, "Because I say so!"
- **Permissive parents.** **Permissive parents** are generally easygoing with their children. As a result, the children do pretty much whatever they wish. Permissive parents are warm and supportive but poor at communicating.
- **Uninvolved parents.** **Uninvolved parents** tend to leave their children on their own. They make few demands and show little warmth or encouragement.

Research shows that the children of warm parents are more likely to be socially and emotionally well adjusted (Lau et al., 2006; Murray et al., 2009). They are also more likely to internalize moral standards—that is, to develop a conscience (Bender et al., 2007; Lau et al., 2006).

Strictness seems to pay off, provided it is tempered with reason and warmth. Children of *authoritative* parents have greater self-reliance, self-esteem, social competence, and achievement motivation than other children (Grusec, 2006). Children of *authoritarian* parents are often withdrawn or aggressive and usually do not do as well in school as children of authoritative parents (Paulussen-Hoogeboom et al., 2007; Rudy & Grusec, 2006). Children of permissive parents seem to be the least mature. They are often impulsive, moody, and aggressive. In adolescence, lack of parental monitoring is often linked to delinquency and poor academic performance. Children of uninvolved parents tend to obtain poorer grades than children whose parents make demands on them (Ginsburg & Bronstein, 1993). The children of uninvolved parents also tend to be more likely to

hang out with crowds who party a good deal and use drugs (Durbin et al., 1993). The message? Simple enough: Children appear to profit when their parents make reasonable demands, show warmth and encouragement, and spend time with them.

Child Abuse: Broken Bonds

The incidence of child abuse is underreported, but it is estimated that nearly 3 million children in the United States are neglected or abused by parents or other caregivers each year (Kaiser & Miller-Perrin, 2009; Runyan et al., 2009). More than half a million suffer serious injuries; thousands die. **Question 23: What factors are associated with child abuse?**

Many factors contribute to child abuse: stress, acceptance of violence as a way of coping with stress, failure to become attached to the children, substance abuse, and rigid attitudes toward child rearing (Babb et al., 2009; S. J. Lee et al., 2009). Unemployment and low socioeconomic status are common stressors that lead to abuse (Strathern et al., 2009).

Children who are abused are quite likely to develop personal and social problems and psychological disorders (Kaiser & Miller-Perrin, 2009). They are less likely than other children to venture out to explore the world. They are more likely to have psychological problems such as anxiety, depression, conduct disorders, low self-esteem, and substance abuse (H. W. Wilson & Widom, 2009). As adults, they are more likely to be violent toward their dates and spouses.

Many children are also victims of sexual abuse. The effects of child sexual abuse are variable, and it does not appear that there is a single identifiable syndrome that results from such abuse (Saywitz et al., 2000). Nevertheless, the research literature shows that sexually abused children are more likely to develop physical and psychological health problems than unabused children (Saywitz et al., 2000). Child sexual abuse can also have lasting effects on children's relationships once they become adults.

Research shows that child abuse runs in families to some degree (Belsky et al., 2009; Conger et al., 2009). **Truth or Fiction Revisited:** It is true that child abusers were frequently abused themselves as children. That is, child abusers are more likely to have been abused than the general population. Even so, *most children who are abused do not abuse their own children as adults* (Conger et al., 2009).

When abuse does run in families, why does it do so? There are several hypotheses. One is the generalization that child abuse is part of a poor parenting environment and that children reared in such an environment are less likely to have resources later on that contribute to a better parenting environment (Belsky et al., 2009). Another is that parents serve as role models. According to sociologist Murray Straus (1995), spanking teaches children that the thing to do when other people are doing something you don't like is to hit them, especially if they don't stop when you ask them to. A third is that children adopt parents' strict philosophies about discipline. Exposure to violence in their own home leads some children to view abuse as normal. A fourth is that being abused can create feelings of hostility that are then expressed against others, including one's own children (Conger et al., 2009).

— ■ —
*Insanity is hereditary; you get it
from your children.*

SAM LEVENSON
— ■ —

LearningConnections • SOCIAL AND EMOTIONAL DEVELOPMENT

ACTIVE REVIEW (28) Erikson presents a theory of _____ development. (29) Ainsworth identified three stages of attachment: The _____ phase, which is characterized by indiscriminate attachment, the attachment-in-the-making phase, and the clear-cut-attachment phase. (30) The Harlow studies with monkeys suggest that _____ comfort is more important than conditioning in the development of attachment. (31) Ethologists argue that attachment is a(n) _____ that occurs during a critical period. (32) Baumrind labeled the three most important parenting styles _____, authoritarian, and permissive.

REFLECT AND RELATE Would you say that your caregivers were basically authoritative, authoritarian, or permissive? What do you believe were the effects of their parenting style on you?

CRITICAL THINKING Which aspects of child development provide evidence for the concept of stages of development?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections DAY CARE: BLESSING, HEADACHE, OR BOTH?

Seeking a phrase that can strike fear in the hearts of millions of American parents? Try *day care*. Only a relatively small percentage of American families still fit the conventional model where the father works and the mother stays at home and cares for the children. Nowadays, most mothers, including those with infants, are in the workforce (Carey, 2007a). As a result, millions of American parents are obsessed with finding proper day care. In fact, according to the Children's Defense Fund (in Carey, 2007a), of the more than 10 million American children under the age of 5, more than 20% are cared for in day-care centers.

How Does Day Care Affect Bonds of Attachment?

It has been shown that children become attached to their caregivers in day care, especially when the number of children per day-care worker is small and the day-care center provides a stimulating environment (De Schipper et al., 2008). Many parents wonder whether attachment is a “zero sum game” so that attachment to day-care caregivers might affect their children's attachment to them. Are such concerns valid? This issue has been hotly debated. Some studies have found that infants who are in full-time day care are more likely than children in part-time day care or children cared for in the home to show insecure attachment (Aviezer & Sagi-Schwartz, 2008; Brandtjen & Verny, 2001). Some psychologists conclude that a mother who works full time puts her infant at risk for developing emotional insecurity (Belsky, 1990a, 1990b). Others note that infants whose mothers work may be less distressed by her departure in the strange situation and less likely to seek her out when she returns—thus perhaps providing the appearance of being less securely attached. Also keep in mind that the likelihood of insecure attachment is not much greater in infants placed in day care than in those cared for in the home. Most infants in both groups are securely attached (Timmerman, 2006).

How Does Day Care Influence Social, Emotional, and Cognitive Development?

Day care has mixed effects on children's social, emotional, and cognitive development. Infants with day-care experience are more peer oriented and play at higher developmental levels than do home-reared infants. Children in day care are more likely to share their toys. They are more independent, self-confident, outgoing, and affectionate as well as more helpful and cooperative with peers and adults (Belsky et al., 2007). Participation in day care also is associated with better school performance during the elementary school years (Belsky, 2006b).

Yet there are suggestions that day care can be stressful, especially for younger children. Harriet Vermeer and Marinus van IJzendoorn (2006) reviewed nine studies that assessed children's cortisol levels in day-care centers. Cortisol is a stress hormone, and an increased cortisol level suggests that the child is being exposed to stress. The researchers' key finding was that children display higher cortisol levels in the day-care setting than they do in the home. Cortisol levels increased throughout the day at day-care centers, possibly because of children's stressful interactions with other children and caregivers. There was no relationship between cortisol levels and the quality of care. Age was a significant factor in cortisol levels in day-care centers; secretion of cortisol was especially high in children below 36 months of age.

The NICHD Study

An ongoing study funded by the National Institute on Child Health and Human Development (NICHD) compared the development of children in high-quality day care with that of children in low-quality day care and with that of children reared in the home by their mothers. The quality of day care was defined in terms of the richness of the learning environment (availability of toys, books, and other materials), the ratio of caregivers to children (high quality meant more caregivers), the amount of indi-

vidual attention received by the child (more was better), and the extent to which caregivers talked to the children and asked them questions (again, more was better). The researchers found that high-quality day care resulted in scores on tests of language and cognitive skills that rivaled or exceeded those of children reared in the home by their mothers (Belsky, 2006b; Thompson, 2008).

Yet the NICHD study also reveals that children placed in day care may be less cooperative and more aggressive toward peers and adults than children who are reared in the home. For example, the more time preschoolers spent in day care, the more likely they were to display behavioral problems in kindergarten (Belsky, 2001). The more time spent away from their mothers, the more likely they were to be rated as defiant, aggressive, and disobedient once they got to kindergarten. **Truth or Fiction Revisited:** It therefore appears to be true that children who attend day-care programs behave more aggressively than children who do not.

Of children who were in child care for more than 30 hours a week, 17% received higher scores on rating items such as “gets in lots of fights,” “cruelty,” “talking too much,” “explosive behavior,” “argues a lot,” and “demands a lot of attention.” Only 6% of children who were in child care for fewer than 10 hours a week had these problems.

However, children who were raised at home—by a grandmother, by a nanny, even by their fathers—also received the troublesome ratings. Was Mom the only answer?

The study held some good news. For example, it found that children who are enrolled in high-quality child care show cognitive benefits compared with children who are in lower-quality day care or who spend more time in the home with their mothers.

Although the study found a connection between time spent away from mothers and aggression, disobedience, and defiance in kindergarten, the reasons for these problems were not clear. For example, was it the time spent away from

mothers that brought on the problems, or did the problems stem from other factors, such as the stresses encountered by families who need two incomes?

A number of the researchers on the team added that if other information yielded by the study had been presented, the reaction might have been different. Note the following:

- Although 17% of kindergartners who had been in child care acted more assertively and aggressively, that percentage is actually the norm for the general population of children. (And 9% of the children who spent most of their time with their mothers were also rated by teachers as showing the more troubling behaviors.)
- The nature of family–child interactions had a greater effect on children’s behavior than the number of hours spent in child care.
- Some aspects of aggression—and the fact that infants in day care may demand more attention as kindergartners—may be adaptive responses to being placed in a situation where many children are competing for limited resources.

In addition, the researchers admitted that the statistics are modest: Yes, 17% acted aggressively and assertively, but only a few exhibited above-average behavior problems. Moreover, the problems were not that serious.

The Latest Shoe to Drop on Day Care from the NICHD

Just when parents were sort of forgetting about the NICHD study reported in 2001, which indicated that 17% of children who were in child care for more than 30 hours a week behaved more aggressively in school than children cared for in the home, along came the 2007 report, which underscored the idea. In the more recent report, according to teacher ratings, once children who were in day care are in school, they are significantly more likely than children cared for in the home by parents or relatives to interrupt in class and to tease or bully other children (Belsky, 2009; Belsky et al., 2007). As in the study reported in 2001 (Belsky, 2001; Thompson, 2008), the degree of disturbance

generally remained “within normal limits.” That is, the children who had been in day care could not be labeled criminals and were not being expelled or spending their days in the principal’s office. Nevertheless, their conduct—as a group—was measurably different.

The quality of the day-care center made no difference in the more current data.

Children from high-quality day-care centers were also more likely to be disruptive than children cared for in the home (Belsky, 2009). Moreover, the difference lasted through elementary school.

In any case, millions of parents do not have the option of deciding whether to place their children in day care; their only choice is which day-care center. (And some parents, given their financial and geographical circumstances, might not even have such a choice.) The following information about finding child care may help guide you to make the choice that is right for you.

Finding Child Care You (and Your Child) Can Live With

It is normal to be anxious. You are thinking about selecting a day-care center or a private home for your child, and there are risks. Despite anxiety, you can go about the task with a checklist that can guide your considerations. Above all: Don’t be afraid to ask questions, even pointed, challenging questions. If the day-care provider does not like questions or if the provider does not answer them satisfactorily, you want your child someplace else. So much for the preamble. Here’s the checklist.

1. Does the center have a license?
2. How many children are cared for at the center? How many caregivers are there? It is important for caregivers not to be overburdened by too many children, especially infants.
3. How were the caregivers hired? How were they trained? Did the center check references? What were the minimum educational credentials? Do the caregivers attempt to engage the children in activities



© AP Photo/Imperial Valley Press, Guadalupe Behran

Children in Day Care High-quality day care often has a positive influence on children’s cognitive development.

and educational experiences, or are they inactive unless a child cries or screams?

4. Is the environment childproof and secure? Can children stick their fingers in electric sockets? Are toys and outdoor equipment in good condition? Can anybody walk in off the street? What is the history of children being injured or otherwise victimized in this day-care center? When are meals served? Snacks? What do they consist of? Will your child find them appetizing or go hungry?
5. Is it possible for you to meet the caregivers who will be taking care of your child? If not, why not?
6. Does the center seem to have an enriching environment? Do you see books, toys, games, and educational objects strewn about?
7. Are there facilities and objects such as swings and tricycles that will enhance your child’s physical and motor development? Are children supervised when they play with these things or left on their own?
8. Does the center’s schedule coincide with your needs?
9. Is the center located conveniently? Does it appear to be in a safe location or have adequate security arrangements?
10. Are parents permitted to visit unannounced?
11. Do you like the overall environment and feel of the center or home?

Most important, listen to your “gut” and choose the center that feels best to you.

How Psychologists Study Human Development

1. How do researchers study development over time?

In longitudinal research, the same people are observed repeatedly over time. In cross-sectional research, people of different ages are observed and compared.

Prenatal Development: The Beginning of Our Life Story

2. What developments occur from conception through birth?

Prenatal development occurs in stages. During the germinal stage, the zygote divides as it travels through the Fallopian tube and becomes implanted in the uterus. The major organ systems are formed during the embryonic stage; the fetal stage is characterized by maturation and gains in size.

3. Does it matter when, during pregnancy, a woman is exposed to a teratogen?

Yes, there are “critical periods” during which certain organ systems are most vulnerable to teratogens.

4. What are the effects of maternal health problems on the embryo and fetus?

Women who contract rubella may bear children who suffer from deafness, mental retardation, heart disease, or cataracts. Syphilis can cause miscarriage, stillbirth, or congenital syphilis. Toxemia is connected with preterm or undersized babies. In Rh incompatibility, antibodies produced by the mother can cause brain damage or death in the fetus.

5. What are the effects of drugs taken by the mother on prenatal development?

Thalidomide causes missing or stunted limbs in babies. Tetracycline can cause yellowed teeth and bone problems. DES leads to risk of cancer. High doses of vitamins A and D are associated with nervous system damage and heart defects. Maternal addiction to narcotics is linked to low birthweight, prematurity, and toxemia. Marijuana may cause tremors and startling in babies. Cocaine increases the risk of stillbirth, low birthweight, and birth defects. Maternal use of alcohol is linked to fetal alcohol syndrome (FAS). Maternal smoking is linked with low birthweight, stillbirth, and mental retardation.

6. What are the effects of environmental hazards during pregnancy?

Prenatal exposure to heavy metals threatens cognitive development. Prenatal exposure to PCBs is connected with babies who are smaller, less responsive, and more likely to develop cognitive deficits.

In the New World

7. What are reflexes?

Reflexes are inborn responses to stimuli that in many cases are essential to the survival of the infant.

8. How well do neonates see, hear, and so on?

Neonates are nearsighted. Hearing develops well prior to birth. Neonates prefer pleasant odors and sweet foods.

9. What patterns of sleep are found among neonates?

Neonates spend most of their time sleeping. The percentage of time spent sleeping declines during childhood, largely because of a decrease in REM sleep.

10. Why do babies cry?

Babies cry because of fatigue, hunger, thirst, and pain.

11. What can I do to stop an infant from crying?

Physical contact and soft, low voices are soothing to infants. Sucking also seems to function as a built-in tranquilizer.

12. What is sudden infant death syndrome (SIDS)?

SIDS apparently strikes while the baby is sleeping. Risk factors include maternal smoking during pregnancy.

Physical Development: The Drama Continues

13. What physical developments occur during childhood?

The brain gains in size and weight through prenatal development and childhood, mainly by proliferating dendrites and axon terminals and by myelination. The prefrontal part of the cerebral cortex shows dramatic developments middle childhood. The motor development of the child involves the interaction of maturation and experience. Newborn babies show greater interest in complex visual stimuli. Infants are capable of depth perception by the time they can crawl.

14. How do nature and nurture affect the development of the brain?

Sensory and motor areas of the brain begin to develop because of maturation, but sensory stimulation and motor activity also spur development.

15. What are some key motor and perceptual developments during childhood?

Locomotion develops in an invariant sequence. Motor skills develop with myelination of the brain.

16. Does development occur gradually or in stages?

Stage theorists like Freud and Piaget view development as discontinuous. Learning theorists tend to view psychological development as more continuous. There is controversy as to whether cognitive development is continuous or discontinuous.

Cognitive Development: On the Edge of Reason?

17. What are Jean Piaget’s views of cognitive development?

Piaget defined intelligence as involving assimilation and accommodation. Piaget’s view of cognitive development includes four stages: sensorimotor, preoperational, concrete-operational, and formal-operational.

18. What are the key concepts of Vygotsky’s theory of cognitive development?

Vygotsky’s key concepts include the zone of proximal development (ZPD) and scaffolding.

19. How do children reason about right and wrong, according to Kohlberg?

Lawrence Kohlberg hypothesized that children’s moral reasoning develops through the preconventional, conventional, and postconventional levels, each of which has two stages.

Social and Emotional Development

20. What are the stages of psychosocial development during childhood, according to Erikson?

Erikson hypothesizes that there are eight stages of psychosocial development. Each represents a life crisis. The first of these is “trust

versus mistrust,” when the child hopefully learns that the world is a good place that can meet his or her needs.

21. How do feelings of attachment develop?

According to Ainsworth, there are three stages of attachment: the initial-preattachment phase, the attachment-in-the-making phase, and the clear-cut-attachment phase. Harlow’s studies with rhesus monkeys suggest that an innate motive, contact comfort, is a key to attachment. There are critical developmental periods during which animals such as geese and ducks become imprinted on an object that they follow.

22. What types of parental behavior are connected with outcomes such as self-esteem, achievement motivation, and independence in children?

Styles of parental behavior include the authoritative, authoritarian, and permissive styles. The children of authoritative parents are most achievement oriented and best adjusted.

23. What factors are associated with child abuse?

Situational stress, a history of child abuse in at least one caregiver’s family of origin, and unrealistic expectations contribute to the risk of child abuse.

KEY TERMS

Accommodation (p. 364)	Critical periods (in prenatal development) (p. 346)	Preconventional level (p. 371)
Alpha-fetoprotein (AFP) assay (p. 353)	Cross-sectional research (p. 342)	Premature (p. 347)
Amniocentesis (p. 352)	Decentration (p. 368)	Preoperational stage (p. 366)
Amniotic sac (p. 345)	DES (p. 348)	Progestin (p. 347)
Androgens (p. 344)	Egocentrism (p. 366)	Reflex (p. 355)
Animism (p. 366)	Embryonic stage (p. 344)	Reversibility (p. 368)
Artificialism (p. 366)	Ethologist (p. 375)	Rh incompatibility (p. 347)
Assimilation (p. 363)	Fetal alcohol syndrome (p. 348)	Rooting (p. 356)
Attachment (p. 373)	Fetal stage (p. 345)	Rubella (p. 347)
Attachment-in-the-making phase (p. 374)	Fixation time (p. 362)	Scaffolding (p. 369)
Authoritarian parents (p. 376)	Germinal stage (p. 344)	Schema (p. 363)
Authoritative parents (p. 376)	HIV (p. 347)	Sensorimotor stage (p. 365)
Autonomy versus shame and doubt (p. 372)	Imprinting (p. 375)	Stillbirth (p. 346)
Center (p. 367)	Indiscriminate attachment (p. 374)	Subjective moral judgment (p. 368)
Chorionic villus sampling (CVS) (p. 353)	Industry versus inferiority (p. 373)	Syphilis (p. 347)
Clear-cut-attachment phase (p. 374)	Initial-preattachment phase (p. 374)	Teratogens (p. 346)
Cohort effect (p. 343)	Initiative versus guilt (p. 373)	Thalidomide (p. 347)
Concrete-operational stage (p. 368)	Instrumental competence (p. 376)	Toxemia (p. 347)
Congenital (p. 347)	Longitudinal research (p. 342)	Trust versus mistrust (p. 372)
Conservation (p. 367)	Maturation (p. 344)	Ultrasound (p. 353)
Contact comfort (p. 374)	Neonate (p. 344)	Umbilical cord (p. 345)
Conventional level (p. 371)	Object permanence (p. 365)	Uninvolved parents (p. 376)
Critical period (in development of attachment) (p. 375)	Objective responsibility (p. 367)	Uterus (p. 353)
	Period of the ovum (p. 344)	Zone of proximal development (ZPD) (p. 369)
	Permissive parents (p. 376)	Zygote (p. 344)
	Placenta (p. 345)	

ACTIVE LEARNING RESOURCES



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11

The Voyage Through the Life Span: Adolescence and Adulthood



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MAJOR TOPICS

Adolescence
Emerging Adulthood
Early Adulthood
Middle Adulthood
Late Adulthood
On Death and Dying

FEATURES

Controversy in Psychology: Are There Gender Differences in Moral Development?
A Closer Look—Real Life: Social Networking Online
Concept Review: James Marcia's Four Identity Statuses
A Closer Look—Diversity: Ethnicity and Development of Identity
Controversy In Psychology: Do Parents Experience an "Empty-Nest Syndrome"
When the Youngest Child Leaves Home?
A Closer Look—Diversity: Aging, Gender, and Ethnicity
Self-Assessment: How Long Will You Live? The Life-Expectancy Scale
Life Connections: Lifestyles of the Rich and Famous—and the Rest of Us

TRUTH OR FICTION?

- T F** It is normal for male adolescents to think of themselves as action heroes and to act as though they are made of steel.
- T F** Adolescents are in a constant state of rebellion against their parents.
- T F** Piaget proposed a fifth stage of cognitive development: the postformal stage.
- T F** Scores on the verbal subtests of standardized intelligence tests can increase for a lifetime.
- T F** Architect Frank Lloyd Wright designed New York's innovative spiral-shaped Guggenheim Museum when he was 65 years old.
- T F** Dementia is a normal part of aging.
- T F** Most parents suffer from the “empty-nest syndrome” when their youngest child leaves home.
- T F** College-educated women experience increased personal distress as they advance from middle adulthood to late adulthood.
- T F** “Successful aging” involves accepting one's limitations and avoiding new challenges.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

What am I like as a person? Complicated! I'm sensitive, friendly and outgoing, though I can also be shy, self-conscious, and even obnoxious. I'd like to be friendly and tolerant all of the time. That's the kind of person I want to be, and I'm disappointed when I'm not. I'm responsible, even studious every now and then, but on the other hand I'm a goof-off too, because if you're too studious, you won't be popular. I'm a pretty cheerful person, especially with my friends, where I can even get rowdy. But I'm usually pretty stressed-out at home, or sarcastic, since my parents are always on my case. They expect me to get all A's. It's not fair! I worry about how I probably should get better grades. But I'd be mortified in the eyes of my friends. Sometimes I feel phony, especially around boys. Say I think some guy might be interested in asking me out. I try to act different, like Madonna. I'll be flirtatious and fun-loving. And then everybody else is looking at me like they think I'm totally weird! Then I get self-conscious and embarrassed and become radically introverted, and I don't know who I really am! But I don't really care what they think anyway. I just want to know what my close friends think. I can be my true self with my close friends. I can't be my real self with my parents. They don't understand me. They treat me like I'm still a kid. That gets confusing, though. I mean, which am I, a kid or an adult? It's scary, too, because I don't have any idea what I want to be when I grow up. I mean, I have lots of ideas. My friend Sheryl and I talk about whether we'll be teachers, or lawyers, veterinarians, maybe mothers. I know I don't want to be a waitress or a secretary. But how do you decide all of this? I mean, I think about it a lot, but I can't resolve it.

—Adapted from Harter, 1990, pp. 352–353

This self-description of a 15-year-old girl illustrates a key aspect of the adolescent years: the search for an answer to the question “Who am I?” She is struggling to reconcile contradictory traits and behaviors to determine the “real me.” She is preoccupied not only with her present self but also with what she wants to become. What were your concerns at this age?

Perhaps no other period of life is as exciting—and as bewildering—as adolescence. Except for infancy, more changes occur during adolescence than during any other time of life, and that is where we begin our chapter. Yet there are also noteworthy changes that occur throughout our lifetimes, and this chapter focuses on those as well. We will see that many developmental psychologists find it useful to speak of early adulthood, middle adulthood, and late adulthood. Within each phase of life, we organize our coverage of adulthood into physical, cognitive, social, and emotional developments. We'll also examine what we can consider to be a new stage of development: emerging adulthood.

ADOLESCENCE

In our society, adolescents are “neither fish nor fowl,” as the saying goes—neither children nor adults. Adolescents may be old enough to reproduce and are as large as their parents, yet they are required to remain in school through age 16, they may not be allowed to get drivers’ licenses until they are 16 or 17, and they cannot attend R-rated films unless accompanied by an adult. Given the restrictions placed on adolescents, their growing yearning for independence, and a sex drive heightened by high levels of sex hormones, it is not surprising that adolescents occasionally are in conflict with their parents.

This section further chronicles human development with the changes of adolescence. **Adolescence** is a time of transition from childhood to adulthood. Like childhood, adolescence entails physical, cognitive, social, and emotional changes. Let’s begin with physical changes.

Physical Development: Fanning the Flames

Following infancy, children grow about 2 to 3 inches a year. Weight gains also remain fairly even at about 4 to 6 pounds per year. **Question 1: What physical developments occur during adolescence?** One of the most noticeable physical developments of adolescence is a growth spurt. The adolescent growth spurt lasts for 2 to 3 years and ends the stable patterns of growth in height and weight that characterize most of childhood. Within this short span of years, adolescents grow some 8 to 12 inches. Most boys wind up taller and heavier than most girls.

In boys, the weight of the muscle mass increases notably. The width of the shoulders and circumference of the chest also increase. Adolescents may eat enormous quantities of food to fuel their growth spurt. Adults fighting the “battle of the bulge” stare at them in wonder as they wolf down french fries and shakes at the fast-food counter and later go out for pizza.

PUBERTY: MORE THAN “JUST A PHASE”?

Puberty is the period during which the body becomes sexually mature. It heralds the onset of adolescence. Puberty begins with the appearance of **secondary sex characteristics** such as body hair, deepening of the voice in males, and rounding of the breasts and hips in females. In boys, pituitary hormones stimulate the testes to increase the output of testosterone, which in turn causes enlargement of the penis and testes and the appearance of body hair. By the early teens, erections become common, and boys may ejaculate (see Figure 11.1 ■). Ejaculatory ability usually precedes the presence of mature sperm by at least a year. Ejaculation thus is not evidence of reproductive capacity.

In girls, a critical body weight in the neighborhood of 100 pounds is thought to trigger a cascade of hormonal secretions in the brain that cause the ovaries to secrete higher levels of the female sex hormone, estrogen (Frisch, 1997). Estrogen stimulates the growth of breast tissue and fatty and supportive tissue in the hips and buttocks. Thus, the pelvis widens, rounding the hips. Small amounts of androgens produced by the adrenal glands, along with estrogen, spur the growth of pubic and underarm hair (see Figure 11.2 ■). Estrogen and androgens together stimulate the development of female sex organs. Estrogen production becomes cyclical during puberty and regulates

the menstrual cycle. The beginning of menstruation, or **menarche**, usually occurs between the ages of 11 and 14. Girls cannot become pregnant until they begin to ovulate, however, and ovulation may begin as much as 2 years after menarche.

BRAIN DEVELOPMENT

What happens to the brains of adolescents who spend hours a day practicing the piano or the violin? Their learning translates physically into increases in the thickness of the parts of the cerebral cortex that are

Adolescence The period of life bounded by puberty and the assumption of adult responsibilities.

Puberty The period of physical development during which sexual reproduction first becomes possible.

Secondary sex characteristics Characteristics that distinguish the genders, such as distribution of body hair and depth of voice, but that are not directly involved in reproduction.

Menarche The beginning of menstruation.

Unlike infants whose brain activity is completely determined by their parents and environment, [adolescents] may actually be able to control how their own brains are wired and sculpted This argues for doing a lot of things as a teenager You are hard-wiring your brain in adolescence. Do you want to hard-wire it for sports and playing music and doing mathematics or for lying on the couch in front of the television?

NEUROSCIENTIST JAY GIEDD OF THE NIMH

Figure 11.1 ■ Stages of Pubertal Development in Males

Boys usually start to show the physical changes of puberty between the ages of 11 and 14, which is slightly older than when girls start puberty. The male sex hormone called testosterone and other hormones cause the physical changes.

Here are the five stages and what happens:

Stage	Characteristics
<p>Stage 1: May begin as early as age 9 and continue until 14.</p>	<ul style="list-style-type: none"> • No sign of physical development but hormone production is beginning.
<p>Stage 2: May begin anywhere from ages 11 to 13.</p>	<ul style="list-style-type: none"> • Height and weight increase rapidly. • Testicles become larger and scrotum hangs lower. • Scrotum becomes darker in color. • Fine hair growth begins at the base of the penis. • Hair growth may begin on the legs and underarms.
<p>Stage 3: May begin anywhere from ages 12 to 14.</p>	<ul style="list-style-type: none"> • The penis, scrotum, and testicles grow. • Pubic hair becomes darker, thicker, and curlier. • Muscles become larger and shoulders become broader. • Sweat and oil glands become more active, which can result in acne. • Sperm production may begin. • Temporary swelling and tenderness may occur around nipples. • Height and weight continue to increase. • Hair growth on the legs and underarms continues.
<p>Stage 4: May begin anywhere from ages 13 to 16.</p>	<ul style="list-style-type: none"> • Sperm production has usually begun. • The larynx (Adam’s apple) increases in size. Vocal chords become longer and thicker, and the voice begins to break or crack, then becomes low. • Height and weight continue to increase. • Penis and testicles continue to grow. • Pubic hair increases in amount and becomes darker, coarser, and curly.
<p>Stage 5: May begin anywhere from ages 14 to 18.</p>	<ul style="list-style-type: none"> • Growth of facial hair begins. • Chest hair growth may begin (not all males get much chest hair). • Adult height is reached. • Penis and testicles have reached full adult size. • Pubic, underarm, and leg hair are adult color, texture, and distribution. • Overall look is that of a young adult man.



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Last revised: March 27, 2009

Source: U.S. Department of Health and Human Services (2009). Sexual development of boys. (Accessed September 29, 2010). http://www.4parents.gov/sexdevt/boysmen/boys_sexdevt/index.html

Figure 11.2 ■ Stages of Pubertal Development in Females

Girls usually start to show the physical changes of puberty between the ages of 9 and 13, which is slightly sooner than boys. The female sex hormone called estrogen and other hormones cause the physical changes. Many girls are fully developed by the age of 16. Some girls will continue to develop through age 18. Here are the five stages and what happens:

Stage	Characteristics
Stage 1: Between ages 8 to 12	<ul style="list-style-type: none"> • No visible signs of physical development. But the ovaries are enlarging and hormone production is beginning.
Stage 2: May begin anywhere from ages 8 to 14.	<ul style="list-style-type: none"> • Height and weight increase rapidly. • Fine hair growth begins close to the pubic area and underarms. • Breast buds appear; nipples become raised and this area may be tender. • Sweat and oil glands become more active, which can result in acne.
Stage 3: May begin anywhere from ages 9 to 15.	<ul style="list-style-type: none"> • Breasts become rounder and fuller. • Hips may start to widen in relation to waist. • Vagina begins secreting a clear or whitish fluid. • Pubic hair becomes darker, thicker, and curlier. • Height and weight continue to increase. • For some girls, ovulation and menstruation (periods) begin, but may be irregular.
Stage 4: May begin anywhere from ages 10 to 16.	<ul style="list-style-type: none"> • Underarm hair becomes darker. • Pubic hair starts to form a triangular patch in front and around sides of genital area. • The nipple and the dark area around the breast (areola) may stick out from the rest of the breast. • For many girls, ovulation and menstruation (periods) begin, but may be irregular.
Stage 5: May begin anywhere from ages 12 to 19.	<ul style="list-style-type: none"> • Adult height is probably reached. • Breast development is complete. • Pubic hair forms a thick, curly, triangular patch. • Ovulation and menstruation (periods) usually occur regularly. • Overall look is that of a young adult woman.



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Last revised: March 27, 2009

Source: U.S. Department of Health and Human Services. (2009). Sexual development of girls. (Accessed September 29, 2010). http://www.4parents.gov/sexdevt/girlswomen/girls_sexdevt/index.html

being used (Bermudez et al., 2009; Johnson et al., 2008; also see Figure 11.3) ■. The gains in thickness of the cerebral cortex represent increases in gray matter, which consists of associative neurons that transmit messages back and forth in the brain when we are engaged in thought and sensorimotor activities. The neurons sprout new axon tips and dendrites, creating new synapses and increasing the flow of information.

Question 2: What brain developments take place during adolescence?

Brain imaging studies reveal a general pattern of brain development into the teenage years related both to maturation and to the use of brain regions (Giedd et al., 2009). But even while parts of the brain gain in processing ability, there is also a pruning process that seems to follow the principle “Use it or lose it.” Neural connections, or synapses, that are used are retained, but those that lie unused are lost.

Many adolescents show poor judgment, at least from time to time, and take risks that most adults would avoid, such as excessive drinking, substance abuse, reckless driving, violence, disordered eating behavior, and unprotected sexual activity (Berten & Rossem, 2009). It seems that brain development or immaturity may play a role. Deborah Yurgelun-Todd and her colleagues (Sava & Yurgelun-Todd, 2008) showed pictures of people with fearful expressions to adolescents ranging in age from 11 to 17 while the adolescents’ brains were scanned by functional magnetic resonance imaging (fMRI). Compared to adults, the adolescents’ frontal lobes (the seat of executive functioning) were less active, and their amygdalas (a part of the limbic system that is involved in discriminating emotions, including fear) were more active. The adolescents often misread the facial expressions, with those younger than 14 more often inferring sadness, anger, or confusion rather than fear. The older adolescents responded correctly more often and also showed the more adult pattern of less activity in the amygdala and more in the frontal lobes. The researchers suggest that one reason many adolescents fail to show the judgment, insight, and reasoning ability of adults is immaturity of the frontal lobes (Yurgelun-Todd, 2007).

Both genes (heredity) and the environment play major roles in shaping early brain development (Lenroot et al., 2009), but there is an interaction between heredity and the environment. Adolescents’ experiences affect which parts of the cortex thicken and which are “pruned.”

Cognitive Development: The Age of Reason?

I am a college student of extremely modest means. Some crazy psychologist interested in something called “formal operational thought” has just promised to pay me \$20 if I can make a coherent logical argument for the proposition that the federal government should under no circumstances ever give or lend more to needy college students. Now what could people who believe *that* possibly say by way of supporting argument? Well, I suppose they *could* offer this line of reasoning . . .

—Adapted from Flavell et al., 2002

The adolescent thinker approaches problems very differently from the elementary school child. **Question 3: What cognitive developments occur during adolescence?**

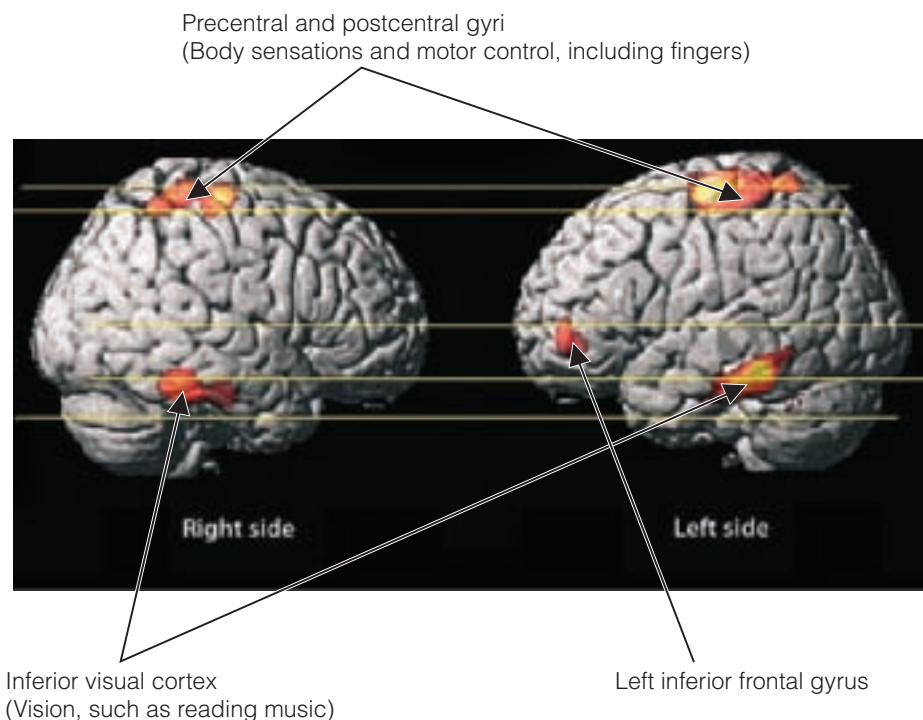


Figure 11.3 ■ What Happens to the Brain When an Adolescent Practices the Piano Several Hours a Day? One result is that parts of the gray matter of the brain are likely to thicken. The areas in red show thicker gray matter among professional keyboard players than in amateurs and nonmusicians. The areas in yellow show greater differences in thickness in the same direction.

Source: Gaser & Schlaug (2003). Copyright by the Society for Neuroscience. Reprinted with permission.



© Photofest Photography/Heer

Brain Development and Violin Practice This adolescent musician is not only learning to play the violin but also thickening the parts of her cerebral cortex that are being used in the effort. Associative neurons are sprouting new axon tips and dendrites, creating new synapses, and enhancing the flow of information.

Let's begin to answer this question by comparing the child's thought processes to that of the adolescent. The child sticks to the facts, to concrete reality. Speculating about abstract possibilities and what might be is very difficult. The adolescent, on the other hand, is able to deal with the abstract and the hypothetical. As shown in the preceding example, adolescents realize that one does not have to believe in the truth or justice of something to argue for it (Flavell et al., 2002). In this section, we explore some of the cognitive developments of adolescence by referring to the theories of Jean Piaget and Lawrence Kohlberg.

THE STAGE OF FORMAL OPERATIONS

According to Piaget, children typically undergo three stages of cognitive development prior to adolescence: sensorimotor, preoperational, and concrete-operational. In Chapter 10, we saw that they develop from infants who respond automatically to their environment to older children who can focus on various aspects of a situation at once and solve complex problems. The **formal-operational stage** is the final stage in Piaget's theory of cognitive development, and it represents cognitive maturity.

For many children in Western societies, formal-operational thought begins at about the beginning of adolescence—the age of 11 or 12. However, not all individuals enter the stage at this time, and some individuals never reach it.

The major achievements of the stage of formal operations involve classification, logical thought, and the ability to hypothesize. Central features are the ability to think about ideas as well as objects and to group and classify ideas—symbols, statements, entire theories. The flexibility and reversibility of operations, when applied to statements and theories, allow adolescents to follow arguments from premises to conclusions and back again. Several features of formal-operational thought give the adolescent a generally greater capacity to manipulate and appreciate the outer environment and the world of the imagination: hypothetical thinking, the ability to use symbols to stand for symbols, and deductive reasoning.

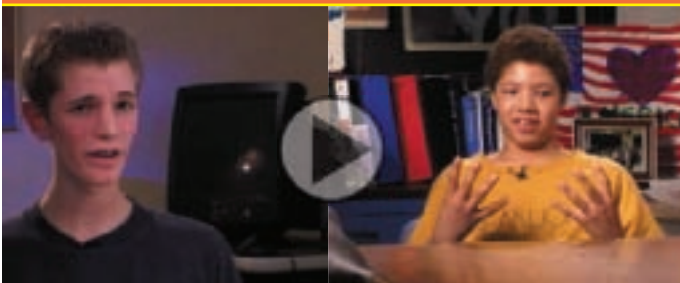
Formal-operational adolescents (and adults) think abstractly. They become capable of solving geometric problems about circles and squares without reference to what the circles and squares may represent in the real world. Adolescents in this stage derive rules for behavior from general principles and can focus, or center, on many aspects of a situation at once in arriving at judgments and solving problems.

In a sense, it is during the stage of formal operations that adolescents tend to emerge as theoretical scientists—even though they may see themselves as having little or no interest in science. They become capable of dealing with hypothetical situations. They realize that situations can have different outcomes, and they think ahead, experimenting with different possibilities. Adolescents also conduct experiments to determine whether their hypotheses are correct. These experiments are not conducted in the laboratory. Rather, adolescents may try out different tones of voice and ways of carrying themselves and of treating others to see what works best for them.

ADOLESCENT EGOCENTRISM: "YOU JUST DON'T UNDERSTAND!"

Adolescents in the formal-operational stage can reason deductively, or draw conclusions about specific objects or people once they have been classified accurately. Adolescents can be somewhat proud of their new logical abilities, and so a new sort of egocentrism can develop in which adolescents emotionally press for acceptance of their logic without recognizing the exceptions or practical problems that are often considered by adults. Consider this example: "It is wrong to hurt people. Company A occasionally hurts people (perhaps through pollution or economic pressures). Therefore, Company A must be severely punished or shut down." This thinking is logical. By impatiently pressing for immediate major changes or severe penalties, however, one may

Video Connections—Piaget's Formal Operational Stage: Hypothetical Propositions



Researchers asked children and adolescents of different ages, "What if people had no thumbs?" Formal-operational adolescents, such as the young man at the left, can mentally picture the situation and answer hypothetically, contrasting it with reality. The younger boy at the right still answers in terms of his own reality and has difficulty imagining a world without thumbs.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

not fully consider various practical problems such as the thousands of workers who would be laid off if the company were shut down. Adults frequently have undergone life experiences that lead them to see shades of gray in situations rather than just black or white.

The thought of preschoolers is characterized by egocentrism; they cannot take another's point of view. Adolescent thought is marked by another sort of egocentrism; adolescents can understand the thoughts of others but still have trouble separating things that are of concern to others and those that are of concern only to themselves (Elkind, 1967, 1985). Adolescent egocentrism gives rise to two interesting cognitive developments: the *imaginary audience* and the *personal fable*.

The concept of the **imaginary audience** refers to the belief that other people are as concerned with our thoughts and behavior as we are. As a result, adolescents see themselves as the center of attention and assume that other people are about as preoccupied with their appearance and behavior as they are (Milstead et al., 1993). In fact, adolescents may feel they are on stage, and all eyes are focused on them.

The concept of the imaginary audience may fuel the intense adolescent desire for privacy. It helps explain why adolescents are so self-conscious about their appearance, why they worry about every facial blemish, and why they spend long hours grooming. Self-consciousness seems to peak at about the age of 13 and then decline. Furthermore, girls tend to be more self-conscious than boys (Elkind & Bowen, 1979).

The **personal fable** is the belief that our feelings and ideas are special, even unique, and that we are invulnerable. **Truth or Fiction Revisited:** It is also true that it is normal for male adolescents to think of themselves as action heroes and to act as though they are made of steel. The personal fable seems to underlie adolescent behavior patterns such as showing off and taking risks (Alberts et al., 2007). Some adolescents adopt an “it can't happen to me” attitude; they assume they can smoke without risk of cancer or engage in sexual activity without risk of sexually transmitted infections (STIs) or pregnancy. “All youth—rich, poor, black, white—have this sense of invincibility, invulnerability,” says Ronald King (2000) of the HIV Community Coalition of Washington, D.C., explaining why many teens who apparently know the risks still expose themselves to HIV. Another aspect of the personal fable is the idea that no one else has experienced or can understand one's “unique” feelings such as needing independence or being in love. The personal fable may underlie the common teenage lament, “You just don't understand me!”

THE POSTCONVENTIONAL LEVEL OF MORAL REASONING

Lawrence Kohlberg's theory of moral reasoning involves three levels: preconventional, conventional, and postconventional. Individuals can arrive at the same decision—for example, as to whether Heinz should save his wife by taking the drug without paying for it (see Chapter 10)—but they would be doing so for a different kind of reason. (Deciding not to take the drug for fear of punishment is cognitively less complex than not taking the drug because of the belief that doing so could have negative consequences for the social order.)

None of Kohlberg's levels is tied precisely to a person's age. Although postconventional reasoning is the highest level, for example, most adolescents and adults reason conventionally. However, when postconventional reasoning does emerge, it usually does so in adolescence. Kohlberg's (1969) research showed that postconventional moral judgments were clearly absent among 7- to 10-year-olds. But by age 16, stage 5 reasoning is shown by about 20% of adolescents, and stage 6 reasoning is shown by about 5% of adolescents.

At the **postconventional level**, moral reasoning is based on the person's own moral standards. In each instance, moral judgments are derived from personal values, not from conventional standards or authority figures. In the contractual, legalistic orientation characteristic of stage 5, it is recognized that laws stem from agreed-upon



Imaginary Audience One aspect of adolescent egocentrism is the belief that others around us are as concerned with our thoughts and behaviors as we are.

Formal-operational stage Piaget's fourth stage, characterized by abstract logical thought; deduction from principles.

Imaginary audience An aspect of adolescent egocentrism; the belief that other people are as concerned with our thoughts and behaviors as we are.

Personal fable Another aspect of adolescent egocentrism; the belief that our feelings and ideas are special and unique and that we are invulnerable.

Postconventional level According to Kohlberg, a period during which moral judgments are derived from moral principles and people look to themselves to set moral standards.

Controversy in Psychology ARE THERE GENDER DIFFERENCES IN MORAL DEVELOPMENT?

Some researchers claim that males reason at higher levels of moral development than females in terms of responses to Heinz's dilemma. For example, Kohlberg and Kramer (1969) reported that the average stage of moral development for men was stage 4, which emphasizes justice, law, and order. The average stage for women was reported to be stage 3, which emphasizes caring and concern for others.

Since Kohlberg's cognitive-developmental theory is largely maturational, it might seem that it is "natural" for males to reason at higher levels than females. However, Carol Gilligan (1977, 1982; Gilligan & Attanucci, 1988) argues that this gender difference reflects patterns of socialization that are in keeping with gender stereotypes rather than maturation. To make her point, Gilligan provides two examples of responses to Heinz's dilemma. Eleven-year-old Jake views the dilemma as a math problem. He sets up an equation showing that life has greater value than property. Heinz should thus steal the drug. Eleven-year-old Amy, on the other hand, notes that stealing the drug and letting Heinz's wife die would both be wrong. Amy searches for alternatives, such as getting a loan, stating that it would

profit Heinz's wife little if he went to jail and was no longer around to help her.

Although Gilligan sees Amy's pattern of reasoning as being as sophisticated as Jake's, it would be rated as showing a lower level of moral development in Kohlberg's system. Gilligan asserts that Amy, like other girls, has been socialized into focusing on the needs of others and forgoing simplistic judgments of right and wrong. Jake, by contrast, has been socialized into making judgments based on logic. To him, clear-cut conclusions are derived from a set of premises. Amy was aware of the logical considerations that struck Jake, but she processed them as one source of information—not as the sole source. It is ironic that Amy's empathy, a trait that has "defined the 'goodness' of women," marks Amy "as deficient in moral development" (Gilligan, 1982, p. 18).

Kohlberg, Gilligan, and other researchers tend to agree that in making moral judgments, females are more likely to show a caring orientation, whereas males are more likely to assume a justice orientation (Jorgensen, 2006). But there remains a dispute as to whether this difference means that girls reason at a lower level than boys do (Gottschalk, 2007; Jorgensen, 2006). Kohlberg, by the way, viewed Gilligan's

ideas as an extension of his own views, not as a repudiation of them, and Gilligan largely supported Kohlberg's stage theory and his claim of its universality (Jorgensen, 2006; Snarey & Samuelson, 2008).



Males vs. Females? According to Lawrence Kohlberg and Carol Gilligan, males and females often see right and wrong in different ways. Males have typically scored "higher" in Kohlberg's system, but Gilligan has said, "Not so fast!" Kohlberg's response?—modifying his system.

procedures and that the rule of law is in general good for society; therefore, laws should not be violated. But under exceptional circumstances, laws cannot bind the individual. (Although it is illegal for Heinz to steal the drug, in this case it is the right thing to do.)

Stage 6 moral reasoning demands adherence to supposed universal ethical principles such as the sanctity of human life, individual dignity, justice, and the Golden Rule ("Do unto others as you would have them do unto you"). If a law is unjust or contradicts the rights of the individual, it is wrong to obey it.

People at the postconventional level look to their conscience as the highest moral authority. This point has created confusion. To some, it suggests that it is right to break the law when it is convenient. But this interpretation is incorrect. Kohlberg means that people at this level of moral reasoning must do what they believe is right even if this action runs counter to social rules or laws or requires personal sacrifice.

Cognitive development blossoms markedly during adolescence. Social and emotional development also tends to change dramatically, especially in societies where much of adolescence is characterized by having to wait before becoming a full-fledged adult, as we see in the following section.

Adolescents are not monsters.
They are just people trying
to learn how to make it among
the adults of the world, who are
probably not so sure themselves.

VIRGINIA SATIR

Social and Emotional Development: Storm and Stress, Smooth Sailing, or Both?

Adolescents also differ markedly from children in their social and emotional development. **Question 4: What social and emotional developments occur during adolescence?** In terms of social and emotional development, adolescence has been associated with turbulence. In the 19th century, psychologist G. Stanley Hall described adolescence as a time of *Sturm und Drang*—"storm and stress" in German. More current views challenge

the assumption that storm and stress are normal for adolescents (C. Griffin, 2001). Many adolescents experience a rather calm and joyous period of development. Jeffrey Arnett (1999) argues that we need to consider individual differences and cultural variations.

Certainly, many American teenagers abuse drugs, get pregnant, contract sexually transmitted infections, become involved in violence, fail in school, even attempt suicide (Miniño, 2010). The U.S. Centers for Disease Control and Prevention regularly survey the behavior of young people in an effort to uncover risks to health. The CDC (Miniño, 2010) reported that 73% of all deaths among people aged 12 to 19 years result from only three causes: accidents (48%), homicide (13%), and suicide (12%). Numerous high school students engage in behaviors that increase their likelihood of death from these causes:

- About one in six rarely or never wear seat belts.
- One in three ride with drivers who have been drinking alcohol.
- One in six carry weapons.
- Half drank alcohol during the 30 days preceding the survey.
- About one in four used marijuana during the 30 days preceding the survey.
- Nearly one in twelve had attempted suicide during the 12 months preceding the survey.

Statistics collected on the behavior of high school students revealed that:

- Half have engaged in sexual intercourse.
- More than two in five of the sexually active students did not use a condom during their latest sexual encounter.
- About one in fifty had injected an illegal drug.

Two thirds of all deaths among people aged 25 and older result from two causes: cardiovascular disease and cancer. The majority of risk behaviors associated with these two causes of death are initiated during adolescence. For example, 35% of high school students had smoked cigarettes within the past 30 days; 76% did not eat enough fruits and vegetables; 16% were at risk for becoming overweight; and 71% did not exercise regularly.

Hall attributed the conflicts of adolescence to biological changes. Research evidence suggests that hormonal changes affect activity levels, mood swings, and aggressive tendencies, but sociocultural influences have a greater effect (C. M. Buchanan et al., 1992).

RELATIONSHIPS WITH PARENTS AND PEERS

Adolescents spend much less time with their parents than they did as children. Fifteen-year-olds spend half as much time with their families than 9-year-olds do (Halpern, 2005; Staff et al., 2004). Adolescents interact more with their mothers than with their fathers and therefore also engage in more conflicts with their mothers. But they also view their mothers as more supportive, as knowing them better, and as more likely to accept their opinions (Costigan et al., 2007; Sheeber et al., 2007).



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Adolescence Is adolescence a time of storm and stress, or is it much more complicated than that?

*To an adolescent there is
nothing in the world more
embarrassing than a parent.*

DAVE BARRY

The best way to keep children home is to make the home atmosphere pleasant—and let the air out of the tires.

DOROTHY PARKER

Friendships in childhood are usually a matter of chance, whereas in adolescence they are most often a matter of choice.

DAVID ELKIND

Ego identity versus role diffusion

Erikson's fifth stage of psychosocial development, in which the life crisis involves the development of a firm sense of who one is and what one stands for (ego identity) or lack of clarity in one's life roles (role diffusion).

The decrease in time spent with family may reflect a striving to become more independent. Yet adolescents maintain a great deal of love, loyalty, and respect for their parents (Collins & Laursen, 2006). And adolescents who feel close to their parents are more likely to show greater independence, higher self-esteem, better school performance, and fewer psychological problems (Costigan et al., 2007; Flouri & Buchanan, 2003).

Parent–adolescent conflict is greatest during puberty and declines in later adolescence (Smetana et al., 2003, 2006). Conflicts typically center on the everyday details of family life, such as chores, homework, curfews, personal appearance, finances, and dating. On the other hand, parents and adolescents are usually quite similar in their values and beliefs regarding social, political, religious, and economic issues (Collins & Laursen, 2006). **Truth or Fiction Revisited:** Thus, adolescents are not in a constant state of rebellion against their parents. As adolescents grow older, parents are more likely to relax controls and are less likely to use punishment (Smetana et al., 2006).

Although relationships with parents generally remain positive, the role of peers as a source of activities, influence, and support increases markedly during the teen years (Kirke, 2009). Most adolescents have one or two “best friends” and several good friends. Teenagers see their friends frequently, and when they are not physically with their friends, you often find them talking with each other on the phone, texting them, or chatting with them online. In fact, I frequently warned my children that I would take them in for major surgery—telephonectomy—unless they got the phones out of their ears by themselves. The warning went unheard (because the children were on the phone). I therefore solved the problem by having a separate line installed for the children and investing heavily in the local telephone company.

Adolescents stress the importance of acceptance, self-disclosure, mutual understanding, and loyalty in their friendships (González et al., 2004). They may say that a friend will “stick up for you in a fight” and will not “talk about you behind your back.” Adolescents and their friends are typically the same age and the same race (Castelli et al., 2009). Even though romantic attachments increase during the teen years, most adolescents still choose members of their own gender as best friends (Kirke, 2009). Friends are also often alike in their school attitudes, educational aspirations, school achievement, and attitudes about drinking, drug use, and sexual activity (Hartup, 1993; Snijders et al., 2007).

Parents often worry that their teenage children will fall in with the wrong crowd and be persuaded by their peers to engage in behaviors that are self-destructive or go against the parents' wishes. Research paints a more complex picture. For one thing, we have seen that adolescents often maintain close and warm relationships with their parents. Nor are most adolescents' friends bad influences. Parents and peers usually have complementary rather than competing influences on teenagers (Allen & Antonishak, 2008; Reis & Youniss, 2004).

Yes, adolescents who smoke, drink, use drugs, and engage in sexual activity often have friends who also engage in these behaviors. But adolescents tend to choose friends and peers who are similar to them to begin with. Peers reinforce behavior patterns and predispositions that may have existed before the individual joined the group. This is true for positive behaviors, such as academic achievement, as well as for negative behaviors, such as drug use (Allen & Antonishak, 2008).

A number of other factors affect the susceptibility of adolescents to peer influence. One of these is gender. Girls appear to be slightly more concerned with peer acceptance than boys, but boys are more likely than girls to conform to pressures to engage in misconduct (Sumter et al., 2009).

EGO IDENTITY VERSUS ROLE DIFFUSION: “WHO AM I?”

According to Erik Erikson (1963), individuals undergo eight stages of psychosocial development, each of which is characterized by a certain “crisis.” (See Table 10.4 on page 372). Four of these stages, beginning with that of trust versus mistrust, occur during childhood and were discussed in Chapter 10. The fifth stage, that of **ego identity versus role diffusion**, occurs during adolescence.

A CLOSER LOOK • REAL LIFE

SOCIAL NETWORKING ONLINE

“As soon as I get home, I turn on my computer. My MySpace is always on, and when I get a message on MySpace, it sends a text message to my phone. It’s not an obsession; it’s a necessity.”

—A 15-year-old boy

“You become addicted. You can’t live without it.”

—A 14-year-old girl

Adolescents generally feel that peers are necessities in their lives, and they interact with them extensively—not only in the flesh and on the telephone but also on social networking sites such as Facebook and MySpace (Ellison et al., 2007). In a scenario all too familiar to many parents, a 17-year-old couple who have been seeing one another for over a year wake up, log on to their computers between showering and doing their hair, chat on their cell phones on the way to school, send text messages back and forth throughout the schoolday, and finally spend time together doing homework after school. Then, in the evening, they’re on the phone again and often text “I love you” before they turn in for the night (Ito et al., 2009).

The lead author of a study on teenagers’ online behavior reports, “There’s been some confusion about what kids are actually doing online. Mostly, they’re socializing with their friends, people they’ve met at school or camp or sports” (Ito, 2008, p. A20). National random surveys show that at least two of three American teenagers and young adults (18- to 29-year-olds) use social networking sites (Valenzuela et al., 2009).

A study of 2,603 Texas college students focused on users of Facebook and found that about one student user in four reported having 400 or more Facebook friends (Valenzuela et al., 2009; see Table 11.1). More than one student user in three (35%) reported using Facebook for 10 to 30 minutes a day, and another 41.9% reported lengthier use (Table 11.1). Most student users tended to agree with the following statements:

- Facebook is part of my everyday activity
- I am proud to tell people I am on Facebook
- I feel out of touch when I haven’t logged onto Facebook for a day
- I would be sorry if Facebook shut down

What are the effects of use of social networking sites? A study of 881 Dutch tweenies and teenagers (10- to 19-year-olds) found that use of the sites enhanced the number of “friendships”

Ego identity is a firm sense of who one is and what one stands for. It can carry one through difficult times and give meaning to one’s achievements. Adolescents who do not develop ego identity may experience role diffusion. They spread themselves too thin, running down one blind alley after another and placing themselves at the mercy of leaders who promise to give them the sense of identity that they cannot find for themselves.

In Western society, in which adolescents generally have a good deal of choice in determining what they will become, the creation of an adult identity is a key challenge. Much of this challenge involves learning about one’s interests and abilities and

Table 11.1 ■ Behavior of Texas College Student Facebook Users (n = 2,603)

1. About how many total Facebook friends do you have?	Percent
Fewer than 10	1.9%
10–49	8.4
50–99	9.7
100–149	11.3
150–199	12.2
200–249	9.9
250–299	8.9
300–399	11.7
400 or more	26.0
2. On a typical day, how much time do you spend on Facebook?	Percent
No time at all	4.9%
Fewer than 10 minutes	18.2
10–30 minutes	34.9
More than 30 minutes, up to 1 hour	22.2
More than 1 hour, up to 2 hours	14.3
More than 2 hours, up to 3 hours	3.9
More than 3 hours	1.5

Source: Adapted from Valenzuela, S., Park, N., & Kee, K. F. (2009). Is there social capital in a social network site? Facebook use and college students’ life satisfaction, trust, and participation. *Journal of Computer-Mediated Communication, 14*(4), 875–901.

created on the site (Valkenburg et al., 2006). Greater use enhanced the frequency with which users received feedback on their profiles. Positive feedback on their profiles increased their self-esteem and their psychological sense of well-being, whereas negative feedback had the opposite effect. A study of 500 youth with an average age of 12 found that Internet use in general, and social networking in particular, had overall positive effects on the users’ self-concepts. Part of the boost derived from the sense that the youth were becoming familiar with the use of the technology of the day (Jackson et al., 2009). Other researchers (Ellison et al., 2007) found that use of Facebook helped maintain or solidify existing offline relationships. They also found that Facebook usage was apparently most beneficial for users with low self-esteem and low life satisfaction. Some teenagers, that is, apparently find it easier to interact with others online than in the flesh. But eventually, the social skills gained online may help them in their flesh-and-blood contacts.

		Exploration	
		Yes	No
Commitment	Yes	<p>Identity Achievement</p> <ul style="list-style-type: none"> • Most developed in terms of identity • Has experienced a period of exploration • Has developed commitments • Has a sense of personal well-being, high self-esteem, and self-acceptance • Cognitively flexible • Sets goals and works toward achieving them 	<p>Foreclosure</p> <ul style="list-style-type: none"> • Has commitments without considering alternatives • Commitments based on identification with parents, teachers, or other authority figures • Often authoritarian and inflexible
	No	<p>Moratorium</p> <ul style="list-style-type: none"> • Actively exploring alternatives • Attempting to make choices with regard to occupation, ideological beliefs, and so on • Often anxious and intense • Ambivalent feelings toward parents and authority figures 	<p>Identity Diffusion</p> <ul style="list-style-type: none"> • Least developed in terms of identity • Lacks commitments • Not trying to form commitments • May be carefree and uninvolved or unhappy and lonely • May be angry, alienated, rebellious



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connecting them with an occupation or a role in life. But identity also involves sexual, political, and religious beliefs and commitments. Will the individual be monogamous or sexually active with a number of people? Will he or she lean left or right along the political spectrum? What role will be played by religion in his or her life?

“IDENTITY STATUSES”: SEARCHING FOR THE SELF, MAKING A COMMITMENT

Building on Erikson’s approach, James Marcia (1991) theorized four identity statuses. **Question 5: What are Marcia’s identity statuses?** The statuses represent the four possible combinations of the dimensions of exploration and commitment that Erikson believed were critical to the development of identity (Schwartz, 2001) (see Concept Review). **Exploration** involves active questioning and searching among alternatives in the quest to establish goals, values, and beliefs. **Commitment** is a stable investment in one’s goals, values, and beliefs.

Identity diffusion is the least developmentally advanced status. This category includes individuals who neither have commitments nor are trying to form them (Berzonsky, 2005; Crocetti et al., 2009). This stage is often characteristic of primary school and early high school children. Older adolescents who remain diffused may drift through life in a carefree, uninvolved way, or they may be unhappy and lonely. Some diffused individuals are apathetic and adopt an “I don’t care” attitude. Others are angry, alienated, and rebellious and may reject socially approved goals, values, and beliefs (Archer & Grey, 2009; Snarey & Bell, 2003).

In the **foreclosure** status, individuals make commitments without seriously considering alternatives. These commitments usually are established early in life and often are based on identification with parents, teachers, or religious leaders who have made a strong impression on the child. For example, a college student may unquestioningly prepare for a career that his parents have chosen for him. In other cases, the adolescent

Exploration In Marcia’s system, active questioning and searching among alternatives in the quest to establish goals, values, or beliefs.

Commitment In Marcia’s system, a stable investment in one’s goals, values, or beliefs.

Identity diffusion In Marcia’s system, lack of a sense of who one is or what one stands for, with no active exploration.

Foreclosure In Marcia’s system, the automatic adoption of a point of view held by authority figures in one’s life.

may uncritically adopt the lifestyle of a religious cult or an extremist political group, as in so-called closed-minded fundamentalists (Saroglou & Galand, 2004). Foreclosed individuals are authoritarian and inflexible (Saroglou & Galand, 2004).

The **moratorium** status refers to a person who is actively exploring alternatives in an attempt to make choices with regard to occupation, ideological beliefs, and so on (Akman, 2007; Schwartz et al., 2009). Such individuals are often anxious and intense as they struggle to work toward commitment.

Identity achievement refers to those who have experienced a period of exploration and have developed relatively firm commitments. Individuals who have achieved a clear sense of identity show a number of strengths. They have a sense of personal well-being in the form of high self-esteem and self-acceptance. As opposed to foreclosed individuals, those who achieve identity are cognitively flexible and capable of reason. They are able to set goals and work toward achieving them (Adams et al., 2006).

During the high school and college years, adolescents increasingly move from the diffusion and foreclosure statuses to the moratorium and achievement statuses (Schwartz et al., 2009; Snarey & Bell, 2003). The greatest gains in identity formation occur during college (Adams et al., 2006; Berzonsky & Kuk, 2005). College students are exposed to a broad spectrum of lifestyles, belief systems, and career choices that spur consideration of identity issues. Are you one of the college students who have changed majors once or twice (or more)? If so, you have most likely experienced the moratorium identity status, which is common among college students.

Moratorium In Marcia's system, an identity status that characterizes those who are actively exploring alternatives in an attempt to form an identity.

Identity achievement In Marcia's system, an identity status that characterizes those who have explored alternatives and have developed commitments.

A CLOSER LOOK • DIVERSITY

ETHNICITY AND DEVELOPMENT OF IDENTITY

The connections between ethnicity and identity had a special significance during journalist Don Terry's childhood:

When I was a kid growing up in Chicago, I used to do anything I could to put off going to bed. One of my favorite delaying tactics was to engage my mother in a discussion about the important questions of the day, questions my friends and I had debated in the backyards of our neighborhood that afternoon—like Who did God root for, the Cubs or the White Sox? (The correct answer was, and still is, the White Sox.)

Then one night I remember asking my mother something I had been wondering for a long time. “Mom,” I asked, “what am I?”

“You’re my darling Donny,” she said.

“I know. But what else am I?”

“You’re a precious little boy who someday will grow up to be a wonderful, handsome man.”

“What I mean is, you’re white and Dad’s black, so what does that make me?”

“Oh, I see,” she said. “Well, you’re half-black and you’re half-white, so you’re the best of both worlds.”

The next day, I told my friends that I was neither black nor white. “I’m the best of both worlds,” I announced proudly.

“Man, you’re crazy,” one of the backyard boys said. “You’re not even the best of your family. Your sister is. That girl is fine.”

For much of my life, I’ve tried to believe my mother. Having grown up in a family of blacks and whites, I’d long thought I saw race more clearly than most people. I appreciated being able to get close to both worlds, something few ever do. It was like having a secret knowledge.

And yet I’ve also known from an early age that things were more complicated than my mother made them out to be. Our country, from its very beginnings, has been obsessed with

determining who is white and who is black. Our history has been shaped by that disheartening question. To be both black and white, then, is to do nothing less than confound national consciousness.

—Terry, 2000

To be both black and white—African American and European American—can also confound or confuse the consciousness of the individual (Arnett & Brody, 2008). Don Terry's mother had once been married to a European American, and Don had European American brothers. His experiences of the next several years reveal his efforts to come to grips with a nation that saw him as African American, not half and half. He chronicles his experiences with prejudice, even within his own family, and how he eventually embraced blackness—as a shield and a cause.

Being African American, Asian American, European American, Latino or Latina American, Native American, or a combination of these is part of the self-identity of the individual. So is one's gender—being male or being female. So is one's religion, whether Christian, Hindu, Jewish, or any of the hundreds of other religions we find in the United States.

The development of self-identity is more complex for adolescents who are members of ethnic minority groups (Arnett & Brody, 2008; Phinney & Ong, 2007; Verkuyten, 2009). Adolescents who belong to the dominant culture—in this country, European Americans of Christian, especially Protestant, heritage—are usually faced with assimilating one set of cultural values into their identities. However, adolescents who belong to ethnic minority groups, such as African Americans and Jewish Americans, confront two sets of cultural values: the values of the dominant culture and those of their particular ethnic group (Phinney & Alipuria, 2006). If the cultural values conflict, the adolescent needs to sort out the values that are most meaningful to him or her and incorporate them into his or her identity.

My first sexual experience occurred in a car after the high school junior prom. We were both virgins, very uncertain but very much in love. We had been going together since eighth grade. The experience was somewhat painful. I remember wondering if I would look different to my mother the next day. I guess I didn't because nothing was said.

ADAPTED FROM MORRISON ET AL., 1980, P. 108

ADOLESCENT SEXUALITY—WHEN? WHAT? (HOW?) WHO? WHERE? AND WHY?—NOT TO MENTION, “SHOULD I?”

Because of the flood of sex hormones, many or most adolescents experience a powerful sex drive. In addition, they are bombarded with sexual messages in the media, including scantily clad hip-grinding, crotch-grabbing pop stars; print ads for barely there underwear; and countless articles on “how to tell if your boyfriend has been (whatever)” and “the 10 things that will drive your girlfriend wild” (McGeal, 2009). Teenagers are strongly motivated to follow the crowd; yet, they are also influenced by the views of their parents and teachers. So what is a teen to do? What do American teens do?

Masturbation—sexual self-stimulation—is the most common sexual outlet in adolescence. Surveys indicate that most adolescents masturbate at some time. The well-known Kinsey studies, published in the mid-20th century (Kinsey et al., 1948, 1953), suggested that masturbation was nearly universal among male adolescents but less common among female adolescents. This gender difference is confirmed in nearly every survey (Petersen & Hyde, 2010). It is unclear whether this difference reflects a stronger sex drive in boys (Lippa, 2009), greater social constraints on girls, or both.

Adolescents today start dating and going out earlier than in past generations. Teens who date earlier are more likely to engage in sexual activity during high school (Guttmacher, 2009). Teens who initiate sexual activity earlier are also less likely to use contraception and more likely to become pregnant. But early dating does not always lead to early sex, and early sex does not always lead to unwanted pregnancies.

Petting is practically universal among American adolescents and has been for many generations. Adolescents use petting to express affection, satisfy their curiosities, heighten their sexual arousal, and reach orgasm while avoiding pregnancy and maintaining virginity. Many adolescents do not see themselves as having sex if they stop short of vaginal intercourse. Girls are more likely than boys to be coerced into petting and to feel guilty about it (Gavin et al., 2009).

Since the early 1990s, the percentage of high school students who have engaged in sexual intercourse has been gradually declining for African American teenagers and holding near 50% for European American and Latino and Latina American teenagers (see Figure 11.4 ■). Male high school students are somewhat more likely than girls to be sexually active. The incidences of kissing, “making out,” oral sex, and sexual intercourse all increase with age.

Adolescent girls and boys usually obtain little advice at home or in school about how to handle their emerging sexuality. Some initiate sex at very early ages, when they are least likely to use contraception (Buston et al., 2007). Many adolescent girls, especially younger adolescents, do not have access to contraceptive devices. Among those who do, fewer than half use them reliably (Buston et al., 2007).

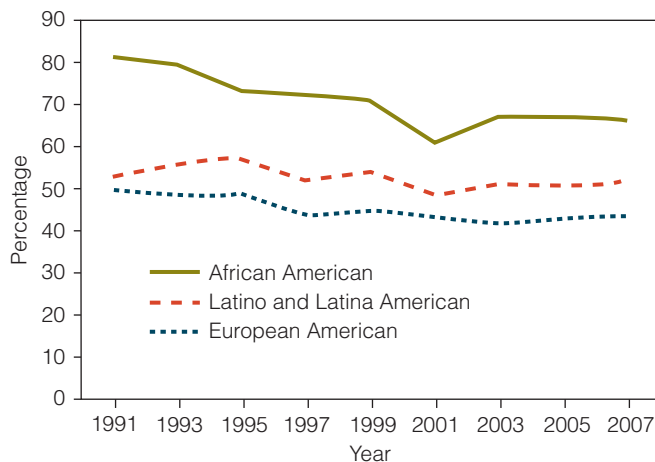


Figure 11.4 ■ Percentage of High School Students Who Have Ever Had Sexual Intercourse, by Race/Ethnicity and Year—United States

Source: Youth Risk Behavior Survey, United States, 1991–2007. In Gavin, L. et al. (2009, July 17). Sexual and reproductive health of persons aged 10–24 years—United States, 2002–2007. Figure 2. *Morbidity and Mortality Weekly Report*, 58(27), 1–58.

TEENAGE PREGNANCY

Most teenage girls are impregnated because they and their partners do not know as much about reproduction and contraception as they think they do or because they miscalculate the odds of getting pregnant (Buston et al., 2007). Even those who have been to all the sex education classes and who have access to family planning clinics slip up now and then, especially if their partners push them or do not want to use condoms.

For all these reasons, about 750,000 teenage girls in the United States are impregnated each year. The pregnancies result in 400,000 or so births and somewhat fewer abortions. However large this number may sound, 10 to 20 years ago, about 1 million girls became pregnant each year. Researchers at the Centers for Disease Control and Prevention attribute the drop-off to educational efforts by schools, the media, religious institutions, and communities (America’s Children, 2007).

Most pregnant teenagers will become single mothers (America’s Children, 2007). The medical, social, and economic costs of unplanned or unwanted pregnancies among adolescents are enormous both to the mothers and to the children. Adolescent mothers

are more likely to experience medical complications during the months of pregnancy, and their labor is likely to be prolonged. The babies are at greater risk of being premature and of low birthweight (Mathews & MacDorman, 2007). These medical problems are not necessarily due to the age of the mother but rather to the fact that teenage mothers—especially those who dwell at the lower end of the socioeconomic spectrum—are less likely to have access to prenatal care or to obtain adequate nutrition.

The education of the teenage mother also suffers. She is less likely than her peers to graduate from high school or move on to college. Her deficit in education means that she earns less and is in greater need of public assistance (Bunting & McAuley, 2004). Although the most attention has been directed toward teenage mothers, the consequences of parenthood for adolescent fathers are similar (Kalil et al., 2005; Quinlivan & Condon, 2005). Teenage fathers tend to have lower grades in school than their peers, and they enter the workforce at an earlier age.

Children born to teenage mothers also are at a disadvantage. As early as the preschool years, they show lower levels of cognitive functioning and more behavioral and emotional problems. Boys appear to be more affected than girls. By adolescence, offspring of teenage mothers are doing more poorly in school, and they are more likely to become teenage parents themselves (Gavin et al., 2009). Again, these problems seem to result not from the mother's age itself but from the socially and economically deprived environments in which teen mothers and their children often live.

LearningConnections • ADOLESCENCE

ACTIVE REVIEW (1) Puberty begins with the appearance of _____ sex characteristics, such as the growth of body hair, deepening of the voice in males, and rounding of the breasts and hips in females. (2) The changes of puberty are stimulated by _____ in the male and by estrogen and androgens in the female. (3) _____-operational thought is characterized by hypothetical thinking and deductive logic. (4) Adolescent egocentrism gives rise to the _____ audience and the personal fable. (5) In stage 6 moral reasoning, people consider behavior that is consistent with _____ ethical standards as right. (6) G. Stanley Hall described adolescence as a time of *Sturm und Drang* in German, which means storm and _____ in English.

(7) Erik Erikson considers the life crisis of adolescence to be ego identity versus role _____.

REFLECT AND RELATE There is a saying: “Adolescents are neither fish nor foul.” Can you apply this saying to your own experiences as an adolescent?

CRITICAL THINKING Can you make the case that adolescence is a distinct stage of life? Explain.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

EMERGING ADULTHOOD

When our mothers were our age, they were engaged. They at least had some idea what they were going to do with their lives. I, on the other hand, will have a dual degree in majors that are ambiguous at best and impractical at worst (English and political science), no ring on my finger and no idea who I am, much less what I want to do. Under duress, I will admit that this is a pretty exciting time. Sometimes, when I look out across the wide expanse that is my future, I can see beyond the void. I realize that having nothing ahead to count on means I now have to count on myself; that having no direction means forging one of my own.

—Kristen, age 22, in Page, 1999, pp. 18, 20

Well, Kristen has some work to do; she needs to forge her own direction. Just think: What if Kristen had been born into the caste system of old England or India, into a traditional Islamic society, or into the United States of the 1950s, where the TV sitcom *Father Knows Best* was perennially in the top 10? Kristen would have had a sense of direction, that's certain. But of course, it would have been the sense of direction society or tradition created for her, not her own.

But Kristen was not born into any of these societies. She was born into the open and challenging United States of the current generation. She has the freedom to become



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Emerging Adulthood: A New Stage of Development in Developed Nations Some researchers suggest that affluent societies like ours have spawned a new stage of development, emerging adulthood, which involves an extended period of self-exploration during which one remains financially dependent.

Human beings are the only creatures on earth that allow their children to come back home.

BILL COSBY

I take a very practical view of raising children. I put a sign in each of their rooms: “Checkout Time is 18 years.”

ERMA BOMBECK

Adulthood The achievement of “grown-up” status as marked by factors such as being of “legal” age, psychological separation from one’s family of origin, and financial independence.

Emerging adulthood A theoretical period of development, spanning the ages of about 18 to 25, in which young people in developed nations engage in extended role exploration or preparation.

whatever the interaction of her genetic heritage and her educational and social opportunities will enable her to become—and the opportunities are many. With freedom comes the need to make choices. When we need to make choices, we profit from information. Kristen is in the process of accumulating information about herself and about the world outside. She is in the process of becoming an adult.

Question 6: How do we define adulthood?

There’s a question. Legally, **adulthood** has many ages, depending on what you want to do. The age of consent to marry varies from state to state, but in general, marriage is permitted in the teens. The age for drinking alcohol legally is 21. The age for driving varies. By and large, however, adulthood is usually defined in terms of what people do rather than how old they are. Adolescents do not necessarily reach adulthood at age 21. Over the years, marriage has been a key criterion to be considered an adult for people who write about human development (Carroll et al., 2007).

Other criteria for adult status include holding a full-time job and living independently (not with one’s parents). Today, the transition to adulthood is mainly marked by adjustment issues, such as deciding on one’s values and beliefs, accepting self-responsibility, becoming financially independent, and establishing an equal relationship with one’s parents (Arnett, 2007; Gottlieb et al., 2007). Marriage is no longer necessarily a crucial marker for entering adulthood (Gottlieb et al., 2007).

Adulthood itself has been divided into stages, and the first of these, early adulthood, has been seen largely as the period of life when people focus on establishing their careers or pathways in life. It has been acknowledged that the transition to adulthood could be slow or piecemeal. Many individuals in their late teens and early 20s remain dependent on their parents and are reluctant or unable to make enduring commitments in terms of either identity formation or the development of intimate relationships. The question is whether we can speak of the existence of another stage of development, one that bridges adolescence and early adulthood. A number of developmental theorists, such as Jeffrey Arnett (2007), believe that we can.

Question 7: What is emerging adulthood? **Emerging adulthood** is theorized to be a distinct period of development roughly spanning the ages of 18 to 25 found in societies that allow young people an extended opportunity to explore their roles in life. These tend to be affluent societies, such as those found in developed nations, our own among them. Parents in the United States are often affluent enough to continue to support their children throughout college and in graduate school. When parents cannot do the job, the government often steps in to help—for example, through student loans. These supports allow young people the luxury of sorting out identity issues and creating meaningful life plans—even if some still do not know where they are going after they graduate from college. Should they know who they are and what they are doing by the age of 21 or 22? Are they spoiled? These are value judgments that may or may not be on the mark. But let’s note that many adults change their careers several times, partly because they did not sort out who they were and where they were going at an early age. On the other hand, even in the United States, many people cannot obtain the supports necessary for sojourning in emerging adulthood.

Arnett (2007) summarizes the kinds of social and technological influences that have spurred the rise of emerging adulthood:

- The changes from a manufacturing-based economy to an information-based economy increased the need for advanced education and training.
- The advent of the birth control pill made it possible for late adolescents to become sexually active without becoming pregnant.
- Increased social acceptance of premarital sex and cohabitation weakened the traditional connection between marriage and the onset of sexual activity; therefore, the median ages of beginning marriage and parenthood rose into the middle to late 20s.

- The period of life from the late teens through the mid-20s became, for many in the developed world, a period of advanced self-development and of gradually laying a foundation for “adulthood.”

Erik Erikson (1968) did not use the term *emerging adulthood*, but he did recognize that developed nations tend to elongate the period of adolescence. Erikson used the term *moratorium* to describe the extended quest for identity among people who dwell in adolescence. He and other theorists also believed that it was more meaningful for the individual to take the voyage to identity rather than foreclose it by adopting the viewpoints of other people.

Although there are pluses to taking time to formulate one’s identity, there are downsides. For example, remaining dependent on parents can compromise an individual’s self-esteem. Taking out loans for graduate school means that there is more to pay back; many individuals mortgage their own lives as they invest in their futures. Women who focus on their educations and their careers may marry later and bear children later. Although many people appreciate children more when they bear them later in life, they also become less fertile as the years wend their ways, and they may find themselves in a race with their “biological clock.”

Young people in the United States seem to be generally aware of the issues involved in defining the transition from adolescence to adulthood. Arnett (2000) reported what people say when they are asked whether they think they have become adults. The most common answer of 18- to 25-year-olds was something like “in some respects yes and in other respects no” (see Figure 11.5 ■). Many think they have developed beyond the conflicts and exploratory voyages of adolescence, but they may not yet have the ability to assume the financial and interpersonal responsibilities they associate with adulthood.

And then, of course, there are those who remain adolescents forever.

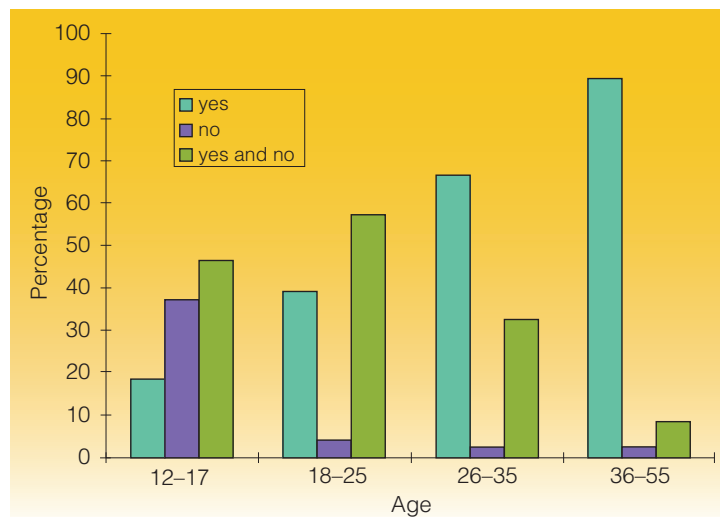


Figure 11.5 ■ People’s Responses When Asked Whether They Have Become Adults Between the ages of 18 and 25, most respondents are likely to say, in effect, “In some ways, yes; in other ways, no.” Source: Arnett, J. J. (2000). *Emerging adulthood*. *American Psychologist*, 55(5), 469–480.

LearningConnections • EMERGING ADULTHOOD

ACTIVE REVIEW (8) Emerging adults tend to be found in (affluent or poor?) nations. (9) Emerging adulthood roughly spans the ages of 18 to _____. (10) When Americans are asked “Do you feel that you have reached adulthood,” the largest group of people aged 18–25 respond _____. (11) According to Erikson, many people whom we would call emerging adults are in the identity status of _____.

REFLECT AND RELATE Are you or are people in your class emerging adults? In what ways?

CRITICAL THINKING How would students in your class react to being called “adolescents”? Why?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

EARLY ADULTHOOD

Early adulthood overlaps with emerging adulthood, beginning at about the age of 20, and is usually considered to end by about the age of 40. Many psychologists speak of differences between the decades of the 20s and 30s, and most agree that early adulthood is generally a time of feeling strong, growing more aware of the differences between ideals and realities, striving intensely, becoming established, and often, settling in.

Physical Development

Question 8: What physical developments occur during early adulthood? Physical development peaks in early adulthood. Most people are at their height of sensory sharpness, strength, reaction time, and cardiovascular fitness. Young adults are at their tallest, and height remains stable through middle adulthood, declining somewhat in late adulthood. A higher percentage of men’s body mass is made of muscle, and men are

normally stronger than women. Physical strength in both men and women peaks in the 20s and early 30s and then slowly declines (Markham, 2006).

On the other hand, women gymnasts find themselves lacking a competitive edge in their 20s because they are accumulating (normal!) body fat and losing suppleness and flexibility. Other athletes, such as football, baseball, and basketball players, are more likely to experience a decline in their 30s. Most athletes retire by age 40. Sexually speaking, most people in early adulthood become readily aroused. They tend to attain and maintain erections as desired and to lubricate readily.

Cognitive Development

Question 9: What cognitive developments occur during early adulthood?

Cognitive development in early adulthood shows multidirectionality, interindividual variability, and plasticity. The concept of *multidirectionality* underscores the finding that some aspects of intellectual functioning may improve while others remain stable or decline. Rather than being something measured strictly by degrees, intellectual functioning reflects the interaction of heredity and environmental factors. There is personal choice to engage in further study to increase one's facility in certain intellectual areas.

People develop in different cultural settings. Some still frown on education for women. Some areas have better schools than others. Some youth find themselves in subcultures in which their peers disapprove of them if they earn high grades or seek approval from teachers. We also find interindividual variability in middle adulthood. Some people find themselves, or allow themselves to be, in “ruts” in which they gain little if any new knowledge. Others are hungry for the new; they read and travel and visit museums in any spare moment they can find. *Plasticity* refers to the fact that people's intellectual abilities are not absolutely fixed but can be modified under certain conditions at almost any time in life. The ideal period for language learning may be childhood, but you can pick up a new language in your 40s, 50s, or even later. You learn the meanings of new words for a lifetime (unless you lock yourself in a closet).

As with physical development, people are at the height of their cognitive powers during early adulthood. In terms of brain development, it is quite possible that most verbal and quantitative capacities of the sort measured by the SAT and the ACT have developed by late adolescence, emerging adulthood, and early adulthood. However, adolescence carries with it a certain egocentrism that can impair judgment and problem solving. Early adult experiences can lead to further cognitive developments, but these experiences are not universal, and many people become set in their cognitive ways long before the arrival of early adulthood. Yet developmental psychologists theorize that college students are less likely to have their beliefs set in concrete.

William Perry (1981, 1970/1998) points out that young adults often enter college or adult life assuming that there are right and wrong answers and that the world can be divided easily into black versus white, good versus bad, and us versus them. After a while, in a multicultural society or on a college campus, students may realize that judgments of good or bad are often made from a certain belief system, such as a religion or a particular cultural background, so that their thinking grows more complex and less absolute (Vukman, 2005). Cognitive development in college life rests not only on exposure to “great books”; it is also fostered by challenges from students of different backgrounds and from professors who have views that differ from those of students (Moshman, 2005).

Gisella Labouvie-Vief (2006) notes that adults must typically narrow possibilities into practical choices, whether the choices are about careers, graduate school, or life partners. The “cognitively healthy” young adult is more willing than the egocentric adolescent to compromise and cope within the world as it is, not the world as she or he would like it to be. To deal with the real world, adults need to develop a complexity that enables them to harbor both positive and negative feelings about their career choices (“I may never get rich, but when I wake up in the morning, I’ll look forward to what I’m doing that day”) and their partners (“Okay, he may not be a hunk, but he’s stable and kind”) (Labouvie-Vief & González, 2004).

POSTFORMAL THINKING—A FIFTH STAGE OF COGNITIVE DEVELOPMENT?

Most developmental psychologists agree that the cognitive processes of young adults are in many ways more advanced than the cognitive processes of adolescents—at least

Of the blessings set before you
make your choice, and be content.

DR. SAMUEL JOHNSON

in our cultural setting (Commons, 2004; Gurba, 2005). Young adults maintain most of the benefits of their general secondary educations, and some may have gathered specialized knowledge and skills through opportunities in higher education and the career world. The thinking of young adults tends to be *less* egocentric than that of adolescents.

Young adults are less likely to see the world in black and white. They are more relativistic but ideally capable of making commitments in their relativistic worlds. For example, an adolescent viewing an environmentally damaging oil spill in the Gulf of Mexico may want to immediately stop all oil drilling and lock up the oil company's executives for life—or worse. A 25-year-old may have similar feelings of outrage but opt instead to heavily fine the oil company and, given the country's need for oil, focus on ways to improve the safety of drilling until the country is less dependent on oil.

Truth or Fiction Revisited: However, despite the advances in cognitive development that take place during young adulthood, Piaget did not propose a **postformal stage** of cognitive development, one that would extend beyond the stage of formal operations. Nor do all developmental psychologists agree on whether they should consider the cognitive abilities of young adults to be a fifth stage of cognitive development.

Social and Emotional Development

Question 10: What social and emotional developments take place during early adulthood? Many theorists suggest that early adulthood is the period of life during which people tend to establish themselves as independent members of society.

At some point during the 20s, many people become fueled by ambition. Many strive to advance in their careers. Those who seek professional careers may spend much of their 20s acquiring the skills that will enable them to succeed professionally (Levinson et al., 1978; Levinson, 1996). It is largely during the 20s that people become generally responsible for their own support, make their own choices, and are free from parental influences. Many young adults adopt what theorist Daniel Levinson and his colleagues (1978) call **the Dream**—the drive to “become” someone, to leave their mark on history—which serves as a tentative blueprint for their life.

During early adulthood, people tend to leave their families of origin and create families of their own. Erik Erikson (1963) characterized early adulthood as the stage of **intimacy versus isolation**. (For a summary of Erikson's stages, see Table 10.4 on p. 372.) Erikson saw the establishment of intimate relationships as central to early adulthood. Young adults who have evolved a firm sense of identity during adolescence are ready to “fuse” their identities with those of other people through marriage and abiding friendships. People who do not reach out to develop intimate relationships risk retreating into isolation and loneliness.

Erikson warned that we may not be able to commit ourselves to others until we have achieved ego identity—that is, established stable life roles. Achieving ego identity is the central task of adolescence. Erikson's clinical experience led him to believe that young adults who had not achieved ego identity—a firm sense of who they are and what they stand for—may not be ready to commit themselves to others. They may not be able to gauge the extent to which their developing values may conflict with those of a potential intimate partner. He suggested that in our society, which values compatibility in relationships, an absent or fluctuating ego identity is connected with the high divorce rate in teenage marriages. Once passion fades a bit, conflicting ways of looking at the world may be too abrasive to bear. Erikson argued that young adults who do not reach out to develop intimate relationships risk retreating into isolation and loneliness.

Levinson labeled the ages of 28 to 33 the **age-30 transition**. For men and women, the late 20s and early 30s are commonly characterized by reassessment: “Where is my life going?” “Why am I doing this?” During our 30s, we often find that the lifestyles we adopted during our 20s do not fit as comfortably as we had expected.

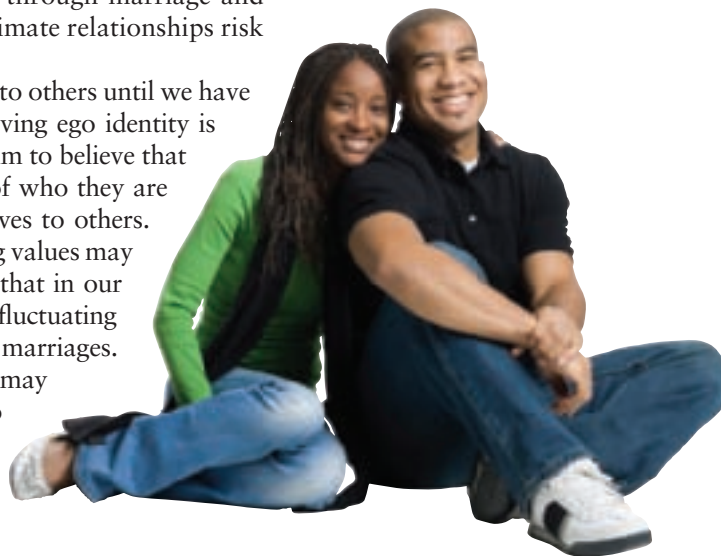
Many psychologists find that the later 30s are characterized by settling down or planting roots. Many young adults feel a need to make a financial and emotional investment in their home. Their concerns become more focused on promotion or tenure, career advancement, and long-term mortgages.

Postformal stage A proposed stage of cognitive development in which the individual has achieved knowledge that judgments of people and behavior are made within certain value systems, has begun to narrow infinite possibilities into practical choices, and has overcome the egocentrism of adolescence.

The Dream Levinson's term for the overriding drive of youth to become someone important, to leave one's mark on history.

Intimacy versus isolation Erikson's life crisis of early adulthood, which is characterized by the task of developing abiding intimate relationships.

Age-30 transition Levinson's term for the ages from 28 to 33, which are characterized by reassessment of the goals and values of the 20s.



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Intimate Relationships Erik Erikson saw the establishment of intimate relationships as central to early adulthood. Young adults who developed a firm sense of identity during adolescence would be ready to “fuse” their identities with those of other people through abiding relationships.

LearningConnections • EARLY ADULTHOOD

ACTIVE REVIEW (12) In _____ adulthood, most people are at their height in sensory acuteness, reaction time, and cardiovascular fitness. (13) Perry points out that young adults are (more or less?) likely than adolescents to realize that judgments of good or bad are often made from a certain belief system, so their thinking grows more complex and less absolute. (14) Young adults are (more or less?) egocentric than adolescents. (15) Erikson characterized early adulthood as the stage of _____ versus isolation. (16) Today, a (higher or lower?) percentage of young adults remain single for an extended period.

REFLECT AND RELATE Where do you see yourself as fitting in the chronicle of adolescent and adult life? Are there any ways you must “stretch” the definition of a phase of development to make the fit?

CRITICAL THINKING How would *you* define adulthood? Explain.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

MIDDLE ADULTHOOD

Middle adulthood spans the ages of 40 to 60 or 65. It is a period of being sort of “sandwiched” between early and late adulthood. Yet it is a most fruitful period of life, and for many, as the saying goes, it is the “prime of life.”

Physical Development

Question 11: What physical developments occur during middle adulthood? In our middle years, we are unlikely to possess the strength, coordination, and stamina that we had during our 20s and 30s. The decline is most obvious in professional sports, where peak performance is at a premium. Most pros at those ages can no longer keep up with the “kids.”

The years between 40 and 60 are reasonably stable. There is gradual physical decline, but it is minor and likely to be of concern only if a person competes with young adults—or with idealized memories of oneself. There are exceptions: A 20-year-old couch potato could become a 50-year-old marathoner. By any reasonable standard, people in middle adulthood can maintain excellent cardiorespiratory condition. Because the physical decline in middle adulthood is gradual, people who begin to eat more nutritious diets (for example, decrease intake of animal fats and increase intake of fruits and vegetables) and to exercise may find themselves looking and feeling better than they did in early adulthood.

For women, **menopause** is usually considered the single most important change of life that occurs during middle adulthood. It usually occurs during the late 40s or early 50s. Menopause is the final phase of the *climacteric*, which is caused by a decline in secretion of female sex hormones. Ovulation draws to an end, and there is some loss of breast tissue and skin elasticity. During the climacteric, many women experience hot flashes, loss of sleep, and some anxiety and depression. This is all normal. Women’s experiences during and following the climacteric reflect the intensity of their physical symptoms—which vary considerably—and the extent to which their self-concept was wrapped up with their reproductive capacity (Rathus et al., 2011).

Cognitive Development

Question 12: What cognitive developments occur in middle adulthood? As we approach middle adulthood, it becomes useful to think in terms of two types of intellectual functioning: crystallized intelligence and fluid intelligence. **Crystallized intelligence** is defined as a cluster of knowledge and skills that depend on accumulated information and experience, awareness of social conventions, and the capacity to make good decisions and judgments. Crystallized intelligence includes knowledge of the specialized vocabulary in a field; in English, for example, one might know the meaning of the terms *iambic pentameter*, *rhetoric*, and *onomatopoeia*. We know that it is socially desirable to look a business associate in the eye in the United States, but did you know that this behavior is considered hostile in Japan? Choosing to eat healthful foods could also be considered a sign of crystallized intelligence.

Menopause The cessation of menstruation.

Crystallized intelligence One’s lifetime of intellectual achievement as shown largely through vocabulary and knowledge of world affairs.



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Fluid intelligence involves a person's skills at processing information. Let's do a quick comparison to a computer. Your crystallized intelligence is like the amount of information you have in storage. Your fluid intelligence is more like the sizes of your processor and your memory (that is, *working memory*—how much you can keep in mind at once), which work together to access and manipulate information and arrive at answers quickly and accurately. Whereas researchers suggest a powerful role for environmental factors in the genesis of crystallized intelligence, they theorize a relatively stronger role for neurological factors in fluid intelligence (Horn & Noll, 1997; Salthouse & Davis, 2006).

Studies show that crystallized intelligence tends to increase with age through middle adulthood. **Truth or Fiction Revisited:** In the absence of senile dementias, crystallized intelligence commonly increases throughout the life span, along with scores on verbal subtests of standardized intelligence tests. The same studies that indicate that crystallized intelligence tends to increase throughout adulthood tend to show a decline for fluid intelligence (Escorial et al., 2003; Salthouse, 2001). K. Warner Schaie's (1994) longitudinal data (see Figure 11.6 ■) show that the intellectual factor of perceptual speed, which is most strongly related to fluid intelligence, is also the one that drops off most dramatically from early adulthood to late adulthood. Spatial orientation and numerical ability, both related to fluid intelligence, also decline dramatically in late adulthood. Verbal ability and inductive reasoning are more closely related to crystallized intelligence, and these show gains through middle adulthood and hold up in late adulthood.

Figure 11.6 reveals group trends; there are interindividual variations. Schaie and his colleagues (2004) found that circumstances such as the following tend to stem cognitive decline in advanced late adulthood:

- Good physical health
- Favorable environmental conditions, such as decent housing
- Remaining intellectually active through reading and keeping up with current events
- Being open to new ideas and new styles of life

Social and Emotional Development

Question 13: What social and emotional developments occur during middle adulthood? Consider Erikson's views on the middle years.

Erikson (1963) labeled the life crisis of the middle years **generativity versus stagnation**. *Generativity* involves doing things that we believe are worthwhile, such as rearing children or producing on the job. Generativity enhances and maintains self-esteem. It also involves helping to shape the new generation. This shaping may involve rearing our own children or making the world a better place, for example, through joining church or civic groups. *Stagnation* means treading water, as in keeping the same job at the same rate of pay for 30 years or even moving backward, as in moving into a less responsible and poorer paying job or neglecting to rear one's children. Stagnation has powerful destructive effects on self-esteem.

According to Levinson and colleagues (1978), whose research involved case studies of 40 men, there is a **midlife transition** at about age 40 to 45 characterized by a shift in psychological perspective. Previously, men had thought of their age in terms of the number of years that had elapsed since birth. Now they begin to think of their age in terms of the number of years they have left. Men in their 30s still think of themselves as older brothers to "kids" in their 20s. At about age 40 to 45, however, some marker event—illness, a change of job, the death of a friend or parent, or being beaten at tennis by their son—leads men to realize that they are a full generation older. Suddenly, there seems to be more to look back on than forward to. It dawns on men that they will never be president or chairperson of the board. They will never play shortstop for the Dodgers. They mourn the passing of their own youth and begin to adjust to the specter of old age and the finality of death.

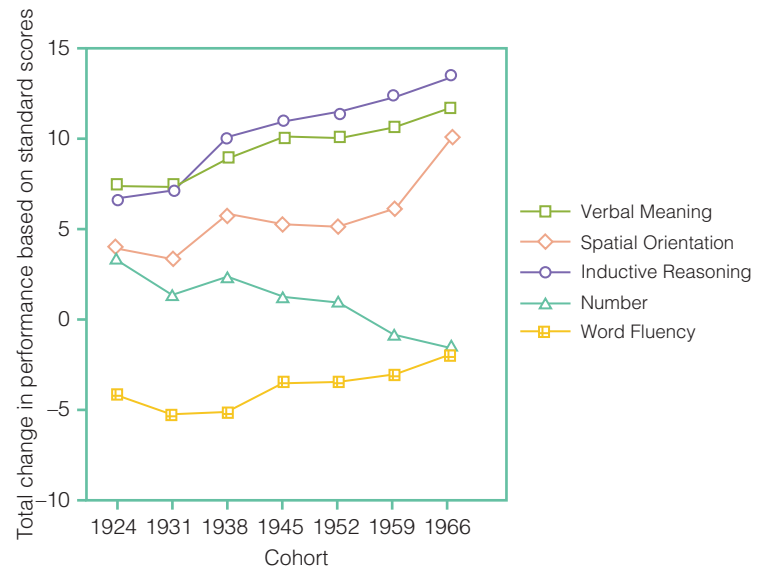


Figure 11.6 ■ Longitudinal Changes in Six Intellectual Abilities, Ages 25–88 Most intellectual abilities show gains or remain largely unchanged through middle adulthood. Numerical ability shows a modest decline throughout middle adulthood, and perceptual speed shows a more dramatic drop-off.

Source: K. Warner Schaie. The course of adult intellectual development. *American Psychologist*, 49, 304–313, Figure 6. Copyright © 1994 American Psychological Association. Reprinted by permission.

Fluid intelligence Mental flexibility as shown in learning rapidly to solve new kinds of problems.

Generativity versus stagnation

Erikson's term for the crisis of middle adulthood, characterized by the task of being productive and contributing to younger generations.

Midlife transition Levinson's term for the ages from 40 to 45, which are characterized by a shift in psychological perspective from viewing ourselves in terms of years lived to viewing ourselves in terms of the years we have left.

Controversy in Psychology DO PARENTS EXPERIENCE AN “EMPTY-NEST SYNDROME” WHEN THE YOUNGEST CHILD LEAVES HOME?

In earlier decades, psychologists placed great emphasis on a concept referred to as the **empty-nest syndrome**. This concept was applied most often to women. It was assumed that women experience a profound sense of loss when their youngest child goes off to college, gets married, or moves out of the home. The sense of loss was assumed to be

greatest among women who had remained in the home (Stewart & Ostrove, 1998).

Truth or Fiction Revisited: However, it is *not* true that parents suffer from the empty-nest syndrome when the youngest child leaves home. Research findings paint a more optimistic picture. Certainly, there can be a sense of loss when the children have

left home, and the loss applies to both parents. Parents may find it difficult to let go of the children after so many years of mutual dependence. However, many mothers report increased marital satisfaction and personal changes such as greater mellowness, self-confidence, and stability once the children have left home (Etaugh & Bridges, 2006).

Research suggests that women may undergo a midlife transition earlier than men do (Stewart & Ostrove, 1998). Why? Much of it is related to the winding down of the “biological clock”—that is, the abilities to conceive and bear children. For example, once they turn 35, women are usually advised to have their fetuses routinely tested for Down syndrome and other chromosomal disorders. At age 35, women also enter higher-risk categories for side effects from birth control pills. Yet many women today are having children in their 40s and, now and then, beyond.

In both genders, according to Levinson, the midlife transition may trigger a crisis—the **midlife crisis**. The middle-level, middle-aged businessperson looking ahead to another 10 to 20 years of grinding out accounts in a Wall Street cubbyhole may encounter severe depression. The homemaker with two teenagers, an empty house from 8 a.m. to 4 p.m., and a 40th birthday on the way may feel that she or he is coming apart at the seams. Both feel a sense of entrapment and loss of purpose. Some people are propelled into extramarital affairs by the desire to prove to themselves that they are still attractive.

Some theorists present portraits of middle-aged people suddenly focusing on tragedy, loss, or doom, but others find people to be in or entering the “prime of life” (Almeida & Horn, 2004; Lachman, 2004). As noted earlier, most people in middle adulthood encounter little decline in physical prowess. Intellectually, there is some loss in fluid intelligence, but crystallized intelligence is often growing—especially among professionals who are continuing to develop skills in their chosen fields.

Middle-aged adults, especially professionals, are also often earning more money than young adults. They are more likely to be settled geographically and vocationally, although there can be midlife career changes. By now, one may have built systems of social support and may be involved in enduring romantic and social relationships and have children. The flip side of all this, as we will see, may be overwhelming responsibility, such as caring for adolescent children, a spouse, aging parents, and remaining in the workplace all at once—quite a juggling act!

I've yet to be on a campus where most women weren't worrying about some aspect of combining marriage, children, and a career. I've yet to find one where many men were worrying about the same thing.

GLORIA STEINEM

PERSONALITY THEMES AMONG COLLEGE-EDUCATED WOMEN

Abigail Stewart, Joan Ostrove, and Ravenna Helson (2001) developed scales to assess a number of personality themes among women, as shown in Table 11.2. Alyssa Zucker and her colleagues (2002) administered these scales to three cohorts of college-educated women: women in their 20s, 40s, and 60s. As you can see in Figure 11.7, scores on three of the scales were higher for women in their 40s than women in their 20s and then higher again for women in their 60s: **identity certainty**, **confident power**, and concern about aging. Generativity was higher in the 40s than in the 20s, but the generativity of the cohort in its 60s was much the same. **Truth or Fiction Revisited:** Despite increasing concern with aging, personal distress was lower among older women, suggesting, perhaps, that older women are more settled. Remember, however, that these samples are of college-educated women, so they are less likely than the general population to incur certain financial and health problems in late adulthood that people on the lower rung of the socioeconomic ladder might encounter.

Yes, the older women were more aware of their aging, both because of physical changes (for example, menopause) and psychosocial markers (for example, the maturation of the children). However, they were also more certain as to who they were

Empty-nest syndrome A sense of depression and loss of purpose felt by some parents when the youngest child leaves home.

Midlife crisis A crisis experienced by many people during the midlife transition when they realize that life may be more than halfway over and reassess their achievements in terms of their dreams.

Identity certainty A strong and clear sense of who one is and what one stands for.

Confident power Feelings of self-confidence, self-efficacy.

Table 11.2 ■ Themes Used on Scales to Assess Development of Personality in Women from Young Adulthood Through Late Adulthood

Theme	Items Assess Feelings Such as the Following:
Identity certainty	Feeling that I am my own person; believing that I will seize my opportunities; being of a clear mind about what I can accomplish
Confident power	Having self-confidence; having a sense of authority and power; believing that others respect me
Concern with aging	Looking old; thinking about death a great deal; feeling less attractive than I used to look; feeling that men are no longer interested in me
Generativity	Having a sense of being needed; helping younger people learn and develop; trying to make positive changes in society; having interests beyond my immediate family
Personal distress	Feeling depressed or disillusioned; feeling angry at men or women; having feelings of incompetence; feeling alone; feeling exploited

Source: Stewart, A. J., Ostrove, J. M., & Helson, R. (2001). Middle aging in women: Patterns of personality change from the 30s to the 50s. *Journal of Adult Development*, 8, 23–37.

and what they stood for. They had assumed more responsibility for society at large (for instance, occupational, civic, and political activities) and were more achievement-oriented, self-confident, dominant, and self-assertive. It is as if middle age frees many women—at least educated women—from traditional gender-related shackles.

RELATIONSHIPS IN MIDDLE ADULTHOOD

The term *middle adulthood* is a convenient way of describing people whose ages lie between early adulthood and late adulthood. In terms of their family relationships, their generation is in the middle in another way—often “sandwiched,” as we will see, between their own children (and grandchildren) and their parents.

Infants are completely dependent on their parents. Children are also dependent. Adolescents strive for independence, and as they mature and gain experience, parents generally begin to share control with them. As a matter of fact, it is stressful for parents when adolescents do not exert self-control, and parents must direct them in many areas of life—waking them up in time for school, urging them to maintain their personal hygiene, fighting with them over their choice of clothing, and coaxing them to complete their homework. Once their children become emerging adults or young adults, most parents in the United States are content to “launch” their children to live on their own or with roommates. In many cases, the children remain at least partly financially dependent, sometimes for several years (Aquilino, 2005; Roberts, 2009). If they have been close to their parents, they may also remain somewhat emotionally dependent once they are out on their own as well—or at the very least, it may hurt when their parents disapprove of their personal choices. The parents are usually satisfied with their children living apart if they call or e-mail regularly and drop by (or allow the parents to drop by) with some sort of reasonable frequency. Parents often try to find a balance between staying in touch and “interfering,” especially once their children have partners or children of their own.

In some traditional societies, young adults do not usually leave the home of origin until they are married or some other key event takes place. Alessandra Rusconi (2004) compared people in Germany and Italy and found that Germans normally left home to

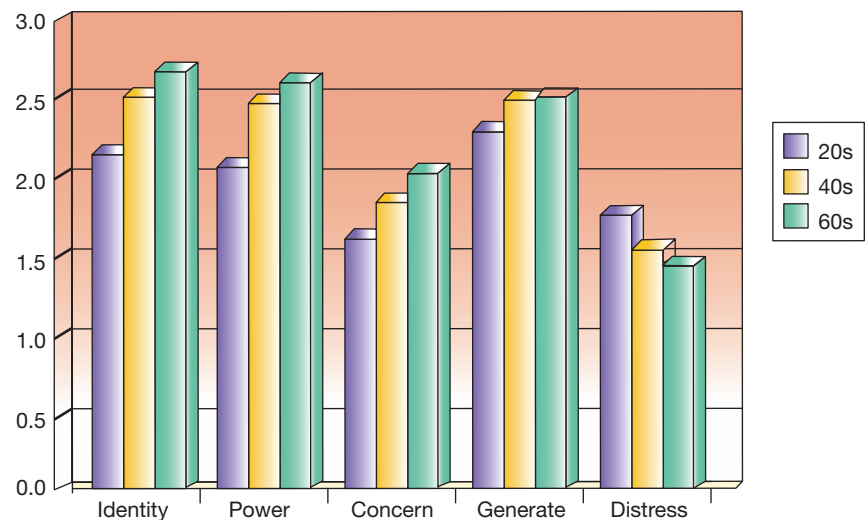


Figure 11.7 ■ Mean Scores of College-Educated Women of Different Ages According to Five Personality Themes

Source: Zucker, A. N., Ostrove, J. M., & Stewart, A. J. (2002). College-educated women's personality development in adulthood: Perceptions and age differences. *Psychology and Aging*, 17(2), 236–244.



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Sandwich generation People in middle adulthood who are responsible for meeting the needs of their children yet also burdened by the needs of aging parents.

set up independent homes prior to marriage. In Italy, however, the picture was mixed. In large industrial cities, young adults tended to follow the German model, whereas more rural and southern Italians tended to remain in the home until they got married. Similarly, parents in some traditional societies assume that their adult children will live nearby; moving to another part of the country is not only painful but also something of an embarrassment for them among their extended family and community.

When their children take partners or get married, new challenges can emerge. First of all, it may seem that nobody can be “good enough” for their child, but sometimes, their child does apparently make a poor choice—or at least a poor match. The parents must then deal with the issues as to whether, and how, they express their feelings about it. Regardless of the partner or spouse chosen by their child, there are also in-laws and the extended family of the in-laws. Sometimes, there is a good match between the families of both partners, but more often, the families would not have chosen each other as friends. Still, for the sake of the child, the parents usually try to act friendly when the families are together. But it can be another source of stress.

MIDDLE-AGED CHILDREN AND AGING PARENTS: ON BEING IN THE “SANDWICH GENERATION”

Because of increasing life expectancy, more than half of the middle-aged people in developed nations have at least one living parent, and they frequently go on to experience late adulthood together (Callahan, 2007; U.S. Bureau of the Census, 2008). In Far Eastern nations such as China, Japan, and South Korea, older parents tend to live with their children and their grandchildren, but not so in the United States (Kwok, 2006).

You might think that most aging American parents move to Sunbelt locations such as Florida and Arizona, but it isn’t true. Nearly two thirds have a residence near a child (U.S. Bureau of the Census, 2008), and there are frequent visits and phone calls. The relationships between middle-aged and older parents can grow quite close, especially as tensions and expectations from earlier years tend to slip into history. If an older mother had been disappointed in her now middle-aged daughter’s choice of a husband, now the marriage may have ended or worked out, or there might be grandchildren to focus on. The years and other events place things in perspective. If the aging parents require assistance, in the United States and Canada the task usually falls to a middle-aged daughter, who then becomes what has been dubbed part of the **sandwich generation**. She is sandwiched between several generations, caring for or contributing to the support of her own children at the same time she is caring for one or two parents (Grundy & Henretta, 2006). She may also be helping out with grandchildren. If she is fortunate, there is a sibling living in the vicinity to share the task. Given that she is also likely to be in the workforce, her role overload is multiplied (Gans & Silverstein, 2006). In other areas, such as Hong Kong, however, where aging parents usually live with a son’s family, it is more often than not the son who assumes the major responsibility for caring for his parents, emotionally and financially (Kwok, 2007). In this patriarchal society, the son’s priorities often run like this: first, his own children; second, his parents; third, his wife.

LearningConnections • MIDDLE ADULTHOOD

ACTIVE REVIEW (17) _____ intelligence refers to one’s lifetime of intellectual achievement as shown by vocabulary and general knowledge. (18) _____ intelligence is mental flexibility as shown by the ability to solve new kinds of problems. (19) Erikson labeled the life crisis of the middle years _____ versus stagnation. (20) Research shows that most parents (do or do not?) suffer from the empty-nest syndrome. (21) Many people in middle adulthood are considered part of the _____ generation because they may be subject to the needs of their children and their aging parents.

REFLECT AND RELATE Are people in your extended family part of the sandwich generation? If so, how do they cope?

CRITICAL THINKING Why do you think the women who are college graduates show increases in “identity certainty” and “confident power” as they advance through middle adulthood?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

LATE ADULTHOOD

An agequake is coming. People age 65 and older are the most rapidly growing segment of the U.S. population (National Center for Health Statistics, 2009). So many people are living longer that we are in the midst of a “graying of America,” an aging of the population that is having significant effects on many aspects of society. In 1900, only one person in twenty-five was over the age of 65. Today, that figure has more than tripled to one in eight of us. By mid-century, more than one in five Americans will be 65 years of age or older. By the year 2050, we expect to see the percentage of Americans over the age of 75 to double (National Center for Health Statistics, 2009; see Figure 11.8 ■).

One’s **life span**, or **longevity**, is the length of time one can live under the best of circumstances. The life span of a species, including humans, depends on its genetic programming. With the right genes and environment and with the good fortune to avoid serious accidents or illnesses, people have a life span of about 115 years.

One’s **life expectancy** refers to the number of years a person in a given population group can expect to live. The average European American child born 100 years ago in the United States could expect to live 47 years. The average African American could expect a shorter life of 35.5 years (Andersen & Taylor, 2009). Great strides have been made in increasing life expectancy. High infant mortality rates due to diseases such as German measles, smallpox, polio, and diphtheria contributed to the lower life expectancy rates of a century ago. These diseases have been brought under control or eradicated. Other major killers, including bacterial infections such as tuberculosis, are now largely controlled by antibiotics. Factors that contribute to longevity include public health measures such as safer water supplies, improved dietary habits, and more efficient health care. Table 11.3 ■ shows the life expectancy of males and females born in 2002 in various regions and countries of the world.

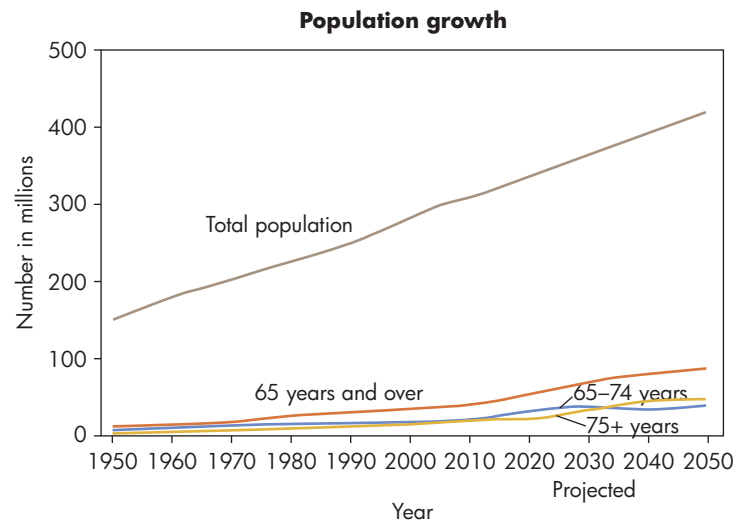


Figure 11.8 ■ Projected Population Growth of the U.S. Population and of People Aged 65 and Over Through 2050

Source: National Center for Health Statistics. (2009). Health, United States, 2008 with Chartbook, Figure 1. Hyattsville, MD: Library of Congress Catalog Number 76-641496. U.S. Government Printing Office, Washington, DC 20402.

Table 11.3 ■ Life Expectancy at Birth by Region, Country, and Gender

	MALES	FEMALES
AFRICA		
Mozambique	32	32
Egypt	68	73
ASIA		
Afghanistan	47	46
China	70	74
India	63	64
Japan	78	84
South Korea	72	79
LATIN AMERICA		
Brazil	67	75
Cuba	74	79
Jamaica	74	78
Mexico	69	75
EUROPE		
France	75	83
Germany	75	81
Italy	76	82
Poland	70	78
Russia	62	73
Sweden	77	83
United Kingdom	76	81
NORTH AMERICA		
Canada	76	83
United States	74	80

Source: Adapted from U.S. Census Bureau. (2004, March 22). International Programs Center, International Data Base. Global Population Profile: 2002, Table A-12.

*Sooner or later I'm going to die,
but I'm not going to retire.*

MARGARET MEAD

Life span (longevity) The maximum amount of time a person can live under optimal conditions.

Life expectancy The amount of time a person can be expected to live in a given setting.

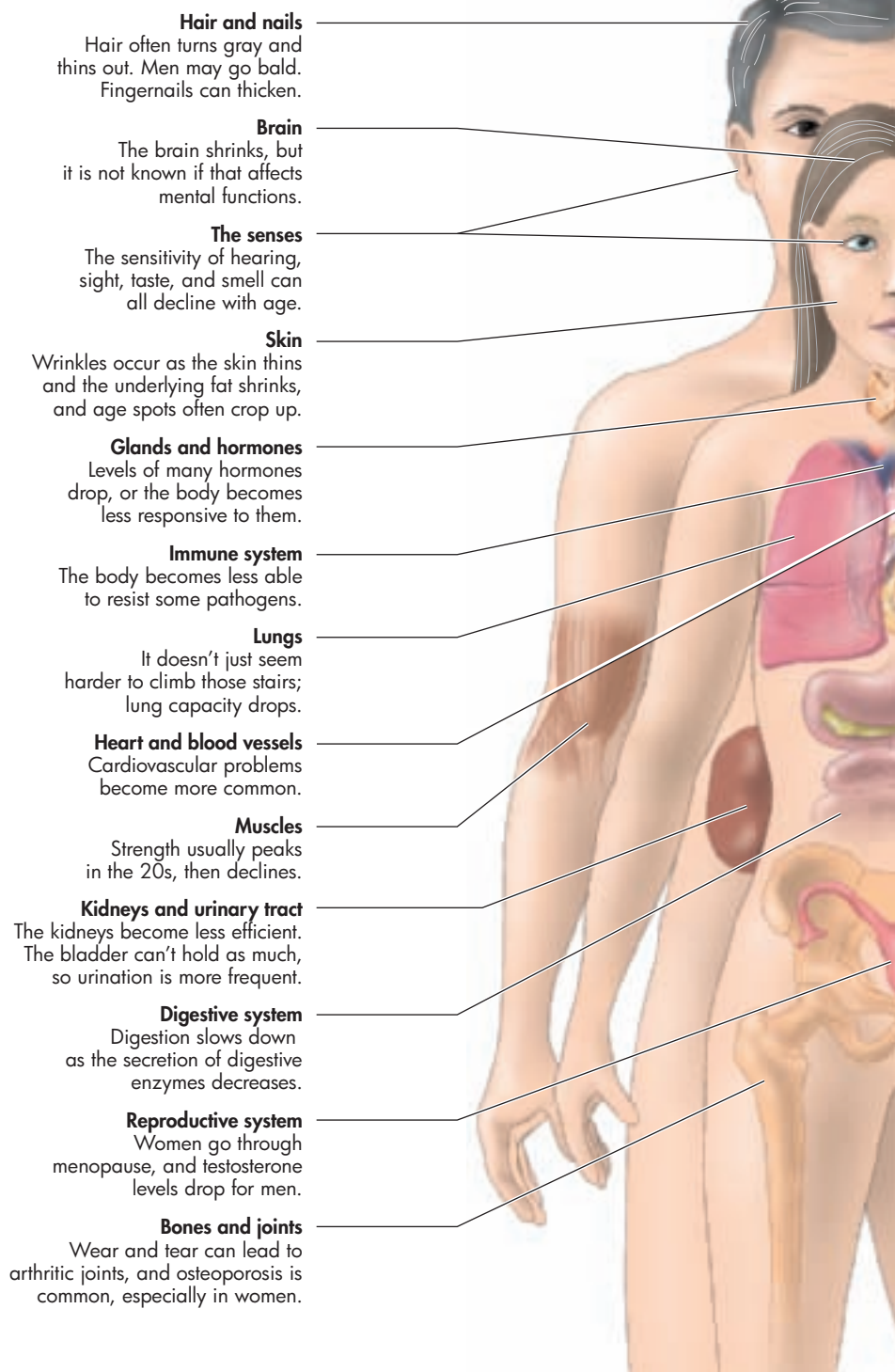


Figure 11.9 ■ The Relentless March of Time A number of physical changes occur during the later years. However, the reasons for aging are not yet completely understood. People can also affect the pace of their aging by eating properly, exercising, maintaining a positive outlook, and finding and meeting challenges that are consistent with their abilities.

to decline. Let's consider changes in sensory functioning, bone density, sleep, and sexual functioning in greater depth, as well as some theories regarding why we age.

SENSORY CHANGES

Beginning in middle age, the lenses of the eyes become brittle, leading to presbyopia, as discussed in Chapter 4. Chemical changes of aging can lead to vision disorders such as **cataracts** and **glaucoma**. Cataracts cloud the lenses of the eyes, reducing vision. Today, outpatient surgery for correcting cataracts is routine. If performed before the condition progresses too far, the outcome for regained sight is excellent. Glaucoma is a buildup of fluid pressure inside the eyeball. It can lead to tunnel vision (lack of peripheral vision) or

Today, the average American newborn can expect to live to about 78 years, but there are important differences in life expectancy according to gender, race, geographical location, and health-related behavior (Ezzati et al., 2008). For example, the life expectancy for an Asian American woman living in an upscale county is in the upper 80s. The life expectancy for an African American male living in an urban environment with a high risk of homicide is in the 60s (Murray et al., 2006).

Despite the increases in life expectancy, our physical being, or health, and many cognitive processes are in decline during late adulthood. Also, many of the social expectations and institutions with which we are familiar—such as a retirement age of 65 and social security—were shaped at times when we did not live so long. Therefore, the retirement age is being pushed back farther and farther. On a psychological level, aging requires adjusting to certain inevitable physical changes and financial limitations and, for many, seeking new age-appropriate challenges and optimizing the opportunities that remain.

Physical Development

Question 14: What physical changes occur as people advance to late adulthood? Let's enumerate the inevitable changes for people who live into late adulthood. For example, the skin becomes less elastic and is subject to wrinkles and folds in late adulthood (see Figure 11.9 ■). Hair tends to thin. Reaction time—the amount of time required to respond to a stimulus—increases. Older drivers, for example, need more time to respond to changing road conditions. As we grow older, our immune system functions less effectively, leaving us more vulnerable to disease. The metabolism slows, frequently leading to weight gain. Muscle strength also tends

blindness. Glaucoma rarely occurs before age 40, and it affects about 1 in 250 people older than 40 and 1 in 25 people older than 80. Glaucoma is treated with medication or surgery.

The sense of hearing, especially the ability to hear higher frequencies, also declines with age. **Presbycusis** is age-related hearing loss that affects about 1 person in 3 over the age of 65 (Sommers, 2008). Taste and smell become less acute as we age. Our sense of smell decreases almost ninefold from youth to advanced late adulthood. We also lose taste buds in the tongue with aging. As a result, foods must be more strongly spiced to yield the same flavor.

CHANGES IN BONE DENSITY

Bones begin to lose density in middle adulthood, becoming more brittle and vulnerable to fracture. Bones in the spine, hip, thigh, and forearm lose the most density as we age. In **osteoporosis**, bones lose so much calcium that they become dangerously prone to breakage. Osteoporosis results in more than 1 million bone fractures a year in the United States, the most serious of which are hip fractures. Hip fractures often result in hospitalization, loss of mobility, and as is often the case in people in advanced late adulthood, death from complications.

Osteoporosis can shorten one's stature and deform one's posture, causing the curvature in the spine known as "dowager's hump." Both men and women are at risk of osteoporosis, but it poses a greater threat to women. Men typically have a larger bone mass, which provides them with more protection against the disorder.

CHANGES IN SLEEP

Older people need about 7 hours of sleep per night, yet sleep disorders such as insomnia and **sleep apnea** become more common in later adulthood (Wickwire et al., 2008). Sleep apnea is linked to increased risk of heart attacks and strokes. Sleep problems in late adulthood may involve physical changes that bring discomfort. Sometimes, they symptomize psychological disorders such as depression, anxiety, or dementia. Men with enlarged prostate glands commonly need to urinate during the night, causing awakening. Other factors contributing to sleep problems include loneliness, especially after the death of a close friend, spouse, or life partner (Wickwire et al., 2008).

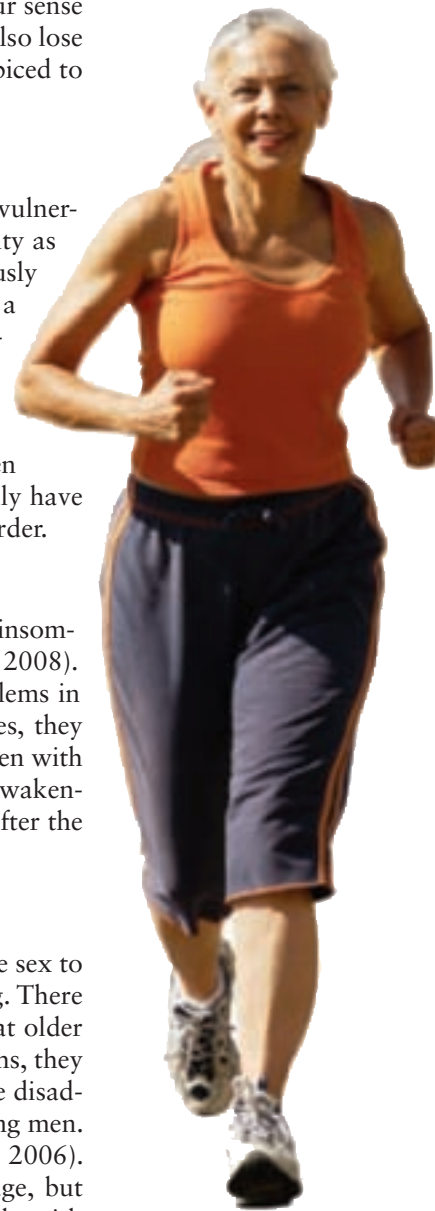
CHANGES IN SEXUALITY

Even in the aftermath of the sexual revolution of the 1960s, many people still tie sex to reproduction. Therefore, they assume that sex is appropriate only for the young. There are unfounded cultural myths to the effect that older people are sexless and that older men with sexual interests are "dirty old men." If older people believe these myths, they may renounce sex or feel guilty if they remain sexually active. Older women are disadvantaged by a double standard of greater tolerance of continued sexuality among men.

However, people do not lose their sexuality as they age (Laumann et al., 2006). Sexual daydreaming, sex drive, and sexual activity all tend to decline with age, but sexual satisfaction may remain high (Barnett & Dunning, 2003). Older people with partners usually remain sexually active (Laumann et al., 2006). Most older people report that they like sex. Sexual activity among older people is influenced not only by physical changes and cultural expectations, but also by psychological well-being and feelings of intimacy (Laumann et al., 2006; Trudel et al., 2007).

Many of the physical changes in older women stem from a decline in estrogen production. The vaginal walls lose much of their elasticity and grow paler and thinner. Thus, sexual activity may become painful. The thinning of the walls may also place greater pressure against the bladder and urethra during sex, sometimes leading to urinary urgency and a burning sensation during urination. The labia majora lose much of their fatty deposits and become thinner. The vaginal opening constricts, and penile entry may become difficult. Following menopause, women also produce less vaginal lubrication, and lubrication may take minutes, not seconds, to appear. Lack of adequate lubrication is a key reason for painful sex. The spasms of orgasm become less powerful and fewer in number. Thus, orgasm may feel less intense, even though the experience may remain satisfying.

Age-related changes occur more gradually in men than women and are not clearly connected with any one biological event (Barnett & Dunning, 2003). Male adolescents



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Cataract A condition characterized by clouding of the lens of the eye.

Glaucoma A condition characterized by abnormally high fluid pressure in the eye.

Presbycusis Loss of sharpness of hearing due to age-related degenerative changes in the ear.

Osteoporosis A disorder in which the bones become more porous, brittle, and subject to fracture due to loss of calcium and other minerals.

Sleep apnea Temporary suspension of breathing while asleep.

AGING, GENDER, AND ETHNICITY

Although Americans in general are living longer, there are gender and ethnic differences in life expectancy. For example, women in our society outlive men by 5 to 6 years (Miniño et al., 2010). European Americans and Asian Americans live longer on average than do Latino and Latina Americans, African Americans, and Native Americans (Miniño et al., 2010).

Why do women in the United States outlive men? For one thing, heart disease—the nation's leading killer—tends to develop later in women than in men. Men are also more likely to die because of accidents, cirrhosis of the liver, strokes, suicide, homicide, AIDS, and cancer (Miniño et al., 2010). Many such deaths

reflect excessive drinking and risky behavior. Many men are also reluctant to have regular physical exams or to talk to their doctors about their health problems. “In their 20s, [men are] too strong to need a doctor; in their 30s, they’re too busy, and in their 40s, too scared” (Courtenay, 2000, p. 4).

There is a 7-year difference in life expectancy between people in the highest income brackets and those in the lowest. Members of certain ethnic minority groups in our society are likely to be poor. Poor people tend to eat less nutritious diets, encounter more stress, and have less access to health care (M. D. Wong et al., 2009; Yang et al., 2009). We cannot control our gender and ethnic background, but we can choose whether or not to engage in more healthful behavior.

may achieve erection in seconds. After about age 50, men take progressively longer to achieve erection. Erections become less firm, perhaps because of lowered testosterone levels (Laumann et al., 2006). Testosterone production usually declines gradually from about age 40 to age 60 and then begins to level off. An adolescent may require but a few minutes to regain erection and ejaculate again after a first orgasm, whereas past age 50, regaining erection may require several hours. Older men produce less ejaculate, and the contractions of orgasm become weaker and fewer. Still, an older male may enjoy orgasm.

WHY DO WE AGE?

Although it may be hard to believe it will happen to us, every person who has walked the earth so far has aged. **Question 15: Why do we age?** Theories of aging fall into two broad categories:

- *Programmed theories* see aging as the result of genetic instructions.
- *Cellular damage theories* propose that aging results from damage to cells.

PROGRAMMED THEORIES OF AGING Programmed theories propose that aging and longevity are determined by a biological clock that ticks at a rate governed by genes. That is, the seeds of our own demise are carried in our genes. Evidence supporting a genetic link to aging comes in part from studies showing that longevity tends to run in families (Terry et al., 2008). For example, the siblings of centenarians are more likely than members of the general population to live to be 100 themselves (Terry et al., 2008).

But why should organisms carry “suicidal” genes? Programmed aging theorists believe that it would be adaptive for species to survive long enough to reproduce and transmit their genes to future generations. From the evolutionary perspective, there would be no advantage to the species (and probably a disadvantage, given limited food supplies) to repair cell machinery and body tissues to maintain life indefinitely.

Cellular clock theory focuses on the built-in limits of cell division. After dividing about 50 times, human cells cease dividing and eventually die (Terry et al., 2008). Researchers find clues to the limits of cell division in *telomeres*, the protective segments of DNA at the tips of chromosomes. Telomeres shrink each time cells divide. When the loss of telomeres reaches a critical point after a number of cell divisions, the cell may no longer be able to function (Terry et al., 2008). The length of the telomeres for a species may determine the number of times a cell can divide and survive.

Hormonal stress theory focuses on the endocrine system, which releases hormones into the bloodstream. Hormonal changes foster age-related changes such as puberty and menopause. As we age, stress hormones, including corticosteroids and adrenaline, are left at elevated levels following illnesses, making the body more vulnerable to chronic conditions such as type 2 diabetes, osteoporosis, and heart disease. The changes in production of stress hormones over time may be preprogrammed by genes.

Immunological theory holds that the immune system is preset to decline by an internal biological clock. For example, the production of antibodies declines with age, rendering the body less able to fight off infections. Age-related changes in the immune system also increase the risk of cancer and may contribute to general deterioration.

CELLULAR DAMAGE THEORIES OF AGING Programmed theories assume that internal bodily processes are preset to age by genes. Cellular damage theories propose that internal bodily changes and external environmental assaults (such as carcinogens and toxins) cause cells and organ systems to malfunction, leading to death. For example, the *wear-and-tear theory* suggests that over the years, our bodies—as machines that wear out through use—become less capable of repairing themselves.

The *free-radical theory* attributes aging to damage caused by the accumulation of unstable molecules called *free radicals*. Free radicals are produced during metabolism by oxidation, possibly damaging cell proteins, membranes, and DNA (Rattan, 2008). Most free radicals are naturally disarmed by nutrients and enzymes called *antioxidants*. Most antioxidants are either made by the body or found in food. As we age, our bodies produce fewer antioxidants (Rattan, 2008). People whose diets are rich in antioxidants are less likely to develop heart disease and some cancers. As we age, cell proteins bind to one another in a process called *cross-linking*, thereby toughening tissues. Cross-linking stiffens collagen—the connective tissue supporting tendons, ligaments, cartilage, and bone. One result is coarse, dry skin. (Flavored animal collagen is called gelatin, better known by the brand name *Jell-O*.) *Cross-linking theory* holds that the stiffening of body proteins accelerates and eventually breaks down bodily processes, leading to some of the effects of aging (Rattan, 2008). The immune system combats cross-linking but becomes less able to do so as we age.

In considering the many theories of aging, we should note that aging is an extremely complex biological process that may not be explained by any single theory or cause. Aging may involve a combination of these and other factors.

Cognitive Development

Question 16: What cognitive developments take place during late adulthood? Cognitive development in late adulthood has many aspects—creativity, memory functioning, and intelligence. People can be creative for a lifetime, and some have flowered in late adulthood. At the age of 80, Merce Cunningham choreographed a dance that made use of computer-generated digital images (Teachout, 2000). Hans Hofmann created some of his most vibrant paintings at 85, and Pablo Picasso was painting in his 90s. Grandma Moses did not even begin painting until she was 78 years old. Giuseppe Verdi wrote his joyous opera *Falstaff* at the age of 79. **Truth or Fiction Revisited:** It is *not* true that architect Frank Lloyd Wright designed New York’s innovative spiral-shaped Guggenheim Museum when he was 65 years old. He was actually 89.

Memory functioning does, however, decline with age. It is common for older people to have trouble recalling the names of common objects or people they know (Rendell et al., 2005; Salthouse & Davis, 2006). Memory lapses can be embarrassing, and older people sometimes lose confidence in their memories, which then lowers their motivation to remember things. But declines in memory are not usually as large as people assume. Older people show better memory functioning in areas in which they can apply their experience, especially their specialties, to new challenges. For example, who would do a better job of learning and remembering how to solve problems in chemistry—a college history major or a retired chemistry professor?



Architect Frank Lloyd Wright with a Model of His Guggenheim Museum

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SELF ASSESSMENT

How Long Will You Live? The Life-Expectancy Scale

The life-expectancy scale is one of several used by physicians and insurance companies to estimate how long people will live. Scales such as these are far from precise—which is a good thing, if you think about it. But they make reasonable “guesstimates” based on our heredity, medical histories, and lifestyles.

Directions: To complete the scale, begin with the age of 72. Then add or subtract years according to the directions for each item.

RUNNING TOTAL

PERSONAL FACTS

- _____ 1. If you are male, subtract 3.
- _____ 2. If female, add 4.
- _____ 3. If you live in an urban area with a population over 2 million, subtract 2
- _____ 4. If you live in a town with under 10,000 people or on a farm, add 2.
- _____ 5. If any grandparent lived to 85, add 2.
- _____ 6. If all four grandparents lived to 80, add 6.
- _____ 7. If either parent died of a stroke or heart attack before the age of 50, subtract 4.
- _____ 8. If any parent, brother, or sister under 50 has (or had) cancer or a heart condition, or has had diabetes since childhood, subtract 3.
- _____ 9. Do you earn over \$75,000^a a year? If so, subtract 2.
- _____ 10. If you finished college, add 1. If you have a graduate or professional degree, add 2 more.
- _____ 11. If you are 65 or over and still working, add 3.
- _____ 12. If you live with a spouse or friend, add 5. If not, subtract 1 for every 10 years alone since age 25.

LIFESTYLE STATUS

- _____ 13. If you work behind a desk, subtract 3.
- _____ 14. If your work requires regular, heavy physical labor, add 3.

- _____ 15. If you exercise strenuously (tennis, running, swimming, etc.) five times a week for at least a half-hour, add 4. If two or three times a week, add 2.
- _____ 16. Do you sleep more than 10 hours each night? Subtract 4.
- _____ 17. Are you intense, aggressive, easily angered? Subtract 3.
- _____ 18. Are you easygoing and relaxed? Add 3.
- _____ 19. Are you happy? Add 1. Unhappy? Subtract 2.
- _____ 20. Have you had a speeding ticket in the last year? Subtract 1.
- _____ 21. Do you smoke more than two packs a day? Subtract 8. One or two packs? Subtract 6. One-half to one? Subtract 3.
- _____ 22. Do you drink the equivalent of 1 1/2 oz. of liquor a day? Subtract 1.
- _____ 23. Are you overweight by 50 lbs. or more? Subtract 8. By 30 to 50 lbs.? Subtract 4. By 10 to 30 lbs.? Subtract 2.
- _____ 24. If you are a man over 40 and have annual checkups, add 2.
- _____ 25. If you are a woman and see a gynecologist once a year, add 2.

AGE ADJUSTMENT

- _____ 26. If you are between 30 and 40, add 2.
- _____ 27. If you are between 40 and 50, add 3.
- _____ 28. If you are between 50 and 70, add 4.
- _____ 29. If you are over 70, add 5.

YOUR LIFE EXPECTANCY

^a This figure is an inflation-adjusted estimate.

Source: From Robert F. Allen with Shirley Linde. (1986). *Lifegain*. Human Resources Institute Press, Tempe Wick Road, Morristown, NJ.

One of the most severe assaults on intellectual functioning, especially among older people, is Alzheimer’s disease.

DEMENTIA AND ALZHEIMER’S DISEASE

Dementia is a condition characterized by dramatic deterioration of mental abilities involving thinking, memory, judgment, and reasoning. **Truth or Fiction Revisited:** Dementia is not a consequence of normal aging but of disease processes that damage brain tissue. Some causes of dementia include brain infections, such as meningitis, HIV infection, and encephalitis, and chronic alcoholism, infections, strokes, and tumors (Lippa, 2008; see Figure 11.10 ■). The most common cause of dementia is **Alzheimer’s disease (AD)**, a progressive brain disease affecting 4–5 million Americans.

The risk of AD increases dramatically with age (see Figure 11.11 ■). About one in ten Americans between the ages of 65 and 74 is diagnosed with AD, jumping to more than one in two among those in the 75- to 84-year-old category (Henderson, 2009).

Dementia A condition characterized by deterioration of cognitive functioning.

Alzheimer’s disease A progressive form of mental deterioration characterized by loss of memory, language, problem solving, and other cognitive functions.

Alzheimer's disease is rare in people younger than 65 (Lippa, 2008). Although some dementias may be reversible, especially those caused by tumors and treatable infections and those that result from depression or substance abuse, the dementia resulting from AD is progressive and irreversible (Lippa, 2008).

Alzheimer's disease progresses in several stages. At first, there are subtle cognitive and personality changes, and people with AD have trouble managing finances and recalling recent events. As AD progresses, people find it harder to manage daily tasks, select clothes, recall names and addresses, and drive. Later, they have trouble using the bathroom and maintaining hygiene. They no longer recognize family and friends or speak in full sentences. They may become restless, agitated, confused, and aggressive. They may get lost in stores, parking lots, even in their own homes. They may experience hallucinations or paranoid delusions, believing that others are attempting to harm them. People with AD may eventually become unable to walk or communicate and become completely dependent on others.

Although the cause or causes of AD remain a mystery, scientists believe that both environmental and genetic factors are involved (Goldman et al., 2008; Tomiyama et al., 2008). It is possible that the accumulation of plaque in the nervous system causes the memory loss and other symptoms of AD; however, experiments with nonhumans suggest that memory deficits may precede the formation of significant deposits of plaque (Jacobsen et al., 2006).

Medicines can help improve memory functions in people with AD, but their effects are modest. Researchers are investigating whether regular use of anti-inflammatory drugs and antioxidants may lower the risk of developing AD by preventing the brain inflammation associated with it (Gray et al., 2008; Meinert & Breitner, 2008). Calorie restriction may prevent the accumulation of plaque (Qin et al., 2006). Researchers are also investigating whether cognitive training that focuses on the enhancement of memory and processing speed can delay or prevent the development of AD (Acevedo & Loewenstein, 2007; Vellas et al., 2008).

Social and Emotional Development

Question 17: What social and emotional developments occur during late adulthood?

Generativity does not end with middle age. Research suggests that many individuals in late adulthood continue to be creative and also to maintain a firm sense of who they are and what they stand for (Webster, 2003). The Greek philosopher Plato was so optimistic about late adulthood that he argued one could achieve great pleasure in one's later years, engage in meaningful public service, and also achieve wisdom (McKee & Barber, 2001).

According to psychologist Erik Erikson, late adulthood is the stage of **ego integrity versus despair**. The basic challenge is to maintain the belief that life is meaningful and worthwhile as one ages and faces the inevitability of death. Erikson, like Plato, spoke of the importance of wisdom. He believed that ego integrity derives from **wisdom**, which can be defined as expert knowledge about the meaning of life, balancing one's own needs and those of others, and pushing toward excellence in one's behavior and achievements (Baltes & Staudinger, 2000; Sternberg, 2000). Erikson also believed that wisdom enables people to accept their life span as occurring at a certain point in the sweep of history and as being limited. We spend most of our lives accumulating objects and relationships, and Erikson argues that adjustment in the later years requires the ability to let go of them. Other views of late adulthood stress the importance of creating new challenges; however, biological and social realities may require older people to become more selective in their pursuits.

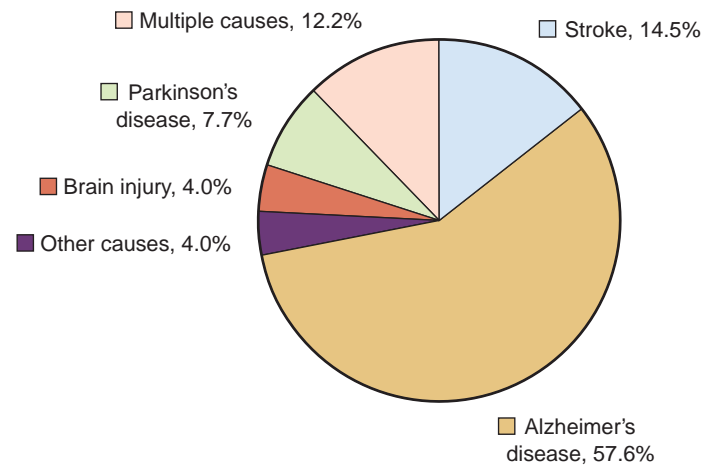


Figure 11.10 ■ Causes of Dementia

Source: Lippa, R. A. (2008). The relationship between childhood gender nonconformity and adult masculinity–femininity and anxiety in heterosexual and homosexual men and women. *Sex Roles*, 59(9–10), 684–693.

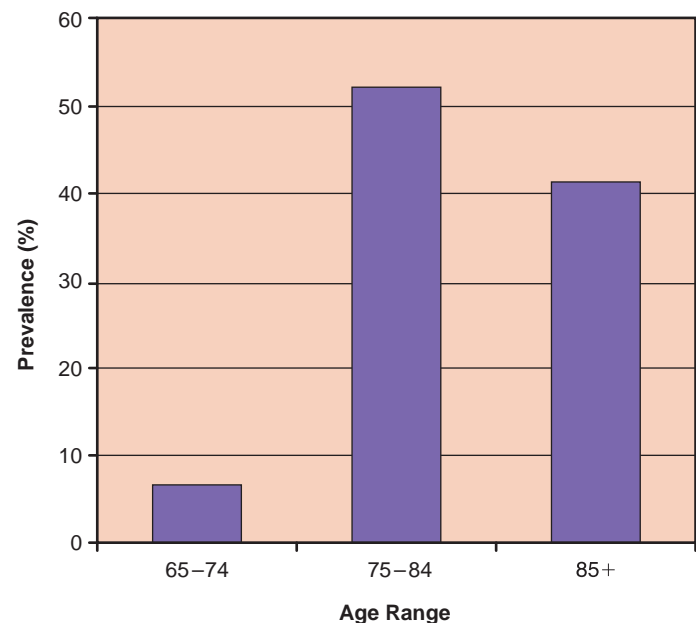


Figure 11.11 ■ Rates of Alzheimer's Disease among Older Adults

Ego integrity versus despair Erikson's term for the crisis of late adulthood, characterized by the task of maintaining one's sense of identity despite physical deterioration.

Wisdom Knowledge or what is right and important, coupled with good judgment.

*It's never too late to be what you
might have been.*

GEORGE ELIOT

Selective optimization with compensation Reshaping of one's life to concentrate on what one considers important and meaningful in the face of physical decline and possible cognitive impairment.

SUCCESSFUL AGING

Despite the changes that accompany aging, the majority of Americans in their 70s report being generally satisfied with their lives (Volz, 2000). According to a national poll by the *Los Angeles Times* of some 1,600 adults, 75% of older people say they feel younger than their years (Stewart & Armet, 2000).

Truth or fiction revisited: Successful aging is not a matter of accepting limitations and avoiding new challenges. Studies of successful aging identify the concept with physical activity, social contacts, self-rated good health, the absence of cognitive impairment and depression, nonsmoking, and the absence of disabilities and chronic diseases such as arthritis and diabetes (Depp & Jeste, 2006). One journal article identified 28 studies with 29 definitions of the concept (Depp & Jeste, 2006). By and large, the definitions included physical activity, social contacts, self-rated good health, the absence of cognitive impairment and depression, nonsmoking, and the absence of disabilities and chronic diseases such as arthritis and diabetes. According to these common criteria, 35% of the older people sampled in these studies could be said to be aging successfully. Other researchers define successful aging as good physical health, cognitive functioning, and social networking (Andrews et al., 2002).

SELECTIVE OPTIMIZATION WITH COMPENSATION

A different view of successful aging is advanced by researchers who focus on the processes by which individuals attempt to provide better person–environment fits to the changing physical, cognitive, and social circumstances of late adulthood (e.g., Baltes & Baltes, 1990; Rohr & Lang, 2009). From this point of view, often referred to as **selective optimization with compensation**, older people manage to maximize their gains while minimizing their losses.

Margaret Baltes and Laura Carstensen (2003) note that a good deal of the research carried on by developmental psychologists focuses on decline and loss as major themes associated with late adulthood. Therefore, this research tends to direct attention away from the fact that many older people experience late adulthood as a satisfying and productive stage of life. Successful agers also tend to seek emotional fulfillment by reshaping their lives to concentrate on what they find to be important and meaningful. Baltes and Carstensen (2003) define the process of selection as a narrowing of the array of goals and arenas to which older people direct their resources. In fact, Baltes and Carstensen go so far as to consider selective optimization with compensation the “cardinal principle of lifespan development” (2003).

Research about people aged 70 and older reveals that successful agers form emotional goals that bring them satisfaction (Löckenhoff & Carstensen, 2004). In applying the principle of selective optimization with compensation, successful agers may no longer compete in certain athletic or business activities (Bajor & Baltes, 2003; Freund & Baltes, 2002). Instead, they focus on matters that allow them to maintain a sense of control over their own lives. Successful agers also tend to be optimistic. Such an outlook may be derived from transcendence of the ego, from spirituality, or sometimes from one's genetic heritage. (Yes, there is a genetic component to happiness; Lykken & Csikszentmihalyi, 2001.) However, retaining social contacts and building new ones also contribute to a positive outlook, as does continuing with one's athletic activities, where possible, and one's artistic and cultural activities.

The stereotype is that retirees look forward to late adulthood as a time when they can rest from life's challenges. But sitting back and allowing the world to pass by is a prescription for depression, not for living life to its fullest. In one experiment, Sandman and Crinella (1995) randomly assigned people (average age 72) either to a foster grandparent program with neurologically impaired children or to a control group. They followed both groups for 10 years. The foster grandparents carried out physical challenges, such as walking a few miles each day, and also engaged in new kinds of social interactions. Those in the control group did not engage in these activities. After 10 years, the foster grandparents showed superior overall cognitive functioning, including memory functioning, and better sleep patterns compared with the controls.

In the more normal course of events, many successful agers challenge themselves by taking up new pursuits such as painting, photography, or writing. Some travel to new destinations. Others return to school and take special



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LearningConnections • LATE ADULTHOOD

ACTIVE REVIEW (22) According to _____ theories of aging, aging is determined by a genetic biological clock. (23) According to _____-and-tear theory, cells lose the ability to regenerate because of environmental factors such as pollution and disease. (24) During late adulthood, the senses become less acute and reaction time (increases or decreases?) (25) Alzheimer’s disease (is or is not?) a normal feature of the aging process. (26) Erikson labeled late adulthood the stage of ego _____ versus despair. (27) Successful agers optimize their strengths and _____ for their weaknesses.

REFLECT AND RELATE Think of the older people in your life. Would you characterize them as successful agers? Explain.

CRITICAL THINKING How do the factors that contribute to longevity demonstrate the roles of nature and nurture?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

courses for older students, sit in on regular college classes, or participate in seminars on special topics of interest. “Get away from that computer for a while!” demands an author’s spouse. “Look at this weather. Let’s go biking along the river.”

ON DEATH AND DYING

When we are young and our bodies are supple and strong, it may seem that we will live forever. All we have to do is eat right and exercise and avoid smoking, driving recklessly, and hanging around with the wrong people in the wrong neighborhoods. We may have but a dim awareness of our own mortality. We parcel thoughts about death and dying into a mental file cabinet to be opened later in life, along with items like retirement, social security, and varicose veins. But death can occur at any age—by accident, violence, or illness. Death can also affect us deeply at any stage of life through the loss of others.

Question 18: What are psychological perspectives on death and dying? In her work with terminally ill patients, Elisabeth Kübler-Ross found some common responses to news of impending death. She identified five stages of dying through which many patients pass, and she suggested that older people who suspect that death is approaching may undergo similar stages:

1. *Denial.* In the denial stage, people feel that “it can’t be happening to me. The diagnosis must be wrong.”
2. *Anger.* Denial usually gives way to anger and resentment toward the young and healthy and, sometimes, toward the medical establishment—“It’s unfair. Why me?”
3. *Bargaining.* Next, people may try to bargain with God to postpone their death, promising, for example, to do good deeds if they are given another 6 months or another year to live.
4. *Depression.* With depression come feelings of loss and hopelessness—grief at the inevitability of leaving loved ones and life itself.
5. *Final acceptance.* Ultimately, an inner peace may come, a quiet acceptance of the inevitable. Such “peace” does not resemble contentment. It is nearly devoid of feeling.

Much current “death education” suggests that hospital staff and family members can help support dying people by understanding the stages they are going through, by not imposing their own expectations on patients, and by helping patients achieve final acceptance when patients are ready to do so. But critics note that staff may be imposing Kübler-Ross’s expectations on dying patients.

There are other critiques of the views of Kübler-Ross. For example, Joan Retsinas (1988) notes that Kübler-Ross’s stages are limited to cases in which people receive a diagnosis of a terminal illness. Edwin Shneidman (1977) acknowledges the presence of feelings such as those described by Kübler-Ross in dying people, but his research shows that in dying, individuals behave more or less as they behaved during earlier periods when they experienced stress, failure, and threat. However, the process of dying does not necessarily follow any progression of stages as suggested by Kübler-Ross. The key factors

It’s only when we truly know and understand that we have a limited time on earth—and that we have no way of knowing when our time is up, we will then begin to live each day to the fullest, as if it was the only one we had.

ELISABETH KÜBLER-ROSS

— ■ —
*Dying is one of the few things
that can be done as easily
lying down.*

WOODY ALLEN
— ■ —

that appear to affect the adjustment of the dying individual include the type and extent of organic cerebral impairment, pain and weakness, the time or phase of the person's life, and the person's philosophy of life (and death). Theorists of social and emotional development in late adulthood suggest that concern for the well-being of humankind in general enables some people to begin to face death with an inner calm (Ardelt, 2008).

Grief and Bereavement

The death of a close friend or family member can be a traumatic experience. It typically leads to a state of **bereavement**, an emotional state of longing and deprivation that is characterized by feelings of **grief** and a deep sense of loss. **Mourning** is synonymous with grief over the death of a person but also describes culturally prescribed ways of displaying grief. Different cultures prescribe different periods of mourning and different rituals for expressing grief. The tradition of wearing unadorned black clothing for mourning dates at least to the Roman Empire. In rural parts of Mexico, Italy, and Greece, widows are often still expected to wear black for the remainder of their lives. In England and the United States, the wearing of black is on the decline. Coping with loss requires time and the ability to come to terms with the loss and move ahead with one's life. Having a supportive social network also helps.

GRIEVING

There is no one right way to grieve or a fixed period of time that grief should last. People grieve in different ways. Some grieve more publicly, whereas others reveal their feelings only in private. Grief usually involves a combination of emotions, especially depression, loneliness, feelings of emptiness, disbelief and numbness, apprehension about the future ("What will I do now?"), guilt ("I could have done something"), even anger ("They could have handled this better"). Grief may also be punctuated by relief that the deceased person is no longer suffering intense pain and by a heightened awareness of one's own mortality. Grief may compromise the immune system, leaving the person more vulnerable to disease. Researchers also find that the death of a loved one puts an individual at greater risk of committing suicide, especially during the 1st week following the loss (Ajdacic-Gross et al., 2008).

STAGES OF GRIEVING

Question 19: Are there stages of grieving as there are (proposed) stages of dying?

John Bowlby (1961), the attachment theorist, was the first to put forth a stage theory of grief for coping with bereavement. It included four stages: shock-numbness, yearning-searching, disorganization-despair, and reorganization. Jacobs (1993) modified the stage theory of grief to include numbness-disbelief, separation distress (yearning-anger-anxiety), depression-mourning, and recovery.

To test Jacobs's theory, Paul Maciejewski and his colleagues (2007) administered five items measuring disbelief, yearning, anger, depression, and acceptance of death to 233 bereaved individuals from 1 to 24 months following their losses. The results are shown in Figure 11.12 ■. A number of findings are clear. Disbelief was highest just after the loss and gradually waned over the course of 2 years. Acceptance of the loss shows the opposite course, being nonexistent at the outset, growing gradually, and peaking 2 years later. Yearning, anger, and depression rise suddenly in the predicted order, and each wanes gradually. Maciejewski and his colleagues (2007) believe they found the predicted feelings. However, others reviewing the same data note that these five emotions were the only ones the investigators tested; other emotions could have been present (Bonanno & Boerner, 2007; Silver & Wortman, 2007). But the predicted emotions are present and in predictable order—at least for the people in this sample.

"Lying Down to Pleasant Dreams . . ."

American poet William Cullen Bryant is best known for his poem "Thanatopsis," which he composed at the age of 18. "Thanatopsis" expresses Erik Erikson's goal of ego integrity—optimism that we can maintain a sense of trust through life. By meeting

Bereavement The state of deprivation brought about by the death of a family member or close friend.

Grief Emotional suffering resulting from a death.

Mourning A customary method of expressing grief.

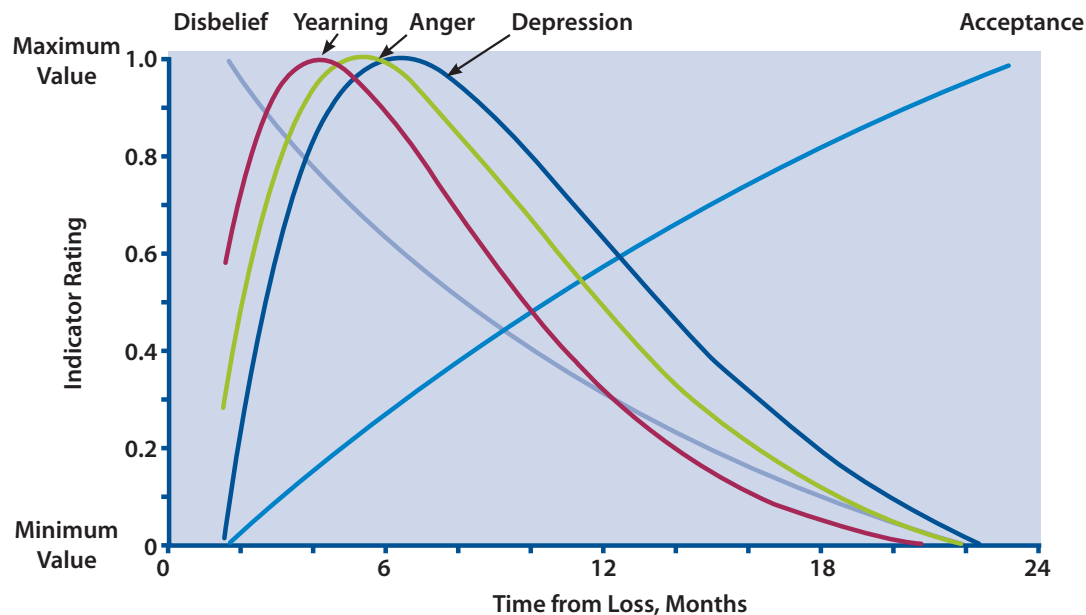


Figure 11.12 ■ Indicators of Grief among Bereaved People

Source: Maciejewski, P.K., Zhang, B., Block, S. D., & Prigerson, H. G. (2007). An empirical examination of the stage theory of grief. *Journal of the American Medical Association*, 297, 716–723.

squarely the challenges of our adult lives, perhaps we can take our leave with dignity. When our time comes to “join the innumerable caravan”—the billions who have died before us—perhaps we can depart life with integrity.

“Live,” wrote the poet, so that
*... when thy summons comes to join
 The innumerable caravan that moves
 To that mysterious realm, where each shall take
 His chamber in the silent halls of death,
 Thou go not, like the quarry-slave at night,
 Scourged to his dungeon, but, sustained and soothed
 By an unfaltering trust, approach thy grave
 Like one that wraps the drapery of his couch
 About him, and lies down to pleasant dreams.*

Bryant, of course, wrote “Thanatopsis” at age 18, not at 85, the age at which he died. At that advanced age, his feelings—and his verse—might have differed. But literature and poetry, unlike science, need not reflect reality. They can serve to inspire and warm us.

LearningConnections • ON DEATH AND DYING

ACTIVE REVIEW (28) Kübler-Ross’s stages of dying include _____, anger, bargaining, depression, and final acceptance. (29) Kübler-Ross conducted her research with _____ ill patients. (30) Bowlby proposed a four-stage theory of grief for coping with bereavement: _____, yearning-searching, disorganization-despair, and reorganization.

REFLECT AND RELATE Do your own experiences with people in the final days of life fit in with the views of Kübler-Ross?

CRITICAL THINKING Erik Erikson wrote that one aspect of wisdom is the ability to visualize one’s role in the march of history and to accept one’s own death. Do you believe that acceptance of death is a sign of wisdom? Why or why not?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections

LIFESTYLES OF THE RICH AND FAMOUS— AND THE REST OF US

Young adults today face a wider range of sexual choices and lifestyles than those available to earlier generations. The sexual revolution loosened traditional constraints on sexual choices, especially for women.

Being Single

An increasing number of young people choose to remain single as a way of life, not merely as a way station preceding the arrival of Mr. or Ms. Right. Being single, not married, is now the most common lifestyle among people in their early 20s. Marriages may be made in heaven, but many Americans are saying heaven can wait.

Several factors contribute to the increased numbers of singles. More young people are postponing marriage to pursue educational and career goals. Many are deciding to “live together” (cohabit), at least for a while, rather than get married. As career options for women have expanded, women are not as financially dependent on men as their mothers and grandmothers were. Single people face less social stigma today, and some haven’t yet found the partner they want. Also, people are getting married later. The typical American man gets married at about age 27 today compared with age 23 some 50 years earlier (U.S. Bureau of the Census, 2006). The typical woman gets married today at about age 25 compared with age 20 in 1960.

Using data from the National Survey of Family Growth, Laura Duberstein Lindberg and Susheela Singh (2008) analyzed the self-reported behavior of a nationally representative sample of 6,493 women. They found that 36% of the women aged 20 to 44 were single, and nine in ten of the single women had engaged in sexual intercourse. Of the sexually initiated women, 70% were sexually active at the time of the study. A higher percentage of the single women (22%) than of married (2%) or cohabiting (9%) women reported having two or more sex partners during the past year.

Dating—Hooking Up? Having Friends with Benefits?

People are single prior to getting married, following divorce, and when widowed. Some do remain single for a lifetime. Throughout those years, many of them date, although the term *dating* is not usually heard among people of high school or college age these days. We are more likely to hear of young people “hooking up” (Bogle, 2008). They meet in class, on campus, at sporting events, at parties, in cafeterias—wherever—and hook up (Bogle, 2008). Going out on a date is likely to be something their parents did or something you do if you hook up with somebody online.

Single people sometimes engage in serial monogamy, a series of relationships that may or may not be long term, which may have the potential to turn into marriages (Lindberg & Singh, 2008). Some have casual relationships with “friends with benefits” (FWBs)—people with whom they have sexual relationships, not necessarily with expectations of future cohabitation or marriage—that might coexist with other relationships (Bogle, 2008). Also known as *friends with privileges* or *cut friends*, these are people for casual sexual relationships. Friends with benefits are usually intended to meet singles’ sexual needs rather than their romantic needs. Relationships with FWBs are usually intended to be temporary and to end when either partner wishes it to, as when she or he finds Mr. or Ms. Right.

Divorced or widowed singles may be somewhat more formal in their dating practices for a number of reasons. One is that they come from an older cohort, perhaps one that was not as current with contemporary values (although many of them were a part of the sexual revolution!). They are likely to be concerned that they cannot

make small talk about current pop stars and trends. (Neither can their peers, of course.) Another is that many of them have children for whom they are responsible, serious jobs and mortgages, and cannot afford to be as playful and adventurous as younger, less-burdened singles. They may also be more concerned about their bodies—more desirous of making love with the lights off, if a relationship develops to that point. Then, too, those who have been divorced may have been painfully “burned” by a former relationship, or former relationships, and not be ready to jump quickly. In these cases, dinner, nice clothing, a movie, even flowers—all the classic trappings—may be in order.

Cohabitation—“Living Together”

*There is nothing I would not do
If you would be my POSSLQ*

—Charles Osgood

POSSLQ? POSSLQ is the abbreviation introduced by the U.S. Bureau of the Census to refer to cohabitation.



Getting Back into the Social Mix Divorced people, like other singles, go on dates. Some have been “burned” by a past relationship and might not be ready to “hook up” quickly. They appreciate all the trappings of a real date—dinner, getting dressed up, a movie, and flowers.

It stands for “People of Opposite Sex Sharing Living Quarters” and applies to unmarried heterosexual couples who live together. The majority of American young adults cohabit at some time (Bramlett & Mosher, 2002; Brown & Manning, 2009). The numbers of households consisting of cohabiters in the United States has increased more than tenfold since 1960, from fewer than half a million couples to nearly 5 million couples (Whitehead & Popenoe, 2006). Another half million households consist of same-gender partners. More than half of marriages are preceded by cohabitation (Bramlett & Mosher, 2002).

People cohabit for many reasons. Cohabitation, like marriage, is an alternative to living alone. Partners may have deep feelings for each other but not be ready to get married. Some couples prefer cohabitation because it provides an abiding relationship without the legal entanglements of marriage (Hussain, 2002; Marquis, 2003). Willingness to cohabit is related to more liberal attitudes toward sexual behavior, less traditional views of marriage, and less traditional views of gender roles (Hussain, 2002; Marquis, 2003).

Marriage—Tying the Knot

It is a truth universally acknowledged that a single man in possession of a good fortune must be in want of a wife.

—Jane Austen, *Pride and Prejudice*



© Christine Kelly/Corbis

Whom Do We Marry? Despite fairy tales like Cinderella, we tend to marry people who are similar to us in physical appearance and attitudes. We also tend to be similar in height and weight, intelligence, even the use of alcohol and other drugs.

My wife and I were happy for twenty years. Then we met.

—Rodney Dangerfield

Marriage is a great institution, but I'm not ready for an institution yet.

—Mae West

Marriage is the most common life-style in the United States. Two of three 35- to 44-year-olds in the United States are married (Whitehead & Popenoe, 2006). This age group is mature enough to have completed graduate school or to have established themselves in careers.

Marriage meets various psychological and cultural needs. For traditionalists, it legitimizes sexual relations. Marriage provides an institution in which children can be supported and socialized. Marriage (theoretically) restricts sexual relations to one's marital partner, establishing paternity and decreasing feelings of jealousy. Unless one has signed a prenuptial agreement to the contrary, marriage permits the orderly transmission of wealth from one family to another and from one generation to another.

Gay Marriage

Mike and Sue were out to dinner when their 6-year-old son, Jack, declared, “Mommy, I'm going to marry you.” When Sue explained that she was already married, Jack persisted, “Then I'll marry Daddy.”

“You can't marry Daddy,” Sue said patiently, “He's a boy.”

“But Mark and Kevin are boys,” replied Jack, logic that his mother could not dispute.

Mark and Kevin, who live across the street, are not actually married. Still, in the 7 years they have lived in this Chicago suburb, they have become just another young family in the neighborhood, socializing porch to porch on summer evenings.

In churches and in politics, the debate about homosexuality has focused recently on whether gays



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should be allowed to marry. But in places like Chicago, homosexuals live openly with heterosexuals with varying degrees of conflict and cooperation. And in many places today, gay and lesbian couples are getting married. In many other places, where gay marriage is not allowed, gay and lesbian couples are entering civil unions that provide all or most of the advantages of married life.

Selecting a Mate

In our society, mate selection is presumably free. Nevertheless, people in our culture tend to marry others from the same geographical area and social class (Haandrikman et al., 2008; Hamplova, 2009). Since neighborhoods are often made up of people from a similar social class, storybook marriages like Cinderella's are the exception to the rule. We tend to marry people who are similar to us in physical attractiveness and attitudes. As relationships progress through stages such as meeting, dating, perhaps cohabiting, and marriage, we tend to become more selective—that is, to narrow our choices to people yet more similar to us in background, attitudes, and interests (Blackwell & Lichter, 2004). We are more often than not similar to our mates in height, weight, personality traits, and intelligence, even on apparently minute matters such as use of alcohol and tobacco (Reynolds et al., 2006). We also tend to think about whether potential mates are likely to meet our material, sexual, and psychological needs.

Adolescence

1. What physical developments occur during adolescence?

Changes that lead to reproductive capacity and secondary sex characteristics are stimulated by increased levels of testosterone in the male and of estrogen and androgens in the female.

2. What brain developments take place during adolescence?

Cortical regions in high use tend to thicken with new dendrites and synapses. Adolescents' frontal lobes (the seat of executive functioning) are less active than those of adults, and their amygdalae (a part of the limbic system involved in discriminating emotions, including fear) are more active—differences that may underlie adolescents' poorer judgment and higher risk taking compared to adults.

3. What cognitive developments occur during adolescence?

Formal-operational thinking appears in adolescence, but not everyone reaches it. Two consequences of adolescent egocentrism are the imaginary audience and the personal fable.

4. What social and emotional developments occur during adolescence?

Adolescents and parents are often in conflict because adolescents desire more independence and may experiment with things that can jeopardize their health. Despite bickering, most adolescents continue to love and respect their parents.

5. What are Marcia's identity statuses?

Identity statuses are based on whether individuals are exploring who they are and what they stand for and whether they have made commitments. They include identity diffusion, foreclosure, moratorium, and identity achievement.

Emerging Adulthood

6. How do we define adulthood?

Adulthood is usually defined both in terms of age and adjustment issues, such as deciding on one's values and beliefs, accepting self-responsibility, becoming financially independent, and establishing an equal relationship with one's parents.

7. What is emerging adulthood?

Emerging adulthood is found in more affluent societies and is an extended period of time from age 18 to 25 during which individuals explore their roles in life.

Early Adulthood

8. What physical developments occur during early adulthood?

Most people are at their height of sensory sharpness, strength, reaction time, and cardiovascular fitness during early adulthood.

9. What cognitive developments occur during early adulthood?

According to Perry, young adults may come to realize that judgments of good or bad are often made from a certain belief system, so their thinking grows more complex and less absolute. Labouvie-Vief notes that young adults often learn to narrow endless possibilities into practical choices.

10. What social and emotional developments take place during early adulthood?

Early adulthood is generally characterized by efforts to advance in the business world and the development of intimate ties. More young adults remain single or cohabit than in earlier generations, but marriage remains the most common lifestyle.

Middle Adulthood

11. What physical developments occur during middle adulthood?

Middle adulthood is characterized by a gradual decline in strength. Research suggests that most women go through menopause without great difficulty.

12. What cognitive developments occur in middle adulthood?

Crystallized intelligence—one's vocabulary and accumulated knowledge—generally increases with age. Fluid intelligence—the ability to process information rapidly—declines.

13. What social and emotional developments occur during middle adulthood?

Erikson speaks of generativity versus stagnation as the key "crisis" of middle adulthood. Many middle adults are "sandwiched" between the needs of the children and their aging parents. Some middle-aged adults become depressed when their youngest child leaves home, but many report increased satisfaction, stability, and self-confidence. College women tend to report increased "identity certainty" and "confident power" in middle age.

Late Adulthood

14. What physical changes occur as people advance to late adulthood?

Older people show less sensory acuity, and their reaction time lengthens. The immune system weakens. There is loss of bone density. Sexual response declines.

15. Why do we age?

Programmed theories of aging see aging as a response to genetic instructions. Cellular damage theories see aging as resulting from damage to cells.

16. What cognitive developments take place during late adulthood?

Memory functioning declines with age, as does processing speed. Verbal skills may remain high—or increase—for a lifetime. Alzheimer's disease is characterized by cognitive deterioration in memory, language, and problem solving.

17. What social and emotional developments occur during late adulthood?

Erikson characterized late adulthood as the stage of ego integrity versus despair. He saw the basic challenge as maintaining the belief that life is worthwhile in the face of physical deterioration. Yet most older Americans report being generally satisfied with their lives. “Successful agers” optimize their strengths and compensate for their weaknesses.

On Death and Dying

18. What are psychological perspectives on death and dying?

Kübler-Ross hypothesized five stages of dying among people who are terminally ill: denial, anger, bargaining,

depression, and final acceptance. However, other investigators find that psychological reactions to approaching death are more varied.

19. Are there stages of grieving as there are (proposed) stages of dying?

Bowlby proposed a theory with four stages of grief for coping with bereavement: shock-numbness, yearning-searching, disorganization-despair, and reorganization.

KEY TERMS

Adolescence (p. 384)	Foreclosure (p. 394)	Moratorium (p. 395)
Adulthood (p. 398)	Formal-operational stage (p. 388)	Mourning (p. 416)
Age-30 transition (p. 401)	Generativity versus stagnation (p. 403)	Osteoporosis (p. 409)
Alzheimer’s disease (p. 412)	Glaucoma (p. 408)	Personal fable (p. 389)
Bereavement (p. 416)	Grief (p. 416)	Postconventional level (p. 389)
Cataract (p. 408)	Identity achievement (p. 395)	Postformal stage (p. 401)
Commitment (p. 394)	Identity certainty (p. 404)	Presbycusis (p. 409)
Confident power (p. 404)	Identity diffusion (p. 394)	Puberty (p. 384)
Crystallized intelligence (p. 402)	Imaginary audience (p. 389)	Sandwich generation (p. 406)
Dementia (p. 412)	Intimacy versus isolation (p. 401)	Secondary sex characteristics (p. 384)
Ego identity versus role diffusion (p. 392)	Life expectancy (p. 407)	Selective optimization with compensation (p. 414)
Ego integrity versus despair (p. 413)	Life span (p. 407)	Sleep apnea (p. 409)
Emerging adulthood (p. 398)	Longevity (p. 407)	The Dream (p. 401)
Empty-nest syndrome (p. 404)	Menarche (p. 384)	Wisdom (p. 413)
Exploration (p. 394)	Menopause (p. 402)	
Fluid intelligence (p. 403)	Midlife crisis (p. 404)	
	Midlife transition (p. 403)	

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Need help studying? This site is your one-stop study shop. Take a Pre-Test and CengageNOW will generate a Personalized Study Plan based on your test results. The Study Plan will identify the topics you need to review and direct you to online resources to help you master those topics. You can then take a Post-Test to determine the concepts you have mastered and what you still need to work on.

12

Personality: Theory and Measurement



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MAJOR TOPICS

The Psychodynamic
Perspective: Excavating
the Iceberg
The Trait Perspective: The
Five-Dimensional Universe
Learning-Theory Perspectives:
All the Things You Do
The Humanistic–Existential
Perspective: How Becoming?
The Sociocultural Perspective:
Personality in Context
Measurement of Personality

FEATURES

In Profile: Sigmund Freud
A Closer Look—Real Life: Who's Really “Number One”?
On “Basking in Reflected Glory”
In Profile: Erik Erikson
A Closer Look—Research: Virtuous Traits—Positive Psychology and Trait Theory
Self-Assessment: Will You Be a Hit or a Miss? The Expectancy for Success Scale
Self-Assessment: Do You Strive to Be All That You Can Be?
A Closer Look—Real Life: Enhancing Self-Esteem
Concept Review: Perspectives on Personality
Life Connections: Using Psychological Tests to Find a Career That Fits

TRUTH OR FICTION?

- T F** Biting one's fingernails or smoking cigarettes as an adult is a sign of conflict experienced during early childhood.
- T F** Bloodletting and vomiting were once recommended as ways of coping with depression.
- T F** 2,500 years ago, a Greek physician devised a way of looking at personality that—with a little “tweaking”—remains in use today.
- T F** Actually, there are no basic personality traits. We are all conditioned by society to behave in certain ways.
- T F** You can inherit self-esteem.
- T F** The most well-adjusted immigrants are those who abandon the language and customs of their country of origin and become like members of the dominant culture in their new host country.
- T F** Psychologists can determine whether a person has told the truth on a personality test.
- T F** There is a psychological test made up of inkblots, and test-takers are asked to say what the blots look like to them.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

Nearly 1,000 years ago, an Islamic theologian told his pupils the fable of the Blind Men and the Elephant:

Once upon a time, a group of blind men heard that an unusual animal called an elephant had come to their country. Since they had no idea what an elephant looked like and had never even heard its name, they resolved that they would obtain a “picture” of sorts, and the knowledge they sought, by feeling the animal. After all, that was the only possibility available to them. They sought out the elephant, and its handler kindly permitted them to touch the beast. One blind man stroked its leg, the other a tusk, the third an ear, and believing that they now had knowledge of the elephant, they returned home satisfied. But when they were questioned by others, they provided very different descriptions.

The one who had felt the leg said that the elephant was firm, strong, and upright, like a pillar. The one who had felt the tusk disagreed. He described the elephant as hard and smooth; clearly not as stout as a pillar, and sharp at the end. Now spoke the third blind man, who had held the ear of the elephant. “By my faith,” he asserted, “the elephant is soft and rough.” It was neither pillar-like nor hard and smooth. It was broad, thick, and leathery. And so the three argued about the true nature of the beast. Each was right in part, but none grasped the real nature of the elephant. Yet each was fervent in his belief that he knew the animal.

Each of the blind men had come to know the elephant from a different angle. Each was bound by his first experience and blind to the beliefs of his fellows and to the real nature of the beast—not only because of his physical limitations but also because his initial encounter led him to think of the elephant in a certain way.

Our own conceptions about people, and about ourselves, may be similarly bound up with our own perspectives and initial beliefs.

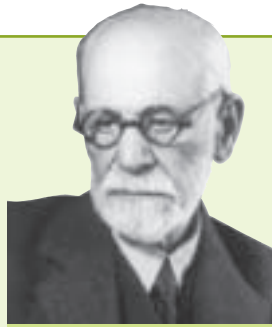
Some think of personality as consisting of the person’s most striking traits, as in “This person has an outgoing personality” or “That person has an agreeable personality.” But many psychological theorists look deeper. Those schooled in the Freudian tradition look at personality as consisting of underlying mental structures that jockey for supremacy outside the range of our ordinary awareness. Other theorists focus on how personality is shaped by learning. And to the humanistic theorists, personality is not something people have but rather something they create to give their lives meaning and direction. Then, too, sociocultural theorists remind us that we must always consider the influences of culture, race, and ethnicity on personality.

Sometimes, even psychologists prefer the first theory of personality they learn about. The Islamic theologian taught his pupils the legend of the blind men and the elephant to foster tolerance and to illustrate that no person can have a complete view of the

In Profile

Sigmund Freud (1856–1939) was a mass of contradictions. He has been lauded as one of the greatest thinkers of the 20th century; he has been criticized as overrated. He preached liberal views of sexuality but was himself a model of sexual restraint. He invented a popular form of psychotherapy but experienced lifelong psychologically related problems such as migraine headaches, bowel problems, fainting under stress, hatred of the telephone, and an addiction to cigars. He smoked 20 cigars a day and could not (or would not) break the habit even after he developed cancer of the jaw.

Although he was rejected by his fellow students because of his religion, Freud excelled in medical school at the University



SIGMUND FREUD

© Imagno/Hulton Archive/Getty Images

of Vienna. His interests lay in neurology and then in psychotherapy. He first practiced hypnotherapy and then developed the method that has had a profound influence on psychology and the arts—psychoanalysis.

Freud saw himself as an outsider. He was born in a small town in the Austro-Hungarian empire at a time when Jews were prevented from holding high offices or practicing most professions. He spent nearly all of his adult life in Vienna, fleeing to England to escape the Nazi threat only a year before his death.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Sigmund Freud.

truth; therefore, we need to be flexible in our thinking and open to new ideas. It is also possible that none of the views of personality presented in this chapter offer the one true portrait of human personality, but each may have something to contribute to our understanding of personality. So let's approach our study with an open mind because years from now psychologists may well be teaching new ideas about personality.

Before we examine these different theoretical views, let's define our subject matter. **Question 1: What is personality?** Psychologists define **personality** as the reasonably stable patterns of emotions, motives, and behavior that distinguish one person from another.

In this chapter, we lay the foundations for the understanding of personality. We also discuss personality tests—the methods used to touch the untouchable. In Chapter 13, we extend our discussion to gender differences in personality and their origins. In Chapter 14, we see how various personality factors help us—or hinder us—in our efforts to cope with stress. In Chapter 15, we consider the connections between personality and psychological disorders.

THE PSYCHODYNAMIC PERSPECTIVE: EXCAVATING THE ICEBERG

There are several **psychodynamic theories** of personality, and each owes its origin to the thinking of Sigmund Freud. These theories have a number of features in common. Each teaches that personality is characterized by conflict—by a dynamic struggle. At first, the conflict is external: Drives like sex, aggression, and the need for superiority come into conflict with laws, social rules, and moral codes. But at some point, laws and social rules are brought inward, or *internalized*. After that, the conflict is between opposing inner forces. At any given moment, our behavior, thoughts, and emotions represent the outcome of these inner contests. **Question 2: What is Freud's theory of psychosexual development?**

Sigmund Freud's Theory of Psychosexual Development

Sigmund Freud was trained as a physician. Early in his practice, he was astounded that some people apparently experience loss of feeling in a hand or paralysis of the legs in the absence of any medical disorder. These odd symptoms often disappear once the person has recalled and discussed stressful events and feelings of guilt or anxiety that seem related to the symptoms. For a long time, these events and feelings have lain hidden beneath the surface of awareness. Even so, they have the capacity to influence behavior.

Personality The reasonably stable patterns of emotions, motives, and behavior that distinguish one person from another.

Conscious Self-aware.

Preconscious Capable of being brought into awareness by the focusing of attention.

Unconscious In psychodynamic theory, not available to awareness by simple focusing of attention.

Repression A defense mechanism that protects the person from anxiety by ejecting anxiety-evoking ideas and impulses from awareness.

Psychoanalysis Freud's method of exploring human personality.

Psychic structure In psychodynamic theory, a hypothesized mental structure that helps explain different aspects of behavior.

Freud found sex an outcast in the outhouse, and left it in the living room an honored guest.

W. BERTRAM WOLFE

From this sort of clinical evidence, Freud concluded that the human mind is like an iceberg. Only the tip of an iceberg rises above the surface of the water; the great mass of it is hidden in the depths (see Figure 12.1 ■). Freud came to believe that people, similarly, are aware of only a small portion of the ideas and impulses that dwell within their minds. He argued that a much greater portion of the mind—our deepest images, thoughts, fears, and urges—remains beneath the surface of conscious awareness, where little light illumines them.

Freud labeled the region that pokes through into the light of awareness the **conscious** part of the mind. He called the regions below the surface the *preconscious* and the *unconscious*. The **preconscious** mind contains elements of experience that are out of awareness but can be made conscious simply by focusing on them. The **unconscious** mind is shrouded in mystery. It contains biological instincts such as sex and aggression. Some unconscious urges cannot be experienced consciously because mental images and words cannot portray them in all their color and fury. Other unconscious urges may be kept below the surface through repression.

Repression is the automatic ejection of anxiety-evoking ideas from awareness. Research evidence suggests that many people repress bad childhood experiences (Myers & Brewin, 1994). Perhaps “something shocking happens, and the mind pushes it into some inaccessible corner of the unconscious” (Loftus, 1993, p. 518). Repression may also protect us from perceiving morally unacceptable impulses.

In the unconscious mind, primitive drives seek expression, while internalized values try to keep them in check. The conflict can arouse emotional outbursts and psychological problems. To explore the unconscious mind, Freud engaged in a form of mental detective work called **psychoanalysis**. For this reason, his theory of personality is also referred to as *psychoanalytic theory*. In psychoanalysis, people are prodded to talk about anything that pops into their mind while they remain comfortable and relaxed.

THE STRUCTURE OF PERSONALITY

Freud spoke of mental or **psychic structures** to describe the clashing forces of personality. Psychic structures cannot be seen or measured directly, but their presence is suggested by behavior, expressed thoughts, and emotions. Freud believed that there are three psychic structures: the id, the ego, and the superego.

The **id** is present at birth. It represents physiological drives and is entirely unconscious. Freud described the id as “a chaos, a cauldron of seething excitations” (1927/1964, p. 73). The conscious mind might find it inconsistent to love and hate the same person, but Freud believed that conflicting emotions could dwell side by side in the id. In the id, one can feel hatred for one’s mother for failing to gratify immediately all of one’s needs while also feeling love for her. The id follows what Freud termed the **pleasure principle**. It demands instant gratification of instincts without consideration of law, social custom, or the needs of others.

The **ego** begins to develop during the 1st year, in part because a child’s demands for gratification cannot all be met immediately. The ego stands for reason and good sense, for rational ways of coping with frustration. It curbs the appetites of the id and makes plans that fit social conventions. Thus, a person can find gratification yet avoid social disapproval. The id informs you that you are hungry, but the ego decides to microwave enchiladas. The ego is guided by the **reality principle**. It takes into account what is practical along with what is urged by the id. The ego also provides the person’s conscious sense of self.

Although most of the ego is conscious, some of its business is carried out unconsciously. For instance, the ego also acts as a censor that screens the impulses of the id. When the ego senses that improper impulses are rising into awareness, it may use psychological defenses to prevent them from surfacing. Repression is one such psychological defense, or **defense mechanism**. Several defense mechanisms are described in Table 12.1 ■.

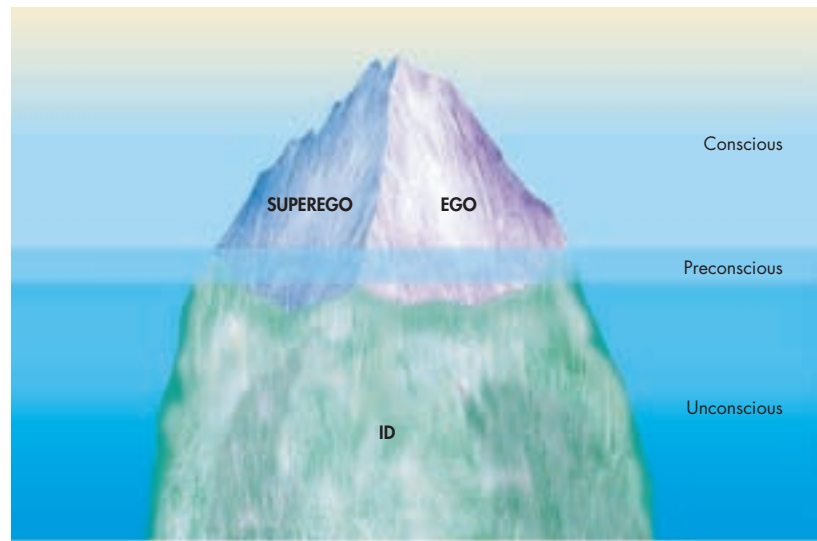


Figure 12.1 ■ The Human Iceberg According to Freud According to psychodynamic theory, only the tip of human personality rises above the surface of the mind into conscious awareness. Material in the preconscious can become conscious if we direct our attention to it. Unconscious material tends to remain shrouded in mystery.

— ■ —

All these primary impulses, not easily described in words, are the springs of man’s actions.

ALBERT EINSTEIN

— ■ —

Id The psychic structure, present at birth, that represents physiological drives and is fully unconscious.

Pleasure principle The governing principle of the id—the seeking of immediate gratification of instinctive needs.

Ego The second psychic structure to develop, characterized by self-awareness, planning, and delay of gratification.

Reality principle Consideration of what is practical and possible in gratifying needs; the governing principle of the ego.

Defense mechanism In psychodynamic theory, an unconscious function of the ego that protects it from anxiety-evoking material by preventing accurate recognition of this material.

Table 12.1 ■ Defense Mechanisms

Defense Mechanism	Definition	Examples
Repression	Ejection of anxiety-evoking ideas from awareness	A student forgets that a difficult term paper is due. A person in therapy forgets an appointment when anxiety-evoking material is to be discussed.
Regression	The return, under stress, to a form of behavior characteristic of an earlier stage of development	An adolescent cries when forbidden to use the family car. An adult becomes highly dependent on his parents after the breakup of his marriage.
Rationalization	The use of self-deceiving justifications for unacceptable behavior	A student blames her cheating on her teacher's leaving the room during a test. A man explains his cheating on his income tax by saying "Everyone does it."
Displacement	The transfer of ideas and impulses from threatening or unsuitable objects to less threatening objects	A worker picks a fight with her spouse after being sharply criticized by her supervisor.
Projection	The thrusting of one's own unacceptable impulses onto others so that others are assumed to have those impulses	A hostile person perceives the world as a dangerous place. A sexually frustrated person interprets innocent gestures as sexual advances.
Reaction formation	Engaging in behavior that opposes one's genuine impulses to keep those impulses repressed	A person who is angry with a relative behaves in a "sickly sweet" manner toward that relative. A sadistic individual becomes a physician.
Denial	The refusal to face the true nature of a threat	Belief that one will not contract cancer or heart disease even though one smokes heavily. "It can't happen to me."
Sublimation	The channeling of primitive impulses into positive, constructive efforts	A person paints nudes for the sake of "beauty" and "art." A hostile person becomes a tennis star.

— ■ —
Denial ain't just a river in Egypt.

MARK TWAIN

— ■ —

Superego The third psychic structure, which functions as a moral guardian and sets forth high standards for behavior.

Identification In psychodynamic theory, the unconscious adoption of another person's behavior.

Moral principle The governing principle of the superego, which sets moral standards and enforces adherence to them.

Psychodynamic theory Sigmund Freud's perspective, which emphasizes the importance of unconscious motives and conflicts as forces that determine behavior. *Dynamic* refers to the concept of (psychological) forces in motion.

Eros In psychodynamic theory, the basic instinct to preserve and perpetuate life.

Libido (a) In psychodynamic theory, the energy of eros; the sexual instinct. (b) Generally, sexual interest or drive.

Erogenous zone An area of the body that is sensitive to sexual sensations.

The **superego** develops throughout early childhood as the child incorporates the moral standards and values of parents and important members of the community. The child does so through **identification**—that is, by trying to become like these people. The superego functions according to the **moral principle**. It holds forth shining examples of an ideal self and also acts like the conscience, an internal moral guardian. Throughout life, the superego monitors the intentions of the ego and hands out judgments of right and wrong. It floods the ego with feelings of guilt and shame when the verdict is negative.

The ego hasn't an easy time of it. It stands between the id and the superego, striving to satisfy the demands of the id and the moral sense of the superego. From the Freudian perspective, a healthy personality has found ways to gratify most of the id's remaining unfulfilled demands without seriously offending the superego. Most of these demands are contained or repressed. If the ego is not a good problem solver or if the superego is too stern, the ego will have a hard time of it.

According to **psychodynamic theory**, identification is a means by which people usually incorporate the moral standards and values of parents and important members of the community. As we see in the nearby Closer Look, "important members of the community" can include athletic teams.

STAGES OF PSYCHOSEXUAL DEVELOPMENT

Freud stirred controversy by arguing that sexual impulses are a central factor in personality development, even among children. He believed that sexual feelings are closely linked to children's basic ways of relating to the world, such as sucking their mother's breasts and moving their bowels.

Freud believed that a major instinct, which he termed **eros**, is aimed at preserving and perpetuating life. Eros is fueled by psychological, or psychic, energy, which Freud labeled **libido**. Libidinal energy involves sexual impulses, so Freud considered it *psychosexual*. As the child develops, libidinal energy is expressed through sexual feelings in different parts of the body, or **erogenous zones**. To Freud, human development involves the transfer of libidinal energy from one erogenous zone to another. He hypothesized five periods of **psychosexual development**: oral, anal, phallic, latency, and genital.

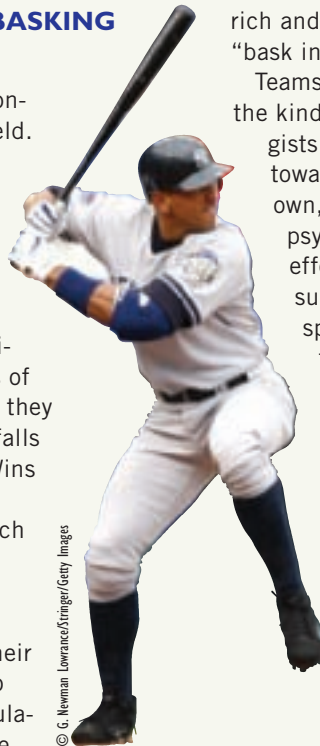
A CLOSER LOOK • REAL LIFE

WHO'S REALLY "NUMBER ONE"? ON "BASKING IN REFLECTED GLORY"

"We're number one" goes the chant at athletic contests. Yet it is usually not "we" who are on the field. It's them—the baseball, football, basketball, or hockey team. Still, when the team is doing well, it's usually "We're number one." And if they're losing game after game, they're "they," not "we."

What have psychologists learned about the appeal of celebrities and especially sports celebrities? Many people form deep and enduring bonds of attachment with athletes and sports teams. Once they identify with a team, their self-esteem rises and falls with the team's wins and losses (Wann, 2006). Wins lead to a surge of testosterone in both males and females—yes, females (Oliveira et al., 2009). Such surges are connected with aggression and self-confidence.

Psychoanalytic theory suggests that children identify with parents and other "big" people in their lives because big people seem to hold the keys to the resources they need for sustenance and stimulation or excitement. Athletes and entertainers—the



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rich and famous—have their fan clubs filled with people who "bask in the reflected glory" of their stars (Wann, 2006).

Teams and sports heroes provide both entertainment and the kind of gutsy competition that evolutionary psychologists believe whisper to us from our genes, pushing us toward aggression and dominance. If we can't do it on our own, we can do it through someone else. In some kind of psychological sense, we can be someone who is more effective at climbing the heap of humankind into the sun. Evolutionary psychologists also connect adoration of sports heroes to a time when humans lived in tribes and their warrior-protectors were their true genetic representatives. Today, college and professional athletes may differ from fans in a genetic sense, but fans can still identify with and worship their heroes even while recognizing that it's sort of silly. "Our sports heroes are our warriors," notes Arizona State psychologist Robert Cialdini (2000), who has deeply studied fans' identification with athletes. "The self is centrally involved in the outcome of the event. Whoever you root for represents you."

Basking in Reflected Glory Why do people identify with sports celebrities like Alex Rodriguez?

During the 1st year of life, a child experiences much of his or her world through the mouth. If it fits, into the mouth it goes. This is the **oral stage**. Freud argued that oral activities such as sucking and biting give the child sexual gratification as well as nourishment.

Freud believed that children encounter conflict during each stage of psychosexual development. During the oral stage, conflict centers on the nature and extent of oral gratification. Early weaning (cessation of breast feeding) could lead to frustration. Excessive gratification, on the other hand, could lead an infant to expect that it will routinely be given anything it wants. Insufficient or excessive gratification in any stage could lead to **fixation** in that stage and to the development of traits characteristic of that stage. Oral traits include dependence, gullibility, and excessive optimism or pessimism.

Freud theorized that adults with an *oral fixation* could experience exaggerated desires for "oral activities," such as smoking, overeating, alcohol abuse, and nail biting. Like the infant whose very survival depends on the mercy of an adult, adults with oral fixations may be disposed toward clinging, dependent relationships.

During the **anal stage**, sexual gratification is attained through contraction and relaxation of the muscles that control elimination of waste products from the body. Elimination, which was controlled reflexively during most of the 1st year of life, comes under voluntary muscular control, even if such control is not reliable at first. The anal stage is said to begin in the 2nd year of life.

During the anal stage, children learn to delay the gratification that comes from eliminating as soon as they feel the urge. The general issue of self-control may become a source of conflict between parent and child. *Anal fixations* may stem from this conflict and lead to two sets of traits in adulthood. So-called anal-retentive traits involve excessive use of self-control. They include perfectionism, a strong need for order, and exaggerated neatness and cleanliness. *Anal-expulsive* traits, on the other hand, "let it all hang out." They include carelessness, messiness, even sadism.

Children enter the **phallic stage** during the 3rd year of life. During this stage, the major erogenous zone is the phallic region (the penis in boys and the clitoris in girls). Parent-child conflict is likely to develop over masturbation, to which parents may

*Flowers are restless to look at.
They have neither emotions
nor conflicts.*

SIGMUND FREUD

Psychosexual development In psychodynamic theory, the process by which libidinal energy is expressed through different erogenous zones during different stages of development.

Oral stage The first stage of psychosexual development, during which gratification is hypothesized to be attained primarily through oral activities.

Fixation In psychodynamic theory, arrested development; attachment to objects of an earlier stage.

Anal stage The second stage of psychosexual development, when gratification is attained through anal activities.

Phallic stage The third stage of psychosexual development, characterized by a shift of libido to the phallic region. (From the Greek *phallos*, referring to an image of the penis. However, Freud used the term *phallic* to refer both to boys and girls.)



respond with threats or punishment. During the phallic stage, children may develop strong sexual attachments to the parent of the other gender and begin to view the parent of the same gender as a rival for the other parent's affection.

It is difficult for children to deal with feelings of lust and jealousy. Home life would be tense indeed if they were aware of them. These feelings, therefore, remain unconscious, but their influence is felt through fantasies about marriage with the parent of the other gender and hostility toward the parent of the same gender.

In boys, this conflict is labeled the **Oedipus complex**, after the legendary Greek king who unwittingly killed his father and married his mother. Similar feelings in girls give rise to the **Electra complex**. According to Greek legend, Electra was the daughter of King Agamemnon. She longed for him after his death and sought revenge against his slayers—her mother and her mother's lover.

The Oedipus and Electra complexes are resolved by about the ages of 5 or 6. Children then repress their hostilities toward the parent of the same gender and begin to identify with her or him. Identification leads them to play the social and gender roles of that parent and to internalize his or her values. Sexual feelings toward the parent of the other gender are repressed for a number of years. When the feelings emerge again during

adolescence, they are **displaced**, or transferred, to socially appropriate members of the other gender.

Freud believed that by the age of 5 or 6, children have been in conflict with their parents over sexual feelings for several years. The pressures of the Oedipus and Electra complexes cause them to repress all sexual urges. In so doing, they enter a period of **latency**, during which their sexual feelings remain unconscious. During the latency phase, it is not uncommon for children to prefer playmates of their own gender.

Freud believed that we enter the final stage of psychosexual development, the **genital stage**, at puberty. Adolescent males again experience sexual urges toward their mother and adolescent females experience such urges toward their father. However, the **incest taboo** causes them to repress these impulses and displace them onto other adults or adolescents of the other gender. Boys might seek girls “just like the girl that married dear old Dad.” Girls might be attracted to boys who resemble their fathers.

People in the genital stage prefer to find sexual gratification through intercourse with a member of the other gender. In Freud's view, oral or anal stimulation, masturbation, and homosexuality all represent pregenital fixations and immature forms of sexual conduct. They are not consistent with the life instinct, *eros*. Today, as we see in Chapter 13, Gender and Sexuality, most psychologists no longer think that sexual orientation is related to fixations—pregenital or otherwise.

The Oral Stage? According to Freud, during the 1st year, the child is in the oral stage of development. If it fits, into the mouth it goes. What, according to Freud, are the effects of too little or too much gratification during the oral stage? Is there evidence to support his views?

Oedipus complex A conflict of the phallic stage in which the boy wishes to possess his mother sexually and perceives his father as a rival in love.

Electra complex A conflict of the phallic stage in which the girl longs for her father and resents her mother.

Displaced Transferred.

Latency A phase of psychosexual development characterized by repression of sexual impulses.

Genital stage The mature stage of psychosexual development, characterized by preferred expression of libido through intercourse with an adult of the other gender.

Incest taboo The cultural prohibition against marrying or having sexual relations with a close blood relative.

Analytical psychology Jung's psychodynamic theory, which emphasizes the collective unconscious and archetypes.

Neo-Freudians

Several personality theorists—neo-Freudians—are among Freud's intellectual heirs. Their theories, like his, include dynamic movement of psychological forces, conflict, and defense mechanisms. In other respects, their theories differ considerably. **Question 3: What are the views of neo-Freudians?**

CARL JUNG

Carl Jung (1875–1961) was a Swiss psychiatrist who had been a member of Freud's inner circle. He fell into disfavor with Freud when he developed his own psychodynamic theory—**analytical psychology**. In contrast to Freud (for whom, he said, “the brain is viewed as an appendage of the genital organs”), Jung downplayed the importance of the sexual instinct. He saw it as just one of several important instincts.

Jung, like Freud, was intrigued by unconscious processes. He believed that we not only have a personal unconscious that contains repressed memories and impulses but also an inherited **collective unconscious**. The collective unconscious contains primitive images, or **archetypes**, that reflect the history of our species. Examples of archetypes are the all-powerful God, the young hero, the fertile and nurturing mother, the wise old man, the hostile brother—even fairy godmothers, wicked witches, and themes of rebirth or resurrection. Archetypes themselves remain unconscious, but Jung declared that they influence our thoughts and emotions and cause us to respond to cultural themes in stories and films.

ALFRED ADLER

Alfred Adler (1870–1937), another follower of Freud, also felt that Freud had placed too much emphasis on sexual impulses. Adler believed that people are basically motivated by an **inferiority complex**. In some people, feelings of inferiority may be based on physical problems and the need to compensate for them. Adler believed, however, that all of us encounter some feelings of inferiority because of our small size as children and that these feelings give rise to a **drive for superiority**. For instance, English poet Lord Byron, who had a disabled leg, became a champion swimmer. As a child, Adler was crippled by rickets and suffered from pneumonia, and it may be that his theory developed in part from his own childhood striving to overcome repeated bouts of illness.

Adler believed that self-awareness plays a major role in the formation of personality. He spoke of a **creative self**, a self-aware aspect of personality that strives to overcome obstacles and develop the individual's potential. Because each person's potential is unique, Adler's views have been termed **individual psychology**.

KAREN HORNEY

Karen Horney (1885–1952) was drummed out of the New York Psychoanalytic Institute because she took issue with the way psychoanalytic theory portrayed women. Early in the 20th century, psychoanalytic theory taught that a woman's place was in the home. Women who sought to compete with men in the business world were assumed to be suffering from unconscious *penis envy*. Psychoanalytic theory taught that little girls feel inferior to boys when they learn that boys have a penis and they do not. Horney argued that little girls do not feel inferior to boys and that these views were founded on Western cultural prejudice, not scientific evidence.

Horney was born in Germany and immigrated to the United States before the outbreak of World War II. Trained in psychoanalysis, she agreed with Freud that childhood experiences are important factors in the development of adult personality. Like other neo-Freudians, however, she asserted that unconscious sexual and aggressive impulses are less important than social relationships in children's development. She also believed that genuine and consistent love can alleviate the effects of even the most traumatic childhood.

ERIK ERIKSON

Like many other modern psychoanalysts, Erik Erikson (1902–1994) believed that Freud had placed undue emphasis on sexual instincts. He asserted that social relationships are more crucial determinants of personality than sexual urges. To Erikson, the nature of the mother–infant relationship is more important than the details of the feeding process or the sexual feelings that might be stirred by contact with the mother. Erikson also argued that to a large extent we are the conscious architects of our own personalities. His view grants more powers to the ego than Freud did. In Erikson's theory, it is possible for us to make real choices. In Freud's theory, we may think that we are making choices but may merely be rationalizing the compromises forced upon us by internal conflicts.

Erikson, like Freud, is known for devising a comprehensive theory of personality development. But whereas Freud proposed stages of psychosexual development, Erikson proposed stages of psychosocial development. Rather than label stages for various erogenous zones, Erikson labeled them for the traits that might be developed during the stages (see Table 10.4 on page 372 in Chapter 10). Each stage is named according to its possible outcomes. For example, the first stage of **psychosocial development** is

Collective unconscious Jung's hypothesized store of vague racial memories.

Archetypes Basic, primitive images or concepts hypothesized by Jung to reside in the collective unconscious.

Inferiority complex Feelings of inferiority hypothesized by Adler to serve as a central motivating force.

Drive for superiority Adler's term for the desire to compensate for feelings of inferiority.

Creative self According to Adler, the self-aware aspect of personality that strives to achieve its full potential.

Individual psychology Adler's psychodynamic theory, which emphasizes feelings of inferiority and the creative self.

Psychosocial development Erikson's theory of personality and development, which emphasizes social relationships and eight stages of growth.



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Karen Horney Horney, like many of Freud's intellectual descendants, took issue with Freud on many issues. For one thing, Horney did not believe that little girls had penis envy or felt inferior to boys in any other way. She also believed that children's social relationships are more important in their development than unconscious sexual and aggressive impulses.

In Profile

Erik Erikson's (1902–1994) natural father deserted his mother before his birth, and the boy was reared by his mother and stepfather, a physician named Theodor Homburger. They did not want Erik to feel different, so he was not told about his father for many years. Though his mother and his stepfather were Jewish, Erikson resembled his father, a Dane with blond hair and blue eyes. In his stepfather's synagogue, he looked Christian. To his classmates, he was a Jew. He began to feel different from other children and alienated from his family. He fantasized he was the child of special parents who had abandoned him. The question "Who am I?" permeated his adolescent quest for identity.

As he matured, Erikson faced another identity issue: "What am I to do in life?" His stepfather encouraged him to attend medical school, but Erikson sought his own path. As a youth, he



ERIK ERIKSON

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studied art and traveled through Europe, leading a Bohemian life. Erikson came to label this period of soul-searching an identity crisis. As a result of his own search for identity, he became oriented toward his life's work—psychotherapy. He left his wanderings and plunged into psychoanalytic training under the supervision of Sigmund Freud's daughter, Anna Freud.

Despite his grueling search for identity, Erikson appears to have denied his own children information about their family. He and his wife institutionalized their fourth child, Neil, who was born with Down syndrome. But his biographer (Friedman, 1999) writes that the Eriksons told their older children that Neil had died after birth. Perhaps Erikson's upbeat view of life did not prepare him to handle harsh reality, so he pushed it away (Edmundson, 1999).



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Erik Erikson.

labeled the stage of trust versus mistrust because of its two possible outcomes: (a) A warm, loving relationship with the mother (and others) during infancy might lead to a sense of basic trust in people and the world. (b) On the other hand, a cold, ungratifying relationship might generate a pervasive sense of mistrust. Erikson believed that most people would wind up with some blend of trust and mistrust—ideally, more trust than mistrust. A basic sense of mistrust could interfere with the formation of relationships unless it was recognized and challenged.

For Erikson, the goal of adolescence is the attainment of **ego identity**, not genital sexuality. The focus is on whom we see ourselves as being and what we stand for, not on sexual interests.

The greater the feeling of inferiority that has been experienced, the more powerful is the urge to conquest and the more violent the emotional agitation.

ALFRED ADLER

Like all sciences and all valuations, the psychology of women has hitherto been considered only from the point of view of men.

KAREN HORNEY

Evaluation of the Psychodynamic Perspective

Psychodynamic theories have tremendous appeal. They involve many concepts and explain many varieties of human behavior and traits. **Question 4: What are the strengths and weaknesses of the psychodynamic perspective?**

Today, concepts such as *the id* and *libido* strike many psychologists as unscientific, but Freud was fighting for the idea that human personality and behavior are subject to scientific analysis. He developed his theories when many people still viewed psychological problems as signs of possession by the devil or evil spirits, as they had during the Middle Ages. Freud argued that psychological disorders stem from problems within the individual—not evil spirits. His thinking contributed to the development of compassion for people with psychological disorders and methods for helping them.

Psychodynamic theory has also focused on the far-reaching effects of childhood events. Freud and other psychodynamic theorists are to be credited for suggesting that personality and behavior develop and that it is important for parents to be aware of the emotional needs of their children. **Truth or Fiction Revisited:** However, there is no adequate evidence that biting one's nails in adulthood or smoking cigarettes is a sign of an oral fixation.

Freud has helped us recognize that sexual and aggressive urges are common and that admitting to them is not the same thing as acting on them. On the other hand, his views of girls and women have been seen as sexist, as noted by Karen Horney.

Freud also noted that people have defensive ways of looking at the world. His defense mechanisms have become part of everyday speech. Whether or not we attribute

Ego identity A firm sense of who one is and what one stands for.

these cognitive distortions to unconscious ego functioning, our thinking may be distorted by our efforts to avert anxiety and guilt. Because defense mechanisms are unconscious, they have been difficult to assess and were rejected by academic psychologists in the 1950s and 1960s. However, the cognitive revolution of more recent years has again made them the subject of scientific investigation, and cognitive, developmental, and personality psychologists have found some evidence for their existence (Cramer, 2009; Somerfield & McCrae, 2000). The debate is unresolved.

A number of critics note that “psychic structures” such as the id, ego, and superego are too vague to measure scientifically (Hergenhahn, 2009). They cannot be used to predict behavior with precision. They are little more than useful fictions—poetic ways to express inner conflict.

The stages of psychosexual development have not escaped criticism. Children begin to masturbate as early as the 1st year, not in the phallic stage. As parents know from discovering their children play “doctor,” the latency stage is not as sexually latent as Freud believed. Much of Freud’s thinking about the Oedipus and Electra complexes remains little more than speculation. The evidence for some of Erikson’s developmental views seems somewhat sturdier. For example, people who fail to develop ego identity in adolescence seem to encounter problems developing intimate relationships later on.

Freud’s method of gathering evidence from clinical sessions is also suspect (Hergenhahn, 2009). In subtle ways, therapists may influence clients to produce memories and feelings they expect to find. Therapists may also fail to separate what they are told from their own interpretations. Furthermore, Freud and many other psychodynamic theorists restricted their evidence gathering to case studies with individuals who sought help for psychological problems. Their clients were mostly European and European American and from the middle and upper classes. People who seek therapy differ from the general population.

— ■ —

*In most of us by the age of thirty,
the character has set like plaster,
and will never soften again.*

WILLIAM JAMES

— ■ —

LearningConnections • THE PSYCHODYNAMIC PERSPECTIVE: EXCAVATING THE ICEBERG

ACTIVE REVIEW (1) Psychodynamic theories of personality teach that personality is characterized by _____ between primitive drives and laws, social rules, and moral codes. (2) According to Freud, the unconscious psychic structure called the _____ is present at birth and operates according to the pleasure principle. (3) The _____ is the sense of self and operates according to the reality principle. (4) The ego uses _____ mechanisms such as repression to protect itself from anxiety. (5) The _____ is the moral sense and develops by internalizing the standards of parents and others. (6) The stages of psychosexual development include the oral, _____, phallic, latency, and genital stages. (7) _____ in a stage may lead to the development of traits associated with the stage. (8) In the Electra complex, girls long to possess the parent of the (same or other?) gender.

(9) Jung believed that in addition to a personal unconscious mind, people also have a(n) _____ unconscious. (10) Adler believed that people are motivated by a(n) _____ complex. (11) Karen _____, like Freud, saw parent-child relationships as paramount in importance.

REFLECT AND RELATE If you were fixated in a stage of psychosexual development, which stage would it be? Explain.

CRITICAL THINKING If Freud’s theory is riddled with scientific shortcomings, why do you think it remains popular in the general population?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

THE TRAIT PERSPECTIVE: THE FIVE-DIMENSIONAL UNIVERSE

The notion of *traits* is familiar enough. If I asked you to describe yourself, you would probably do so in terms of traits such as bright, sophisticated, and witty. (That is you, is it not?) We also describe other people in terms of traits. **Question 5: What are traits?**

Traits are reasonably stable elements of personality that are inferred from behavior. If you describe a friend as shy, perhaps it’s because you have observed social

Trait A relatively stable aspect of personality that is inferred from behavior and assumed to give rise to consistent behavior.

Humans recognize unique individuals, and also pigeonhole them into categories. They distinguish stable categories that capture an individual's essence from transitory and superficial properties they may happen to possess.

STEVEN PINKER

anxiety or withdrawal in that person's encounters with others. Traits are assumed to account for consistent behavior in diverse situations. You probably expect your shy friend to be retiring in most social confrontations—"all across the board," as the saying goes. The concept of traits is also found in other approaches to personality. Freud linked the development of certain traits to children's experiences in each stage of psychosexual development.

From Hippocrates to the Present

Question 6: What is the history of the trait perspective? The trait perspective dates back at least to the Greek physician Hippocrates (ca. 460–377 b.c.e.). It has generally been assumed that traits are embedded in people's bodies, but how? Hippocrates believed that traits are embedded in bodily fluids, which give rise to certain types of personalities. In his view, an individual's personality depends on the balance of four basic fluids, or "humors," in the body. Yellow bile is associated with a choleric (quick-tempered) disposition; blood with a sanguine (warm, cheerful) temperament; phlegm with a phlegmatic (sluggish, calm, cool) disposition; and black bile with a melancholic (gloomy, pensive) temperament. Disease was believed to reflect an imbalance among the humors. Methods such as bloodletting and vomiting were recommended to restore the balance (Lander & Pritchett, 2009). **Truth or Fiction Revisited:** Therefore, it is true that bloodletting and vomiting were recommended as ways of coping with depression. Although Hippocrates' theory was speculative, the terms choleric, sanguine, and so on are still used in descriptions of personality.

More enduring theories assume that traits are heritable and are embedded in the nervous system. These theories rely on the mathematical technique of factor analysis, developed by Charles Spearman to study intelligence (see Chapter 8), to help determine which traits are basic.

Sir Francis Galton was among the first scientists to suggest that many of the world's languages use single words to describe fundamental differences in personality. Nearly 75 years ago, Allport and Odbert (1936) cataloged some 18,000 human traits from a search through word lists like dictionaries. Some were physical traits such as *short*, *black*, and *brunette*. Others were behavioral traits such as *shy* and *emotional*. Still others were moral traits such as *honest*. This exhaustive list has served as the basis for personality research by many other psychologists. **Question 7: How have contemporary psychologists reduced the universe of traits to more manageable lists?**

Hans Eysenck's Trait Theory: A Two-Dimensional View

British psychologist Hans J. Eysenck (1916–1997) developed the first English training program for clinical psychologists and focused much of his research on the relationships between two personality traits: **introversion–extraversion** and emotional stability–instability (Eysenck & Eysenck, 1985). (Emotional instability is also known as **neuroticism**). Carl Jung was first to distinguish between introverts and extraverts. Eysenck added the dimension of emotional stability–instability to introversion–extraversion. He cataloged various personality traits according to where they are situated along these dimensions or factors (see Figure 12.2 ■). For instance, an anxious person would be high in both introversion and neuroticism—that is, preoccupied with his or her own thoughts and emotionally unstable.

Eysenck acknowledged that his scheme is similar to Hippocrates' system. According to Eysenck's dimensions, the choleric type would be extraverted and unstable; the sanguine type, extraverted and stable; the phlegmatic type, introverted and stable; and the melancholic type, introverted and unstable. **Truth or Fiction Revisited:** It is therefore true that some 2,500 years ago, Hippocrates, the Greek physician, devised a way of looking at personality that could be said to remain in use today.

The "Big Five": The Five-Factor Model

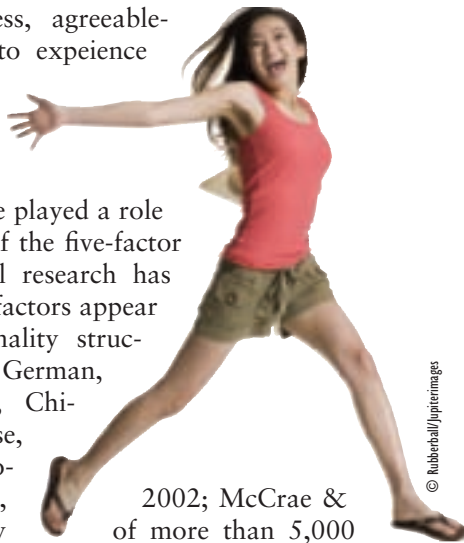
More recent research suggests that there may be five basic personality factors, not two. These include the two found by Eysenck—extraversion and neuroticism—along

Introversion A trait characterized by tendencies to direct one's interests inward and to inhibit impulses.

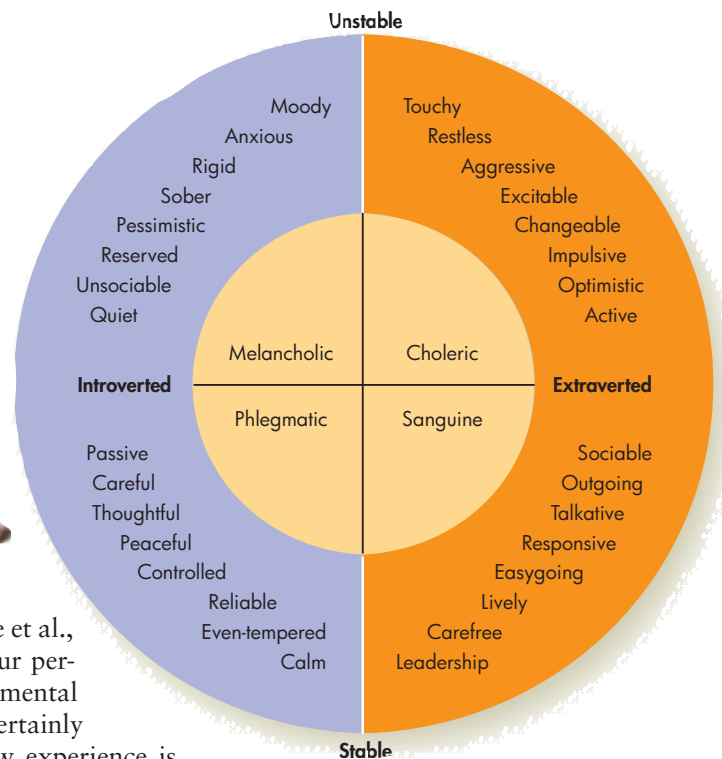
Extraversion A trait characterized by tendencies to be socially outgoing and to express feelings and impulses freely.

Neuroticism Eysenck's term for emotional instability.

with conscientiousness, agreeableness, and openness to experience (see Table 12.2 ■). Many personality theorists, especially Robert McCrae and Paul T. Costa Jr., have played a role in the development of the five-factor model. Cross-cultural research has found that these five factors appear to define the personality structure of American, German, Portuguese, Hebrew, Chinese, Korean, Japanese, and Philippine people (Katigbak et al., 2002; McCrae & Costa, 1997). A study of more than 5,000 German, British, Spanish, Czech, and Turkish people suggests that the factors are related to people's basic temperaments, which are considered to be largely inborn (McCrae et al., 2000). The researchers interpret the results to suggest that our personalities tend to mature rather than be shaped by environmental conditions, although the expression of personality traits is certainly affected by culture. (A person who is basically open to new experience is likely to behave less openly in a restrictive society than in an open society.)



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The *five-factor model*—also known as the Big Five model—is fueling a great deal of research now. There are hundreds of studies correlating scores on the five factors, according to a psychological test constructed by Costa and McCrae (the NEO Five-Factor Inventory), with various behavior patterns, psychological disorders, and kinds of “personalities.” Consider driving. Significant negative correlations have been found between the numbers of tickets people get and accidents people get into, on the one hand, and the factor of agreeableness on the other (Cellar et al., 2000). As we have long suspected, it’s safer to share the freeway with agreeable people. People who are not judgmental—who will put up with your every whim—tend to score low on conscientiousness (they don’t examine you too closely) and high on agreeableness (you can be yourself) (Bernardin et al., 2000). A firm handshake is positively correlated with extraversion and negatively correlated with neuroticism (Chaplin et al., 2000).



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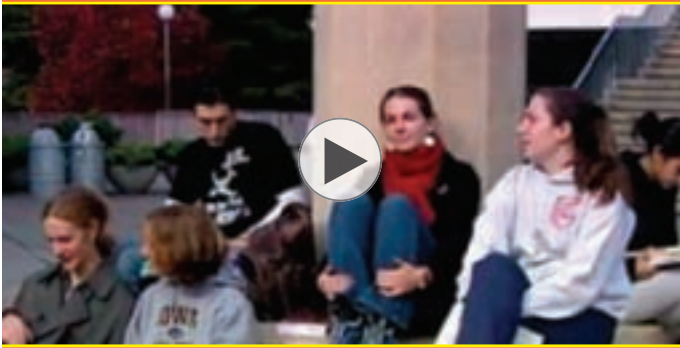
On a more serious note, researchers have also found relationships between the five-factor model of personality and health. For example, the factors of openness to experience, extraversion, and conscientiousness are negatively correlated with the progression of HIV disease (Ironson et al., 2008). That is, people who are more open to treatment, more assertive, more positive in their attitudes and emotions (extraversion), and more likely to follow doctors’ orders (conscientious) are more likely to take

Figure 12.2 ■ Eysenck’s Personality Dimensions and Hippocrates’ Personality Types Various personality traits shown in the outer ring fall within the two major dimensions of personality suggested by Hans Eysenck. The inner circle shows how Hippocrates’ four major personality types—choleric, sanguine, phlegmatic, and melancholic—fit within Eysenck’s dimensions.

Table 12.2 ■ The “Big Five”: The Five-Factor Model

Factor	Name	Traits
I	Extraversion	Contrasts talkativeness, assertiveness, and activity with silence, passivity, and reserve
II	Agreeableness	Contrasts kindness, trust, and warmth with hostility, selfishness, and distrust
III	Conscientiousness	Contrasts organization, thoroughness, and reliability with carelessness, negligence, and unreliability
IV	Neuroticism	Contrasts nervousness, moodiness, and sensitivity to negative stimuli with coping ability
V	Openness to experience	Contrasts imagination, curiosity, and creativity with shallowness and lack of perceptiveness

Video Connections—Personality Theories and Measurement



The “person-in-the-situation” phenomenon offers one explanation of why we may be shy in one situation and uninhibited in another. See the video for discussion of patterns of behavior, personality traits, and how to understand “if-then” signatures.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

Antisocial personality A personality descriptive of an individual who is in frequent conflict with society yet who is undeterred by punishment and experiences little or no guilt and anxiety.

shy children readily acquire fears and are highly reactive to stress, children who are on the path to developing antisocial personalities show low responses to threats and stressors (Gao et al., 2010b; Isen et al., 2010). As children, they show a pattern of deceit, callous disregard for the feelings of others, and lack of interest in conforming their behavior to social rules (Raine, 2008). As adults, they are likely to become involved in criminal activity.

their medicine and adopt a healthful lifestyle. In an Italian study, conscientiousness (about diet and lifestyle) was associated with lower levels of unhealthy cholesterol (Sutin et al., 2010). Being neurotic—but also conscientious—is associated with a relatively low body weight; impulsivity and lack of conscientiousness, on the other hand, are connected with being overweight and obese (Terracciano et al., 2009).

Biology and Traits

Possibly, our psychological traits cannot be traced to our bile and other bodily liquids, but researchers have been investigating biological factors that are connected with, and may give rise to, personality traits. For example, researchers estimate that the heritability of the extraverted personality is 40% to 60% (Smillie et al., 2009). Research suggests that brain levels of the neurotransmitter dopamine are involved with extraversion and that levels tend to be higher in extraverts than in introverts (Smillie et al., 2009; Wacker et al., 2009).

Jerome Kagan and other researchers (Kagan & Saudino, 2001; Dai et al., 2003) have also found evidence that genetic factors are part of a child’s basic temperament and are involved in shyness and behavioral inhibition. The **antisocial personality** is the other side of the coin when it comes to personality. Whereas

A CLOSER LOOK • RESEARCH

VIRTUOUS TRAITS—POSITIVE PSYCHOLOGY AND TRAIT THEORY

Curious. Open-minded. Persistent. Zestful. Kind. Fair. Modest. Hopeful. Humorous. That’s you, isn’t it?

Trait theory has recently found applications within positive psychology, a field that studies character strengths and virtues such as those just listed—how they come into being and how they are related to life satisfaction. Psychologists are also developing psychological methods that help people increase their happiness and life satisfaction (Sheldon, 2009; Shyrack et al., 2010).

Christopher Peterson and Martin E. P. Seligman (2004) summarized many of these research findings in their book, *Character Strengths and Virtues: A Handbook and Classification (the CSV)*. The handbook lists six major virtues that were found in 40 different countries as different as Azerbaijan and Venezuela, along with the United States and other developed nations:

- **Wisdom and knowledge:** Creativity, curiosity, open-mindedness, love of learning, perspective (ability to provide other people with sound advice)

- **Courage:** Authenticity (speaking one’s mind), bravery, persistence, zest
- **Humanity:** Kindness, love, social intelligence
- **Justice:** Fairness, leadership, teamwork
- **Temperance:** Forgiveness, modesty, prudence, self-regulation
- **Transcendence:** Appreciation of beauty and excellence, gratitude (when appropriate), hope, humor, religiosity (having a belief system about the meaning of life)

These virtues were traitlike in that they were reasonably stable individual differences (M. E. P. Seligman et al., 2005). Research has also found that these virtues are related to life satisfaction and personal fulfillment (Peterson et al., 2005). In addition, these virtues are defined by a number of character strengths. The strengths of zest, gratitude, hope, and love were most closely related to life satisfaction. Although the researchers did not isolate the causes of the development of these virtues, they did find that they were widely recognized and valued despite cultural and religious differences and that they were generally promoted by institutions in the cultures studied (N. Park et al., 2005).



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Figure 12.3 ■ Is He on the Path to Developing an Antisocial Personality?

Children who are developing antisocial personalities show low responses to threats and stressors, deceit, callous disregard for the feelings of others, and lack of interest in conforming to social rules. Adrian Raine has suggested that antisocial personality development may involve parts of the brain including the ventral (lower) part of the prefrontal cortex and the amygdala.

Adrian Raine (2008) has extensively studied the intersection of biology and the antisocial personality. In a review of the literature, he found a number of brain impairments that are related to the development of an antisocial personality. Figure 12.3 ■ shows areas of the brain that are impaired in the case of many people with antisocial personality—the ventral prefrontal cortex (part of the so-called executive center of the brain) and the amygdala (part of the limbic system).

Experiences with animals also support the connections between biology and personality. People have been selectively breeding dogs for various traits for thousands of years (Wong et al., 2009). There are more than 400 breeds of dogs today, bred not only for behavioral traits but also for shape, size, and the quality of fur (Z. Zhang et al., 2009). People have bred dogs to hunt with them, to work (as in pulling sleds and herding sheep), and to keep them company (Driscoll et al., 2009). All of them, from the most nervous Chihuahua to the calmest and least aggressive Golden Retriever, are descended from and belong to the same species as *Canis lupus*—the wolf.

There is also a good deal of research into the personalities of dogs (Helton, 2010). Perhaps in a bow to the Big Five model of personality, one group of researchers has developed a five-factor assessment of dogs' personalities—to be completed by their owners (Ley et al., 2008, 2009). These factors include extraversion, motivation, trainability, amicability, and neuroticism. The investigators found that larger breeds tend to be less neurotic than smaller breeds and that working and hunting dogs tend to be more extraverted and trainable than the average. Other researchers have studied traits like boldness and found that young males are boldest (Kubinyi et al., 2009). Gender matters: Female dogs are more affectionate and sociable than males (Kubinyi et al., 2009).

How does research with dogs relate to humans? It shows, at the very least, that biological differences can be related to personality. Perhaps it also shows that despite the fierceness of our ancestors, our personalities can develop along different paths and that perhaps the human species, like *Canis lupus*, is capable of

Canis Lupus—the Wolf All dogs, from the most aggressive German shepherds and pit bulls to the mildest golden retrievers and Labrador retrievers, from the largest Newfoundlands to the smallest toy poodles, are descended from—and can interbreed with—wolves.



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unexpected and even surprising outcomes. And as with *Canis lupus*, environmental influences also matter. Just as there may be different outcomes for dogs who are adopted by humans at various ages and who are trained, there may be different outcomes for genetically similar people who have different early social and academic experiences.

Evaluation of the Trait Perspective

Trait theories, like psychodynamic theories, have their pluses and minuses. **Question 8: What are the strengths and weaknesses of trait theory?** Trait theorists have focused much attention on the development of personality tests. They have also given rise to theories about the fit between personality and certain kinds of jobs (Gottfredson, 2009). The qualities that suit a person for various kinds of work can be expressed in terms of abilities, personality traits, and interests.

One limitation of trait theory is that it has tended to be more descriptive than explanatory. It has historically focused on describing traits rather than on tracing their origins or finding out how they may be modified.

LearningConnections • THE TRAIT PERSPECTIVE: THE FIVE-DIMENSIONAL UNIVERSE

ACTIVE REVIEW (12) _____ are personality elements that endure and account for behavioral consistency. (13) Eysenck used factor analysis to derive two basic traits: introversion–extraversion and emotional _____. (14) Five-factor theory suggests that there are five basic personality factors: extraversion, neuroticism, _____, agreeableness, and openness to experience.

REFLECT AND RELATE How would you describe yourself in terms of traits? Where would you place yourself in

Eysenck’s two-dimensional scheme? Where would you stand according to the five-factor model? Are you pleased with your self-evaluation? Why or why not?

CRITICAL THINKING The trait theories of Hippocrates and Eysenck are similar. Is one more scientific than the other?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

LEARNING-THEORY PERSPECTIVES: ALL THE THINGS YOU DO

Trait theory focused on enduring personality characteristics that were generally presumed to be embedded in the nervous system. Learning theorists tend not to theorize in terms of traits. They focus, instead, on behaviors and presume that those behaviors are largely learned. That which is learned is also, in principle, capable of being unlearned. As a result, learning theory and personality theory may not be a perfect fit. Nevertheless, learning theorists—both behaviorists and social-cognitive theorists—have contributed to the discussion of personality. **Question 9: What does behaviorism contribute to our understanding of personality?**

Behaviorism: On Being Easy in One’s Harness?

In 1924, at Johns Hopkins University, John B. Watson raised the battle cry of the behaviorist movement:

Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I’ll guarantee to take any one at random and train him to become any type of specialist I might suggest—doctor, lawyer, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and the race of his ancestors. (p. 82)

This proclamation underscores the behaviorist view that personality is plastic. Situational variables or environmental influences—not internal individual variables—are the key shapers of human preferences and behaviors. In contrast to the psychoanalysts and structuralists of his day, Watson argued that unseen, undetectable mental structures must be rejected in favor of what can be seen and measured. Furthermore, Watson's view is extreme and inconsistent with evidence suggesting that personality traits are to some degree heritable. Nevertheless, in the 1930s, Watson's battle cry was taken up by B. F. Skinner, who agreed that psychologists should avoid trying to see into the "black box" of the organism and instead emphasized the effects that reinforcements have on behavior.

The views of Watson and Skinner largely ignored the notions of personal freedom, choice, and self-direction. Most of us assume that our wants originate within us. Watson and Skinner suggested that environmental influences such as parental approval and social custom shape us into wanting certain things and not wanting others.

In his novel *Walden Two*, Skinner (1948) described a Utopian society where people are happy and content because they are allowed to do as they please. However, from early childhood, they have been trained or conditioned to cooperate. Because of their reinforcement histories, they want to behave in decent, kind, and unselfish ways. They see themselves as free because society makes no effort to force them to behave in particular ways. American poet Robert Frost wrote, "You have freedom when you're easy in your harness." Society in Skinner's *Walden Two* made children "easy" in their "harnesses," but the harnesses did exist.

Some object to behaviorist notions because they downplay the importance of consciousness and choice. Others argue that humans are not ruled by reinforcers (that is, rewards and punishments). In some circumstances, people have rebelled against the so-called necessity of survival by choosing pain and hardship over pleasure or death over life. Many people have sacrificed their own lives to save those of others. The behaviorist defense might be that the apparent choice of pain or death is forced on altruistic individuals just as conformity to social custom is forced on others. The altruist is also shaped by external influences, even if those influences differ from those that affect most people.

Social-Cognitive Theory: Is Determinism a Two-Way Street?

Social-cognitive theory¹ is a contemporary view of learning developed by Albert Bandura (1986, 2008) and other psychologists. It focuses on the importance of learning by observation and on the cognitive processes that underlie individual differences. **Question 10: How does social-cognitive theory differ from the behaviorist view?** Social-cognitive theorists differ from behaviorists in that they see people as influencing their environment just as their environment influences them. Bandura terms this mutual pattern of influence **reciprocal determinism**. Social-cognitive theorists agree with behaviorists and other empirical psychologists that discussions of human nature should be tied to observable experiences and behaviors. They assert, however, that variables within people—which they call **person variables**—must also be considered if we are to understand them (see Figure 12.4 ■).

One goal of psychological theories is the prediction of behavior. We cannot predict behavior from situational variables alone. Whether a person will behave in a certain way also depends on the person's **expectancies** about the outcomes of that behavior and the perceived or **subjective values** of those outcomes.

Social-cognitive theory A cognitively oriented learning theory in which observational learning and person variables such as values and expectancies play major roles in individual differences.

Reciprocal determinism Bandura's term for the social-cognitive view that people influence their environment just as their environment influences them.

Person variables Factors within the person, such as expectancies and competencies, that influence behavior.

Expectancies Personal predictions about the outcomes of potential behaviors.

Subjective value The desirability of an object or event.



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What Does This Child Want, and Why Does He Want It?

According to B. F. Skinner, societies socialize individuals into wanting what is good for society. Are the music, the color, and all the excitement socializing this child into wanting to belong to the group?

¹ The name of this theory is in flux. It was formerly referred to as *social-learning theory*. Today, it is sometimes referred to as *cognitive-social theory*.

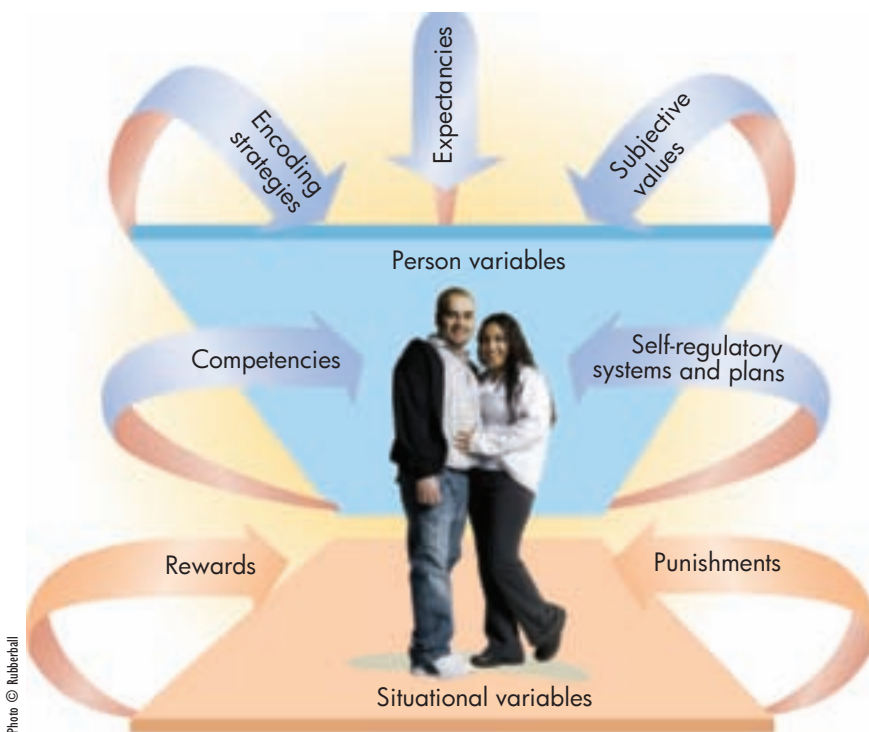


Photo © Rubberball

Figure 12.4 ■ Person Variables and Situational Variables in Social-Cognitive Theory According to social-cognitive theory, person variables and situational variables interact to influence behavior.

Modeling In social-cognitive theory, exhibiting behaviors that others will imitate or acquire through observational learning.

Competencies Knowledge and skills.

Encode Symbolize or represent.

Self-efficacy expectations Beliefs to the effect that one can handle a task.



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How Do Competencies Contribute to Performance? What factors contribute to these students' performances on tests? Individual differences in competencies may stem from variations in genetic endowment, nutrition, learning opportunities, and cultural factors.

learn that they will be reprimanded for behaving in what some might term an “unlady-like” manner.

Social-cognitive theorists believe that behavior reflects person variables and situational variables. Person variables include competencies, encoding strategies, expectancies, emotions, and self-regulatory systems and plans (Bandura, 2008; Bandura & Locke, 2003).

COMPETENCIES: WHAT CAN YOU DO?

Competencies include knowledge of rules that guide conduct, concepts about ourselves and other people, and skills. Knowledge of the physical world and of cultural codes of conduct is an important competency. So are academic skills such as reading and writing, physical skills such as swimming and tossing a football, social skills such as knowing how to ask someone out, and many others. Individual differences in competencies reflect genetic variation as well as learning opportunities and other environmental factors.

ENCODING STRATEGIES: HOW DO YOU SEE IT?

Different people **encode** (symbolize or represent) similar stimuli in different ways. Encoding strategies affect their feelings and behavior. One person might encode a tennis game as a chance to have some fun. Another might encode the game as a demand to perfect his or her serve. Some people make themselves miserable by encoding events in self-defeating ways, as in encoding an unsuccessful date as a sign of their social incompetence. Others might encode the date as simply showing that not all people are “made for each other.” Cognitive therapists foster adjustment by challenging people to view life in more optimistic ways.

EXPECTANCIES: WHAT WILL HAPPEN?

There are various kinds of expectancies. Some are predictions about what will follow various stimuli or signs. For example, some people predict other people’s behavior on the basis of signs such as “tight lips” or “shifty eyes” (Ross & Nisbett, 1991). Other expectancies involve what will happen if we engage in certain behaviors. **Self-efficacy expectations**

To social-cognitive theorists, people are not simply at the mercy of the environment. Instead, they are self-aware and purposefully engage in learning. They seek to learn about their environment and to alter it to make reinforcers available.

OBSERVATIONAL LEARNING

Observational learning (also termed **modeling** or *cognitive learning*) is one of the foundations of social-cognitive theory. It refers to acquiring knowledge by observing others. For operant conditioning to occur, an organism must first engage in a response, and that response must then be reinforced. But observational learning occurs even when the learner does not perform the observed behavior. Therefore, direct reinforcement is not required either. Observing others extends to reading about them or seeing what they do and what happens to them in books, TV, radio, and film.

Our expectations stem from our observations of what happens to ourselves and other people. For example, teachers are more likely to call on males and are more accepting of “calling out” in class by males than by females (Sadker & Sadker, 1994). As a result, many males expect to be rewarded for calling out. Females, however, may

are beliefs that we can accomplish certain things, such as speaking before a group, doing a backflip into a swimming pool, or solving math problems (Bandura, 2008; Bandura & Locke, 2003).

People with positive self-efficacy expectations have higher self-esteem and are more likely to try difficult tasks than are people who do not believe that they can master those tasks (Rodin et al., 2009; Sherman et al., 2009). Lack of self-efficacy may be associated with depression and hopelessness (Bandura, 2008; Bandura et al., 2001). Psychotherapy often motivates people to try new things by changing their self-efficacy expectations from “I can’t” to “Perhaps I can” (Bandura, 2008).

EMOTIONS: HOW DOES IT FEEL?

Because of our experiences, situations arouse various feelings in us—anxiety, depression, fear, hope, and delight. What frightens one person may entice another. What bores one person may excite another. From the social-cognitive perspective in contrast to the

SELF ASSESSMENT

Will You Be a Hit or a Miss? The Expectancy for Success Scale

Life is filled with opportunities and obstacles. What happens when you are faced with a difficult challenge? Do you rise to meet it, or do you back off? Social-cognitive theorists note that our self-efficacy expectancies influence our behavior. When we believe that we are capable of succeeding through our own efforts, we marshal our resources and apply ourselves.

The following scale can give you insight as to whether you believe that your own efforts are likely to meet with success. You can compare your own expectancies for success with those of other undergraduates taking psychology courses by turning to the scoring key in the Appendix.

IN THE FUTURE, I EXPECT THAT I WILL:

- | | | | |
|--|-----------|---|-----------|
| 1. Find that people don't seem to understand what I'm trying to say | 1 2 3 4 5 | 16. Be listened to when I speak | 1 2 3 4 5 |
| 2. Be discouraged about my ability to gain the respect of others | 1 2 3 4 5 | 17. Discover that my plans don't work out too well | 1 2 3 4 5 |
| 3. Be a good parent | 1 2 3 4 5 | 18. Find that no matter how hard I try, things just don't turn out the way I would like | 1 2 3 4 5 |
| 4. Be unable to accomplish my goals | 1 2 3 4 5 | 19. Handle myself well in whatever situation I'm in | 1 2 3 4 5 |
| 5. Have a stressful marital relationship | 1 2 3 4 5 | 20. Be able to solve my own problems | 1 2 3 4 5 |
| 6. Deal poorly with emergency situations | 1 2 3 4 5 | 21. Succeed at most things I try | 1 2 3 4 5 |
| 7. Find my efforts to change situations I don't like are ineffective | 1 2 3 4 5 | 22. Be successful in my endeavors in the long run | 1 2 3 4 5 |
| 8. Not be very good at learning new skills | 1 2 3 4 5 | 23. Be very successful working out my personal life | 1 2 3 4 5 |
| 9. Carry through my responsibilities successfully | 1 2 3 4 5 | 24. Experience many failures in my life | 1 2 3 4 5 |
| 10. Discover that the good in life outweighs the bad | 1 2 3 4 5 | 25. Make a good first impression on people I meet for the first time | 1 2 3 4 5 |
| 11. Handle unexpected problems successfully | 1 2 3 4 5 | 26. Attain the career goals I have set for myself | 1 2 3 4 5 |
| 12. Get the promotions I deserve | 1 2 3 4 5 | 27. Have difficulty dealing with my superiors | 1 2 3 4 5 |
| 13. Succeed in the projects I undertake | 1 2 3 4 5 | 28. Have problems working with others | 1 2 3 4 5 |
| 14. Not make any significant contributions to society | 1 2 3 4 5 | 29. Be a good judge of what it takes to get ahead | 1 2 3 4 5 |
| 15. Discover that my life is not getting much better | 1 2 3 4 5 | 30. Achieve recognition in my profession | 1 2 3 4 5 |

Source: “The Generalized Expectancy for Success Scale,” B. Finkel and W. D. Hale, *Journal of Consulting and Clinical Psychology*, 46, 1978, pp. 924–931. Copyright © 1978 by the American Psychological Association. Reprinted by permission.

People who believe they have the power to exercise some measure of control over their lives are healthier, more effective and more successful than those who lack faith in their ability to effect changes in their lives.

ALBERT BANDURA

By exercising control over a few healthy habits, people can live longer, healthier lives and slow the process of aging.

ALBERT BANDURA

behaviorist perspective, we are not controlled by stimuli. Instead, stimuli arouse feelings in us, and feelings affect our behavior. For example, hearing Chopin may make one person weep and another person switch to a rock 'n' roll station.

SELF-REGULATORY SYSTEMS AND PLANS: HOW CAN YOU ACHIEVE IT?

We tend to regulate our own behavior, even in the absence of observers and external constraints. We set our own goals and standards. We make plans to achieve them. We congratulate or criticize ourselves depending on whether or not we succeed (Bandura, 2008; Bandura & Locke, 2003). We can select the situations to which we expose ourselves and the arenas in which we will compete.

Evaluation of the Learning Perspective

Learning theorists have made monumental contributions to the scientific understanding of behavior, but they have left some psychologists dissatisfied. **Question 11: What are the strengths and weaknesses of learning theories as they apply to personality?**

Psychodynamic theorists and trait theorists propose the existence of psychological structures that cannot be seen and measured directly. Learning theorists—particularly behaviorists—have dramatized the importance of referring to publicly observable variables, or behaviors, if psychology is to be accepted as a science.

Similarly, psychodynamic theorists and trait theorists focus on internal variables such as unconscious conflict and traits to explain and predict behavior. Learning theorists emphasize the importance of environmental conditions, or situational variables, as determinants of behavior. They have also elaborated on the conditions that foster learning—even automatic kinds of learning. They have shown that we can learn to do things because of reinforcements and that many behavior patterns are acquired by observing others.

On the other hand, behaviorism is limited in its ability to explain personality. Behaviorism does not describe, explain, or suggest the richness of inner human experience. We experience thoughts and feelings and browse our inner maps of the world, but behaviorism does not deal with these. To be fair, the limitations of behaviorism are self-imposed. Personality theorists have traditionally dealt with thoughts, feelings, and behavior, whereas behaviorism, which studies only what is observable and measurable, deals with behavior alone.

Critics of social-cognitive theory cannot accuse its supporters of denying the importance of cognitive activity and feelings. But they often contend that social-cognitive theory has not come up with satisfying statements about the development of traits. In addition, social-cognitive theory—like its intellectual forebear, behaviorism—may not pay enough attention to genetic variation in explaining individual differences in behavior. Learning theories have done very little to account for the development of traits or personality types. **Truth or Fiction Revisited:** Actually, there may be some basic personality traits, as suggested by trait theory. We may be conditioned by society to behave in certain ways, but conditioning is unlikely to fully explain individual differences in personality.

LearningConnections • LEARNING-THEORY PERSPECTIVES: ALL THE THINGS YOU DO

ACTIVE REVIEW (15) _____-cognitive theory argues that people can shape the environment and learn by intention. (16) Social-cognitive theorists believe that we must consider person and _____ variables to predict behavior. (17) Person variables include _____, which refer to knowledge and skills, encoding strategies, expectancies, emotions, and self-regulatory systems and plans.

REFLECT AND RELATE Self-efficacy is a key concept in social-cognitive theory. Do you expect that you will succeed? Do you believe in your abilities? How do your

attitudes toward yourself affect your self-esteem and your behavior?

CRITICAL THINKING In *Walden Two*, children are conditioned to want what is good for the group. Given the cultural and social conditioning we experience as we develop, do you think that true freedom is possible? Might free will be merely an illusion? Explain your views.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

THE HUMANISTIC–EXISTENTIAL PERSPECTIVE: HOW BECOMING?

Humanists and existentialists dwell on the meaning of life. Self-awareness is the hub of the humanistic–existential search for meaning. **Question 12: What are humanism and existentialism?**

The term **humanism** has a long history and many meanings. It became a third force in American psychology in the 1950s and 1960s, partly in response to the predominant psychodynamic and behavioral models. Humanism puts people and self-awareness at the center of consideration and argues that they are capable of free choice, self-fulfillment, and ethical behavior. Humanism also represented a reaction to the “rat race” spawned by industrialization and automation. Humanists felt that work on assembly lines produced “alienation” from inner sources of meaning. The humanistic views of Abraham Maslow and Carl Rogers emerged from these concerns.

Existentialism in part reflects the horrors of mass destruction of human life through war and genocide, frequent events in the 20th century. The European existentialist philosophers Jean-Paul Sartre and Martin Heidegger saw human life as trivial in the grand scheme of things. But psychiatrists like Viktor Frankl, Ludwig Binswanger, and Medard Boss argued that seeing human existence as meaningless could give rise to withdrawal and apathy—even suicide. Psychological salvation therefore requires giving personal meaning to things and making personal choices (McDonald, 2008). Yes, there is pain in life, and yes, sooner or later life ends, but people can see the world for what it is and make genuine choices.

Freud argued that defense mechanisms prevent us from seeing the world as it is. Therefore, the concept of free choice is meaningless. Behaviorists view freedom as an illusion determined by social forces. Social-cognitive theorists also speak of external or situational forces that influence us. To existentialists, we are really and painfully free to do what we choose with our lives. Moreover, the meaning of our lives is the meaning that we give to our lives.

Abraham Maslow and the Challenge of Self-Actualization

Humanists see Freud as preoccupied with the “basement” of the human condition. Freud wrote that people are basically motivated to gratify biological drives and that their perceptions are distorted by their psychological needs. **Question 13: How do humanistic psychologists differ from psychodynamic theorists?** Humanistic psychologist Abraham Maslow argued that people also have a conscious need for **self-actualization**—to become all that they can be—and that people can see the world as it is. Because people are unique, they must follow unique paths to self-actualization. People are not at the mercy of unconscious, primitive impulses. Rather, one of the main threats to individual personality development is control by other people. We must each be free to get in touch with and actualize our selves. But self-actualization requires taking risks. Many people prefer to adhere to the tried and . . . what may be untrue for them. But people who adhere to the “tried and true” may find their lives degenerating into monotony and predictability.

Let’s learn more about the nature of the self by examining Carl Rogers’s self theory. Rogers offers insights into the ways the self develops—or fails to develop—in the real social world.

Carl Rogers’s Self Theory

Humanistic psychologist Carl Rogers (1902–1987) wrote that people shape themselves through free choice and action. **Question 14: What is the self?** Rogers defined the self as the center of experience. Your self is your ongoing sense of who and what you are, your sense of how and why you react to the environment and how you choose to act on the environment.

Humanism The view that people are capable of free choice, self-fulfillment, and ethical behavior.

Existentialism The view that people are completely free and responsible for their own behavior.

Self-actualization In humanistic theory, the innate tendency to strive to realize one’s potential.



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SELF ASSESSMENT

Do You Strive to Be All That You Can Be?

Are you a self-actualizer? Do you strive to be all that you can be? Psychologist Abraham Maslow attributed the following eight characteristics to the self-actualizing individual. How many of them describe you? Why not check them and undertake some self-evaluation?

YES	NO		YES	NO	
___	___	1. Do you fully experience life in the present—the here and now? (Self-actualizers do not focus excessively on the lost past or wish their lives away as they stride toward distant goals.)	___	___	6. Do you strive toward new goals? Do you strive to be the best that you can be in a chosen life role? (Self-actualizers do not live by the memory of past accomplishments. Nor do they present second-rate efforts.)
___	___	2. Do you make growth choices rather than fear choices? (Self-actualizers take reasonable risks to develop their unique potentials. They do not bask in the dull life of the status quo. They do not “settle.”)	___	___	7. Do you seek meaningful and rewarding life activities? Do you experience moments of actualization that humanistic psychologists call peak experiences? (Peak experiences are brief moments of rapture filled with personal meaning. Examples might include completing a work of art, falling in love, redesigning a machine tool, suddenly solving a complex problem in math or physics, or having a baby. Note that we differ as individuals; one person’s peak experience might bore another person silly.)
___	___	3. Do you seek to acquire self-knowledge? (Self-actualizers look inward. They search for values, talents, and meaningfulness. It might be enlightening to take an interest inventory—a test frequently used to help make career decisions—at your college testing and counseling center.)	___	___	8. Do you remain open to new experiences? (Self-actualizers do not hold themselves back for fear that novel experiences might shake their views of the world or of right and wrong. Self-actualizers are willing to revise their expectations, values, and opinions.)
___	___	4. Do you strive toward honesty in interpersonal relationships? (Self-actualizers strip away the social facades and games that stand in the way of self-disclosure and the formation of intimate relationships.)			
___	___	5. Do you behave self-assertively and express your own ideas and feelings, even at the risk of occasional social disapproval? (Self-actualizers do not bottle up their feelings for the sake of avoiding social disapproval.)			

You are unique, and if that is not fulfilled, then something has been lost.

MARTHA GRAHAM

Your choices are made on the basis of your values, and your values are also part of your self. **Question 15: What is self theory?** Rogers’s self theory focuses on the nature of the self and the conditions that allow the self to develop freely. Two of his major concerns are the self-concept and self-esteem.

THE SELF-CONCEPT AND FRAMES OF REFERENCE

Our self-concepts consist of our impressions of ourselves and our evaluations of our adequacy. It may be helpful to think of us as rating ourselves according to various scales or dimensions such as good–bad, intelligent–unintelligent, strong–weak, and tall–short.

Rogers believed that we all have unique ways of looking at ourselves and the world—that is, unique frames of reference. Perhaps we each use a different set of dimensions in defining ourselves and judge ourselves according to different sets of values. To one person, achievement–failure may be the most important dimension. To another person, the most important dimension may be decency–indecency. A third person may not even think in terms of decency.

SELF-ESTEEM AND POSITIVE REGARD

Rogers assumed that we all develop a need for self-regard, or self-esteem, as we develop and become aware of ourselves. At first, self-esteem reflects the esteem in which others hold us. Parents help children develop self-esteem when they show them **unconditional positive regard**—that is, when they accept them as having intrinsic merit regardless of their behavior at the moment. But when parents show children **conditional positive regard**—that is,

Unconditional positive regard An enduring expression of esteem for the essential value of a person.

Conditional positive regard Judgment of another person’s value on the basis of the acceptability of that person’s behaviors.

when parents accept them only when they behave in a desired manner—children may develop **conditions of worth**. Therefore, children may come to think that they have merit only if they behave as their parents wish them to behave. The nearby Closer Look has more information on the origins of self-esteem along with suggestions as to how you can raise your own self-esteem.

Because each individual is thought to have a unique potential, children who develop conditions of worth must be somewhat disappointed in themselves. We cannot fully live up to the wishes of others and remain true to ourselves. This does not mean that the expression of the self inevitably leads to conflict. Rogers was optimistic about human nature. He believed that we hurt others or act in antisocial ways only when we are frustrated in our efforts to develop our potential. But when parents and others are loving and tolerant of our differentness, we, too, are loving—even if some of our preferences, abilities, and values differ from those of our parents.

However, children in some families learn that it is bad to have ideas of their own, especially about sexual, political, or religious matters. When they perceive their caregivers' disapproval, they may come to see themselves as rebels and label their feelings as selfish, wrong, or evil. If they wish to retain a consistent self-concept and self-esteem, they may have to deny many of their feelings or disown aspects of themselves. In this way, the self-concept becomes distorted. According to Rogers, anxiety often stems from recognition that people have feelings and desires that are inconsistent with their distorted self-concept. Because anxiety is unpleasant, people may deny the existence of their genuine feelings and desires.

According to Rogers, the path to self-actualization requires getting in touch with our genuine feelings, accepting them, and acting on them. This is the goal of Rogers's method of psychotherapy, *client-centered therapy*. Rogers also believed that we have mental images of what we are capable of becoming. These are termed **self-ideals**. We are motivated to reduce the discrepancy between our self-concepts and our self-ideals.

Evaluation of the Humanistic–Existential Perspective

Question 16: What are the strengths and weaknesses of humanistic–existential theory? Humanistic–existential theories have tremendous appeal for college students because of their focus on the importance of personal experience. We tend to treasure our conscious experiences (our “selves”) and those of the people we care about. For lower organisms, to be alive is to move, to process food, to exchange oxygen and carbon dioxide, and to reproduce. But for human beings, an essential aspect of life is conscious experience—the sense of oneself as progressing through space and time.

Psychodynamic theories see individuals largely as victims of their childhood. Learning theorists, to some degree, see people as victims of circumstances—or at least as victims of situational variables. But humanistic–existential theorists see humans as free to make choices. Psychodynamic theorists and learning theorists wonder whether our sense of freedom is merely an illusion. Humanistic–existential theorists, in contrast, begin by assuming personal freedom.

Ironically, the primary strength of the humanistic–existential approaches—their focus on conscious experience—is also their main weakness. Conscious experience is private and subjective. Therefore, the validity of formulating theories in terms of consciousness has been questioned. On the other hand, some psychologists (e.g., Bevan & Kessel, 1994) believe that the science of psychology can afford to loosen its methods somewhat if this will help it address the richness of human experience.

Self-actualization, like trait theory, yields circular explanations for behavior. When we see someone engaging in what seems to be positive striving, we gain little insight by attributing this behavior to a self-actualizing force. We have done nothing to account for the origins of the force. And when we observe someone who is not engaging in growth-oriented striving, it seems arbitrary to “explain” this outcome by suggesting that the self-actualizing tendency has been blocked or frustrated.

Humanistic–existential theories, like learning theories, have little to say about the development of traits and personality types. They assume we are all unique, but they do not predict the sorts of traits, abilities, and interests we will develop.

*Always remember that you
are absolutely unique. Just like
everyone else.*

MARGARET MEAD

*What a man can be, he must
be. This need we call self-
actualization.*

ABRAHAM MASLOW

Conditions of worth Standards by which the value of a person is judged.
Self-ideal A mental image of what we believe we ought to be.

LearningConnections • THE HUMANISTIC-EXISTENTIAL PERSPECTIVE: HOW BECOMING?

ACTIVE REVIEW (18) The humanistic view argues that people (are or are not?) capable of free choice and self-fulfillment. (19) Maslow argued that people have growth-oriented needs for self-_____. (20) Rogers's theory begins with the assumption of the existence of the _____. (21) According to Rogers, we see the world through unique frames of _____.

REFLECT AND RELATE Try a mini-experiment: Think of how your own views are unique, how they differ from those of family members, friends, and perhaps, love interests.

Then consider some of the things that earn the approval or disapproval of these important people in your life. Can you explain their responses to you in terms of their frames of reference?

CRITICAL THINKING If humanistic–existential theory is less scientific than some other views of personality, how do you explain its enduring popularity?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

A CLOSER LOOK • REAL LIFE

ENHANCING SELF-ESTEEM

No one can make you feel inferior without your consent.

—Eleanor Roosevelt

Few of us are as attractive as the models in the Abercrombie's and Victoria's Secret catalogs. Should that disturb our self-esteem? Our physical attributes are only part of the story, and most of us realize that the individuals in these ads are rare indeed and that it is pointless for us to compare ourselves with them. But research shows that one of the psychological boulders that can crush our self-esteem is self-comparison to people who are superior to us in a way that matters to us. For some of us, the crusher may be superior intellectual ability, for others, athletic ability, and for still others, physical appearance.

Our self-esteem is the value or worth that we attach to ourselves. A positive self-image is one of the keys to psychological adjustment (Sherman et al., 2009). High self-esteem can buffer the effects of stress

and help provide the courage to deal with it (Sherman et al., 2009). Low self-esteem, on the other hand, makes people more vulnerable to stress. It is connected with feelings of helplessness and hopelessness and may contribute to feelings of depression and suicidal thoughts (Rodin et al., 2009; Southall & Roberts, 2002).

DEVELOPMENTAL FACTORS AND SELF-ESTEEM

Research shows that children's self-worth is connected with their being "good at doing things" (whether they have feelings of self-efficacy that are connected with obtaining reinforcers) and with whether they are accepted by adults and other children (whether they obtain positive regard) (Bandura, 2008; Davidson et al., 2010). In keeping with gender-role stereotypes, girls tend to have more positive self-concepts regarding reading, writing, and general academics than boys do during the early school years. Boys tend to develop more positive self-concepts in math and physical abilities (Halpern et al., 2007; Su et al., 2009).

Just Doing It Many males tie their self-esteem to prowess in sports.



THE SOCIOCULTURAL PERSPECTIVE: PERSONALITY IN CONTEXT

Thirteen-year-old Hannah brought her lunch tray to the table in the cafeteria. Her mother, Julie, eyed with horror the french fries, the plate of mashed potatoes in gravy, the bag of potato chips, and the large paper cup brimming with soda. “You can’t eat that!” she said. “It’s garbage!”

“Oh come on, Mom! Chill, okay?” Hannah rejoined before taking her tray to sit with some friends rather than with us.

I used to spend Saturdays with my children at the Manhattan School of Music. Not only did they study voice and piano, they—and I—widened our cultural perspective by relating to families and students from all parts of the world.

Julie and Hannah are Korean Americans. Flustered, Julie shook her head and said, “I’ve now been in the United States longer than I was in Korea, and I still can’t get used to the way children act here.” Dimitri, a Russian American parent, chimed in, “I never would have spoken to my parents the way Michael speaks to me. I would have been . . . whipped or beaten.”

“I try to tell Hannah she is part of the family,” Julie continued. “She should think of other people. When she talks that way, it’s embarrassing.”

Research suggests that authoritative parenting, as described in Chapter 10, contributes to high self-esteem in children and endures into adulthood (Liem et al., 2010; Milevsky et al., 2007). That is, children with high self-esteem tend to have parents who are strict but also involved and loving. Parental demands for mature, skillful behavior may encourage the development of these behaviors; these behaviors, in turn, may lead to social approval.

Truth or Fiction Revisited: Self-esteem also appears to have a genetic component, which would contribute to its stability (Caprara et al., 2009; Neiss et al., 2009). Self-esteem, once established, seems to endure. Most of us will encounter failure in something at one time or another, but high self-esteem may contribute to the continuing belief that we can master adversity.

HOW TO ENHANCE YOUR SELF-ESTEEM

There are many things you can do to enhance your self-esteem. Broadly speaking, they involve changing the things you can change and having the wisdom to accept what you cannot change.

- *Improve Yourself.* For example, are you miserable because of excess dependence on another person? Perhaps you can enhance your social skills or your vocational skills in an effort to become more independent. Are you too heavy? Perhaps you can follow some of the suggestions for losing weight discussed in Chapter 9.

When it comes to self-improvement, there may or may not be things you can do about your facial features, your hair, and your body. It is not a good idea to compete with the cultural ideal as exemplified by chiseled facial features and a tight, slender body, but there may be some minor adjustments you can make. One “minor” but important change is to smile more often. As you will see in Chapter 17, people are perceived as more attractive when they are smiling.

- *Challenge the Realism of Your Ideal Self.* Cognitive psychologists note that our internal list of “oughts” and “shoulds” can create perfectionist standards. We constantly fall short of these

standards and experience frustration. Challenge your perfectionist demands on yourself and, when appropriate, revise them. It may be harmful to abolish worthy and realistic goals, even if we do have trouble measuring up now and then. However, some of our goals or values may not stand up to scrutiny.

- *Stop Comparing Yourself to Others!* It is self-defeating to compare ourselves to other people who surpass us in traits or achievements that we deem important. You can be a respectable scientist without being an Einstein or a Madame Curie. You can be a good writer without being a Maya Angelou or a Shakespeare. You can be a worthy athlete without being a Serena Williams or a Peyton Manning. You can also make a good appearance without landing work for print ads in clothing catalogs. You can earn a decent living even if you are not making as much money as _____ (you fill in the blank).
- *Substitute Realistic Goals for Unattainable Goals.* Perhaps we will never be as artistic, as tall, or as graceful as we would like to be. We can work to enhance our drawing skills, but if it becomes clear that we will not become Michelangelos, perhaps we can enjoy our scribbles for what they are and also find satisfaction elsewhere. We cannot make ourselves taller (except by wearing elevator shoes or high heels), but we can take off 5 pounds and cut our time for running the mile. We can learn to whip up a great fettuccine Alfredo.
- *Build Self-Efficacy Expectations.* Our self-efficacy expectations affect our willingness to take on challenges and persist in efforts to meet them. We can build self-efficacy expectations by selecting tasks that are consistent with our interests and abilities and working at them. We can also build self-efficacy expectations by working at hobbies or charitable causes. Use realistic self-assessment, realistic goals, and a reasonable schedule for improvement. Perhaps you will never run a 5-minute mile, but after a few months of workouts, you might be able to put a few 8- to 10-minute miles back to back. (You might even enjoy them.)

“Over here, children are not part of the family,” said Ken, an African American parent. “They are either part of their own crowd or they are ‘individuals.’”

“Being an individual does not mean you have to talk back to your mother,” Julie said. “What do you think, Spencer? You’re the psychologist.”

I think I made some unhelpful comments about the ketchup on the french fries having antioxidants and some slightly helpful comments about what is typical of teenagers in the United States. But I’m not sure because I was thinking deeply about Hannah at the time. Not about her lunch, but about the formation of her personality and the influences on her behavior.

Question 17: Why is the sociocultural perspective important to the understanding of personality? As I thought about Hannah, I realized that in our multicultural society, personality cannot be understood without reference to the **sociocultural perspective**. Different cultural groups within the United States have different attitudes, beliefs, norms, self-definitions, and values (Phinney, 2006; S. J. Schwartz et al., 2010). Perhaps there were some unconscious psychodynamic influences operating on Hannah. Her traits included exceptional academic ability and musical talent, which were at least partly determined by her heredity. Clearly, she was consciously striving to become a great violinist. But one could not fully understand her personality without also considering the sociocultural influences acting on her.

Here was a youngster who was strongly influenced by her peers—she was completely at home with blue jeans and french fries. She was also a daughter in an Asian American immigrant group that views education as the key to success in our culture (Leppel, 2002; Magno, 2010). Belonging to this ethnic group had contributed to her ambition but had not prevented her from becoming an outspoken American teenager. Her outspokenness had struck her mother as brazen and inappropriate. Julie was offended by behavior that I consider acceptable in my own children. She reeled off the things that were “wrong” with Hannah from her Korean American perspective. I listed some things that were very right with Hannah and encouraged Julie to worry less.

Let’s consider how sociocultural factors can affect one’s sense of self.

Sociocultural perspective The view that focuses on the roles of ethnicity, gender, culture, and socioeconomic status in personality formation, behavior, and mental processes.

Individualist A person who defines herself or himself in terms of personal traits and gives priority to her or his own goals.

Collectivist A person who defines herself or himself in terms of relationships to other people and groups and gives priority to group goals.

Individualism versus Collectivism: Who Am I (in This Cultural Setting)?

One could say that Julie’s complaint was that Hannah saw herself as an individual and an artist to a greater extent than as a family member and a Korean girl. **Question 18: What do individualism and collectivism mean?** Cross-cultural research reveals that people in the United States and many northern European nations tend to be individualistic. **Individualists** tend to define themselves in terms of their personal identities and to give priority to their personal goals (Brewer & Chen, 2007; Triandis, 2006). When asked to complete the statement “I am . . .,” they are likely to respond in terms of their personality traits (“I am outgoing,” “I am artistic”) or their occupations (“I am a nurse,” “I am a systems analyst”) (Triandis & Suh, 2002). In contrast, many people from cultures in Africa, Asia, and Central and South America tend to be collectivistic (Brewer & Chen, 2007; Triandis, 2006). **Collectivists** tend to define themselves in terms of the groups to which they belong and to give priority to the group’s goals (Triandis, 2006). They feel complete in terms of their relationships with others (Triandis, 2006; see Figure 12.5 ■). They are more likely than individualists to conform to group norms and judgments (Brewer & Chen, 2007; Triandis & Suh, 2002). When asked to complete the statement “I am . . .,” they are more likely to respond in terms of their families, gender, or nation (“I am a father,” “I am a Buddhist,” “I am Japanese”) (Triandis, 2001).

The seeds of individualism and collectivism are found in the culture in which a person grows up. The capitalist system fosters individualism to some degree. The traditional writings of the East have exalted people who resist personal temptations to do their duty and promote the welfare of the group.

Another issue from the sociocultural perspective is acculturation. Just how much acculturation is good for you? **Question 19: How does acculturation affect the psychological well-being of immigrants and their families?**

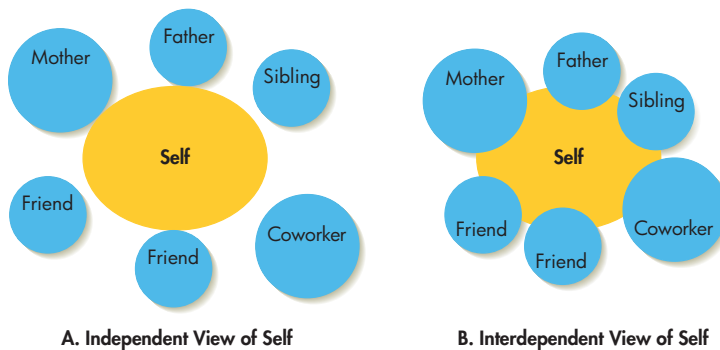


Figure 12.5 ■ The Self in Relation to Others from the Individualist and Collectivist Perspectives To an individualist, the self is separate from other people (part A). To a collectivist, the self is complete only in terms of relationships to other people (part B). Based on Markus and Kitayama, 1991.

Acculturation, Adjustment, and Self-Esteem: Just How Much Acculturation Is Enough?

Self-esteem has been shown to be connected with patterns of **acculturation** among immigrants (Phinney, 2006). Some immigrants are completely assimilated by the dominant culture. They lose the language and customs of their country of origin and become like the dominant culture in the new host country. Others maintain almost complete separation. They retain the language and customs of their country of origin and never acclimate to those of the new country. Still others become bicultural. For example, they remain fluent in the language of their country of origin but become conversant in the new language. They also blend the customs and values of both cultures (Schwartz et al., 2010). They can switch “mental gears”—apply the values of one culture under some circumstances and apply the values of the other culture under different circumstances (Phinney, 2006). Perhaps they relate to other people in one way at work or in school and in another way at home or in the neighborhood.

Truth or Fiction Revisited: Research evidence suggests that people who identify with the bicultural pattern, and not those who surrender their traditional backgrounds, have the highest self-esteem (David et al., 2009; Schwartz et al., 2010). For example, Mexican Americans and Asian Americans who are more proficient in English are less likely to be anxious and depressed than less-proficient Mexican and Asian Americans (Kim & Omizo, 2003; Weisskirch, 2007).

Evaluation of the Sociocultural Perspective

The sociocultural perspective provides insights into the roles of ethnicity, gender, culture, and socioeconomic status in personality formation. Sociocultural factors are external forces that are internalized. They touch many aspects of our cognitions, motives, emotions, and behavior. Without reference to sociocultural factors, we are not able to understand how individuals think, behave, and feel about themselves within a given cultural setting. The sociocultural perspective enhances our sensitivity to cultural differences and expectations and allows us to appreciate the richness of human behavior and mental processes.

MEASUREMENT OF PERSONALITY

Methods of personality assessment take a sample of behavior to predict future behavior. Standardized interviews are often used. Some psychologists use computers to conduct routine interviews. **Behavior-rating scales** assess behavior in settings such as classrooms or mental hospitals. With behavior-rating scales, trained observers usually check off each occurrence of a specific behavior, such as talking to another student during class or biting a fingernail, within a certain time frame—say, 15 minutes. Behavior-rating scales are growing in popularity, especially for use with children (Kamphaus et al., 2000). However, standardized objective and projective tests are used more frequently, and we focus on them in this section.

Question 20: How are measures of personality used? Measures of personality are used to make important decisions, such as whether a person is suited for a certain type of work, a particular class in school, or a drug to reduce agitation. As part of their

Acculturation The process of adaptation in which immigrants and native groups identify with a new, dominant culture by learning about that culture and making behavioral and attitudinal changes.

Behavior-rating scale A systematic means for recording the frequency with which target behaviors occur.

LearningConnections • THE SOCIOCULTURAL PERSPECTIVE: PERSONALITY IN CONTEXT

ACTIVE REVIEW (22) The _____ perspective considers the influences of ethnicity, gender, and socioeconomic status on personality. (23) _____ define themselves in terms of their personal identities and give priority to their personal goals. (24) _____ define themselves in terms of the groups to which they belong and give priority to group goals. (25) Immigrants who identify with the bicultural pattern of assimilation have the (highest or lowest?) self-esteem.

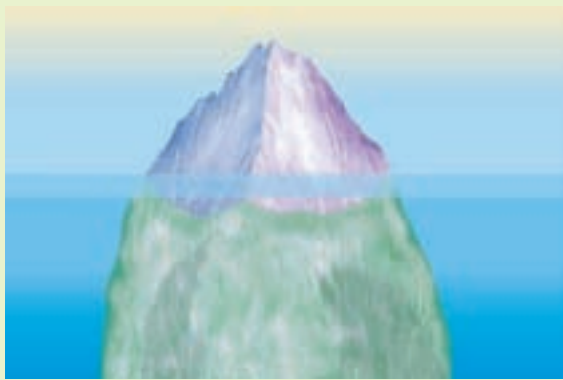
REFLECT AND RELATE Do you see yourself as an individualist or collectivist? Explain.

CRITICAL THINKING Can one “believe in” more than one theory of personality? For example, could one accept the sociocultural perspective along with another perspective?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

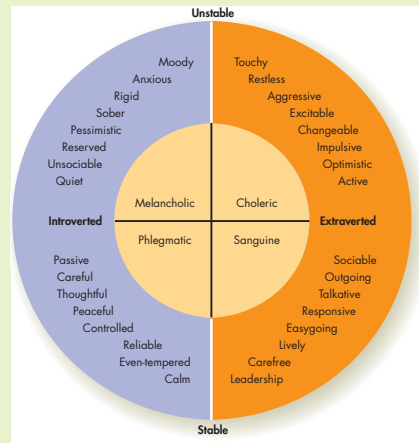
Psychodynamic Perspective



Preconscious and unconscious elements drive personality.

Trait Perspective

Personality is determined by a limited number of fundamental inherent traits. Hippocrates divides these traits into four types (inner circle), while Eysenck groups them into two major dimensions—extraversion–introversion and neuroticism (unstable–stable).



THE BIG FIVE

Extraversion
Neuroticism
Conscientiousness
Agreeableness
Openness to Experience

The current five-factor theory includes the two factors found by Eysenck, along with conscientiousness, agreeableness, and openness to experience.

Key Theorists

- Sigmund Freud (1856–1939)
- Carl Jung (1875–1961)
- Alfred Adler (1870–1937)
- Karen Horney (1885–1952)
- Erik Erikson (1902–1994)
- Margaret Mahler (1897–1985)

- Hippocrates (ca. 460–377 b.c.e.)
- Hans Eysenck (1916–1997)
- Paul T. Costa Jr.
- Robert McCrae

Focus of Research

- Unconscious conflict
- Drives such as sex, aggression, and the need for superiority come into conflict with laws, social rules, and moral codes
- Use of mathematical techniques to catalog and organize basic human personality traits

View of Personality

- Three structures of personality—id, ego, superego
- Five stages of psychosexual development—oral, anal, phallic, latency, genital
- Ego analysts—or *neanalysts*—focus more on the role of the ego in making meaningful conscious decisions
- Based on theory of Hippocrates and work of Gordon Allport
- Eysenck’s two-dimensional model—Introversion–extraversion and emotional stability–instability
- Current emphasis is on the five-factor model (the “Big Five”)—extraversion, agreeableness, conscientiousness, neuroticism, openness to experience

admissions process, graduate schools often ask professors to rate prospective students on scales that assess traits such as intelligence, emotional stability, and cooperation. Students may take tests to measure their **aptitudes** and interests to gain insight into whether they are suited for certain occupations. It is assumed that students who share the aptitudes and interests of people who function well in certain positions are also likely to function well in those positions.

Let’s consider objective tests and projective tests.

Objective Tests

Question 21: What are objective personality tests? Objective tests present respondents with a **standardized** group of test items in the form of a questionnaire. Respondents are limited to a specific range of answers. One test might ask respondents to indicate

Aptitude A natural ability or talent.

Objective tests Tests whose items must be answered in a specified, limited manner. Tests whose items have concrete answers that are considered correct.

Standardized test A test that is given to a large number of respondents so that data concerning the typical responses can be accumulated and analyzed.

Learning-Theory Perspective



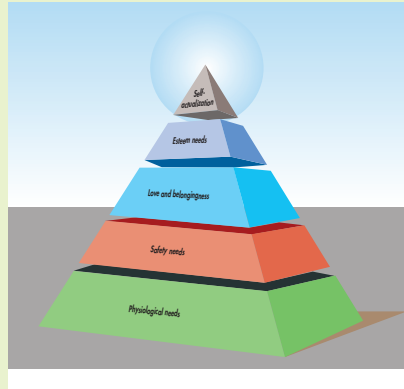
Situational and person variables mold personality.

John B. Watson (1878–1958)
B. F. Skinner (1904–1990)
Albert Bandura

- Behaviorist focus on situational factors that determine behavior
- Social-cognitive emphasis on observational learning

- Watson saw personality as plastic and determined by external situational variables.
- Skinner believed that society conditions individuals into wanting what is good for society.
- Bandura believes in reciprocal determinism

Humanistic–Existential Perspective



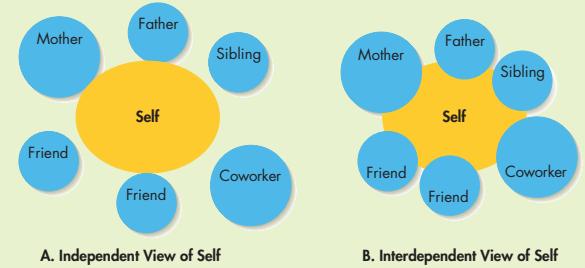
Maslow believed we progress toward higher psychological needs once basic survival needs have been met.

Abraham Maslow (1908–1970)
Carl Rogers (1902–1987)

- The experiences of being human and developing one's unique potential within an often hostile environment

- People have inborn drives to become what they are capable of being.
- Unconditional positive regard leads to self-esteem, which facilitates individual growth and development.

Sociocultural Perspective



Martha Bernal
Beverly Greene
Jean Phinney
Harry Triandis
Lillian Comas-Diaz
Stanley Sue
Richard Suinn

- The roles of ethnicity, gender, culture, and socioeconomic status in personality formation and behavior

- Development differs in individualist and collectivist societies.
- Discrimination, poverty, and acculturation affect the self-concept and self-esteem.

whether items are true or false for them. Another might ask respondents to select the preferred activity from groups of three.

Some tests have a **forced-choice format** in which respondents are asked to indicate which of two statements is truer for them or which of several activities they prefer. The respondents are not usually given the option of answering “none of the above.” Forced-choice formats are frequently used in interest inventories, which help predict whether the person would function well in a certain occupation. The following item is similar to those found in occupational interest inventories:

I would rather

- be a forest ranger.
- work in a busy office.
- play a musical instrument.

Forced-choice format A method of presenting test questions that requires a respondent to select one of a number of possible answers.

Table 12.3 ■ Minnesota Multiphasic Personality Inventory (MMPI) Scales

	Scale	Abbreviation	Possible Interpretations
Validity Scales	Question	?	Corresponds to number of items left unanswered
	Lie	L	Lies or is highly conventional
	Frequency	F	Exaggerates complaints or answers items haphazardly; may have bizarre ideas
Clinical Scales	Correction	K	Denies problems
	Hypochondriasis	Hs	Has bodily concerns and complaints
	Depression	D	Is depressed; has feelings of guilt and helplessness
	Hysteria	Hy	Reacts to stress by developing physical symptoms; lacks insight
	Psychopathic deviate	Pd	Is immoral, in conflict with the law; has stormy relationships
	Masculinity/femininity	Mf	High scores suggest interests and behavior considered stereotypical of the other gender
	Paranoia	Pa	Is suspicious and resentful, highly cynical about human nature
	Psychasthenia	Pt	Is anxious, worried, high-strung
	Schizophrenia	Sc	Is confused, disorganized, disoriented; has bizarre ideas
	Hypomania	Ma	Is energetic, restless, active, easily bored
Social introversion	Si	Is introverted, timid, shy; lacks self-confidence	



Photo: Collection/Getty Images

Is This Test-Taker Telling the Truth? How can psychologists determine whether or not people answer test items honestly? What are the validity scales of the MMPI?

The Minnesota Multiphasic Personality Inventory (MMPI)² contains hundreds of items presented in a true–false format. The MMPI is designed for use by clinical and counseling psychologists to help diagnose psychological disorders. Accurate measurement of an individual’s problems should point to appropriate treatment. The MMPI is the most widely used psychological test in clinical work and the most widely used instrument for personality measurement in psychological research.

The MMPI is usually scored for the 4 **validity scales** and 10 **clinical scales** described in Table 12.3 ■. The validity scales suggest whether answers actually represent the person’s thoughts, emotions, and behaviors. **Truth or Fiction Revisited:** However, psychologists cannot guarantee that deception on a personality test will be disclosed.

The validity scales in Table 12.3 assess different **response sets**, or biases, in answering the questions. People with high L scores, for example, may be attempting to present themselves as excessively moral and well-behaved individuals. People with high F scores may be trying to seem bizarre or are answering haphazardly. Many personality measures have some kind of validity scale. The clinical scales of the MMPI assess the problems shown in Table 12.3 as well as stereotypical masculine or feminine interests and introversion.

The MMPI scales were constructed empirically—that is, on the basis of actual clinical data rather than on the basis of psychological theory. A test-item bank of several hundred items was derived from questions that are often asked in clinical interviews. Here are some examples of the kinds of items that were used:

- | | |
|--|-----|
| My father was a good man. | T F |
| I am very seldom troubled by headaches. | T F |
| My hands and feet are usually warm enough. | T F |
| I have never done anything dangerous for the thrill of it. | T F |
| I work under a great deal of tension. | T F |

The items were administered to people with previously identified symptoms, such as depressive or schizophrenic symptoms. Items that successfully set these people apart were included on scales named for these conditions. Confidence in the MMPI has developed because of its extensive use.

Validity scales Groups of test items that indicate whether a person’s responses accurately reflect that individual’s traits.

Clinical scales Groups of test items that measure the presence of various abnormal behavior patterns.

Response set A tendency to answer test items according to a bias—for instance, to make oneself seem perfect or bizarre.

² Currently, the updated MMPI-2.

Now that we have defined objective tests and surveyed the MMPI, we may ask—
Question 22: How do projective tests differ from objective tests?

Projective Tests

Projective tests have no clear specified answers. People are shown ambiguous stimuli such as inkblots or ambiguous drawings and asked to say what they look like or to tell stories about them. Or they are asked to complete sentences or to draw pictures of persons. There is no one correct response. It is assumed that people project their own personalities into their responses. The meanings they attribute to these stimuli are assumed to reflect their personalities as well as the drawings or blots themselves.

THE RORSCHACH INKBLOT TEST

Truth or Fiction Revisited: There are a number of psychological tests made up of inkblots, and test-takers are indeed asked to say what the blots look like to them. The best known and most widely used of these is the Rorschach inkblot test, named after its originator, Hermann Rorschach (R. P. Archer et al., 2006).

In the Rorschach test, people are given the inkblots, one by one, and are asked what they look like or what they could be. A response that reflects the shape of the blot is considered a sign of adequate **reality testing**. A response that richly integrates several features of the blot is considered a sign of high intellectual functioning. Supporters of the Rorschach believe it provides insight into a person's intelligence, interests, cultural background, personality traits, psychological disorders, and many other variables. Critics argue that there is little empirical evidence to support the test's validity (Garb et al., 2005). Even when the Rorschach is being severely challenged as a method of obtaining diagnoses of psychological disorders, researchers continue to claim that it has uses in many other areas, including the hiring and selection of personnel in organizations (Del Giudice, 2010), determination of whether individuals are suitable to have child custody (I. B. Weiner, 2006), and even in the assessment of children in schools (Hojnoski et al., 2006).

Although there is no single “correct” response to the Rorschach inkblot shown in Figure 12.6 ■, some responses are not in keeping with the features of the blots. Figure 12.6 could be a bat or a flying insect, the pointed face of an animal, the face of a jack-o'-lantern, or many other things. But responses like “an ice cream cone,” “diseased lungs,” or “a metal leaf in flames” are not suggested by the features of the blot and may indicate personality problems.



Figure 12.6 ■ A Rorschach Inkblot The Rorschach is the most widely used projective personality test. What does this inkblot look like to you? What could it be?

THE THEMATIC APPERCEPTION TEST

The Thematic Apperception Test (TAT) was developed in the 1930s by Henry Murray and Christiana Morgan. It consists of drawings, like the one in Figure 9.3 (see p. 323), that are open to a variety of interpretations. Individuals are given the cards one at a time and asked to make up stories about them.

The TAT is widely used in research on motivation and in clinical practice (Archer et al., 2006; Hojnoski et al., 2006). The notion is that we are likely to project our own needs into our responses to ambiguous situations, even if we are unaware of them or reluctant to talk about them. The TAT is also widely used to assess attitudes toward other people, especially parents, lovers, and spouses.

Projective test A psychological test that presents ambiguous stimuli onto which the test-taker projects his or her own personality in making a response.

Reality testing The capacity to perceive one's environment and oneself according to accurate sensory impressions.

LearningConnections • MEASUREMENT OF PERSONALITY

ACTIVE REVIEW (26) Personality tests sample _____ to predict future behavior. (27) _____ tests present standardized sets of test items in the form of questionnaires. (28) The MMPI is an objective test that uses a(n) _____-false format to assess psychological disorders. (29) Projective tests present _____ stimuli and permit the respondent a broad range of answers. (30) The foremost projective technique is the _____ inkblot test.

REFLECT AND RELATE Have you ever taken a personality test? What were the results? Do you believe the results were valid? Why or why not?

CRITICAL THINKING Do you think personality tests should be required as part of completing a job application? Why or why not?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections USING PSYCHOLOGICAL TESTS TO FIND A CAREER THAT FITS

At social gatherings, “*What do you do?*” is asked more frequently than “*How do you do?*” Psychologists use psychological tests to help people predict whether they are likely to adjust to various occupations by matching their key traits to a particular type of job. Several kinds of tests are used for this purpose.

Personnel Tests

Industrial/organizational psychologists attempt to match performances on personnel tests with specific job requirements. Personnel tests include tests of intellectual abilities, spatial-relations and mechanical abilities, perceptual accuracy, motor abilities, and personality and interests.

Tests of mechanical comprehension are appropriate for many factory workers, construction workers, and of course, mechanics. They include items such as indicating which of two pairs of shears would cut metal better. Spatial-relations ability is needed in any job that requires the ability to visualize objects in three dimensions. Examples include drafting, clothing design, and architecture. Tests of perceptual accuracy are useful for clerical positions, such as bank tellers and secretaries. Some items on these tests ask respondents to compare columns of letters, words, or numbers and indicate which ones do or do not match. Tests of motor abilities are useful for jobs that require strength, coordination, rapid reaction time, or dexterity. Moving furniture, driving certain kinds of equipment, and sewing all require some motor skills.

The relationships between personality and performance in a job are less

clear. It seems logical that one might wish to hire a candidate for a sales position who has a strong need to persuade others. Many businesses have used personality tests to measure candidates’ general “stability.” However, such use has sometimes been criticized as an invasion of privacy.

Interest Inventories

Psychologists have devised interest inventories that predict psychological adjustment in various occupations.

Although interest in an occupation does not guarantee the ability to excel in that occupation, there are many types of jobs in a broad occupational area. Tests may reveal that a candidate is better suited for one type than for another. Consider medicine. There are medical technicians (X-ray technicians, blood analysts, and so on), nurses, physical therapists, physicians, and other occupations within this broad field. Assessment of interests and aptitudes can help a person zero in on one of them.

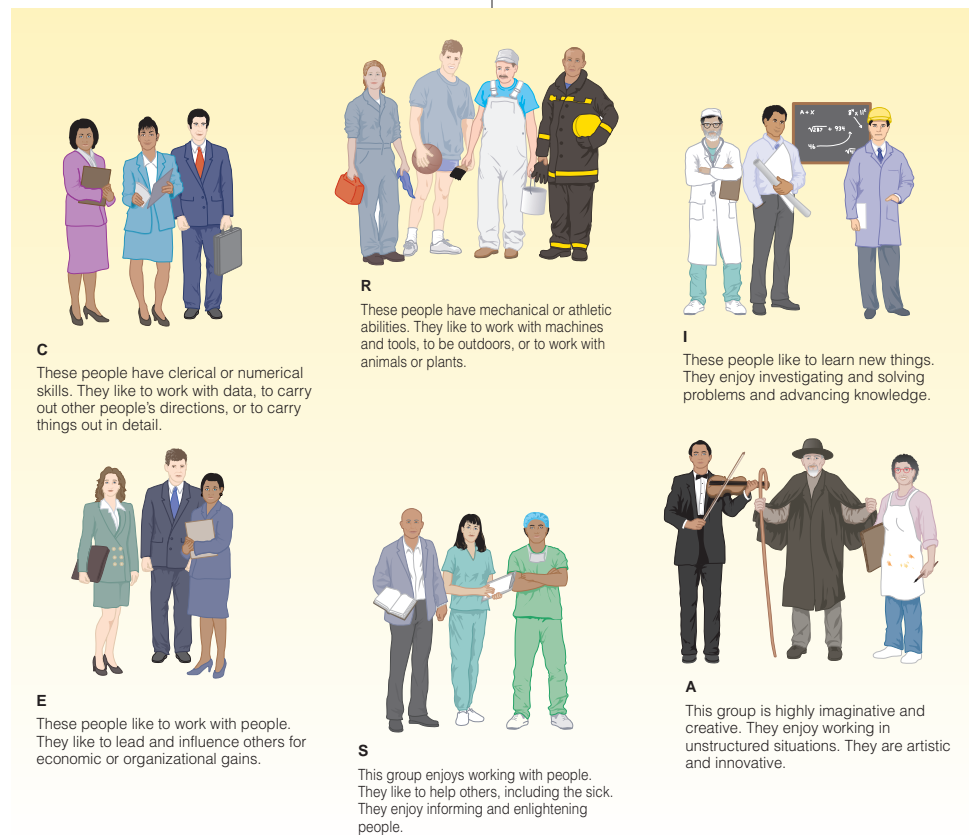


Figure 12.7 ■ The Job Fair Which group or groups seem most likely to share your interests?

John Holland's Vocational Personality Types

Psychologist John Holland developed a theory of vocational personality types in which six traits (realistic, investigative, artistic, social, enterprising, and conventional) are matched to particular occupations (Gottfredson, 2009). To obtain insight into what might be a match for you, let's attend a job fair.

Figure 12.7 ■ shows an aerial view of a job fair in a college gymnasium. When the fair got under way, students and prospective employers began to chat. As time elapsed, they found mutual interests and collected in different parts of the gym according to those interests.

Now *you* enter the room. Groups have already formed. As you decide which group to join, you overhear snatches of conversation that indicate the types of people in various groups.

Now consider the types of people in the six groups by reading the descriptions in Figure 12.7:

Which group would you most like to join? Write the letter that signifies the group (R, I, A, S, E, or C) here: _____

What is your second choice? After you had met and chatted with the folks in the first group, with whom else might you like to chat? Write the letter here: _____

Now, which group looks most *boring* to you? With which group do you have nothing in common? Which group would you most like to avoid? Write the letter

signifying the group that should have stayed at home here: _____

Where, then, did you fit in at the fair? What might it mean for your vocational adjustment? Holland has predicted how well people will enjoy a certain kind of work by matching personality traits to the job. Each of the groups in Figure 12.7 represents one of Holland's vocational personality types:

Realistic. Realistic people tend to be concrete in their thinking, mechanically oriented, and interested in jobs that involve motor activity. Examples include farming; unskilled labor, such as gas station attendants; and skilled trades, such as construction and electrical work.

Investigative. Investigative people tend to be creative, introverted, and abstract in their thinking. They are frequently well adjusted in research and in college and university teaching.

Artistic. Artistic individuals tend to be creative, emotional, interested in subjective feelings, and intuitive. They tend to gravitate toward the visual and performing arts.

Social. Socially oriented people tend to be extraverted and socially concerned. They frequently show high verbal ability and strong needs for affiliating with others. They are

often well suited to jobs such as social work, counseling, and teaching children.

Enterprising. Enterprising individuals tend to be adventurous and impulsive, domineering, and extraverted. They gravitate toward leadership and planning roles in industry, government, and social organizations. The successful real estate developer or tycoon is usually enterprising.

Conventional. Conventional people tend to enjoy routines. They show high self-control, a need for order, and a desire for social approval. They are not particularly imaginative. Jobs that suit them include banking, accounting, and clerical work.

Many occupations call for combinations of these traits. A copywriter in an advertising agency might be both artistic and enterprising. Clinical and counseling psychologists tend to be investigative, artistic, and socially oriented. Military personnel and beauticians tend to be realistic and conventional. (But military leaders who plan major operations and form governments are also enterprising, and individuals who create new hairstyles and fashions are also artistic.)

Holland has created the Vocational Preference Inventory to assess these traits. These styles are also measured by some interest inventories. Check with your college testing and counseling center if you would like to learn more about your vocational preferences.

1. What is personality?

Personality refers to the reasonably stable patterns of emotions, motives, and behavior that distinguish one person from another.

The Psychodynamic Perspective: Excavating the Iceberg

2. What is Freud's theory of psychosexual development?

Freud assumed we are driven largely by unconscious motives and conflicts. Psychic structures include the unconscious id, the ego, or the sense of self or "I," and the superego. Defense mechanisms repress unacceptable ideas or distort reality. There are five stages of development: oral, anal, phallic, latency, and genital.

3. What are the views of neo-Freudians?

Jung's theory features a collective unconscious and numerous archetypes. Adler's theory, individual psychology, features the inferiority complex. Horney's theory focuses on parent-child relationships. Erikson's theory highlights social relationships.

4. What are the strengths and weaknesses of the psychodynamic perspective?

Freud argued that personality is subject to scientific analysis. However, there is no evidence for the existence of psychic structures, and his theory is fraught with inaccuracies about child development.

The Trait Perspective: The Five-Dimensional Universe

5. What are traits?

Traits are personality elements that are inferred from behavior and that account for behavioral consistency.

6. What is the history of the trait perspective?

Hippocrates believed that personality reflected the balance of fluids ("humors") in the body. Allport surveyed traits by studying words that referred to them in dictionaries.

7. How have contemporary psychologists reduced the universe of traits to more manageable lists?

Eysenck used factor analysis to arrive at two basic personality dimensions: introversion-extraversion and emotional stability-instability. More recent mathematical analyses point to the existence of five basic factors: extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience.

8. What are the strengths and weaknesses of trait theory?

Trait theorists have helped develop personality tests and used them to predict adjustment in various lines of work.

Learning-Theory Perspectives: All the Things You Do

9. What does behaviorism contribute to our understanding of personality?

Behaviorists believe that we should focus on observable behavior rather than hypothesized unconscious forces and that we should emphasize the situational determinants of behavior. In *Walden Two*, Skinner argued that environmental contingencies can shape people into wanting to do what is required of them.

10. How does social-cognitive theory differ from the behaviorist view?

Social-cognitive theory has a cognitive orientation and focuses on learning by observation. To predict behavior, social-cognitive theorists consider situational variables and person variables.

11. What are the strengths and weaknesses of learning theories as they apply to personality?

Learning theorists highlight the value of referring to observable behavior in theorizing. Critics of social-cognitive theory note that it does not address self-awareness or pay enough attention to genetic variation in explaining individual differences.

The Humanistic-Existential Perspective: How Becoming?

12. What are humanism and existentialism?

Humanism argues that we are capable of free choice, self-fulfillment, and ethical behavior. Existentialists argue that our lives have meaning when we give them meaning.

13. How do humanistic psychologists differ from psychodynamic theorists?

Whereas Freud wrote that people are motivated to gratify unconscious drives, humanistic psychologists believe that people have a conscious need for self-actualization.

14. What is the self?

According to Rogers, the self is an organized and consistent way a person perceives his or her "I" in relation to others.

15. What is self theory?

Self theory assumes the existence of the self and each person's unique views. The self attempts to actualize and best does so when the person receives unconditional positive regard.

16. What are the strengths and weaknesses of humanistic-existential theory?

Humanistic-existential theory appeals because of its focus on self-awareness and freedom of choice, but critics argue that concepts such as conscious experience and self-actualization are unscientific.

The Sociocultural Perspective: Personality in Context

17. Why is the sociocultural perspective important to the understanding of personality?

One cannot fully understand personality without understanding the cultural beliefs and socioeconomic conditions that affect the individual.

18. What do individualism and collectivism mean?

Individualists define themselves in terms of their personal identities and give priority to their personal goals. Collectivists define themselves in terms of the groups to which they belong and give priority to the group's goals.

19. How does acculturation affect the psychological well-being of immigrants and their families?

Immigrants who retain the customs and values of their country of origin but who also learn those of their new host country, and blend the two, tend to have higher self-esteem than immigrants who

either become completely assimilated or who maintain separation from the dominant culture.

Measurement of Personality

20. How are measures of personality used?

Personality measures are used to assess psychological disorders, predict adjustment in various lines of work, measure aptitudes, and determine academic placement.

21. What are objective personality tests?

Objective tests present test-takers with a standardized set of test items to which they must respond in specific, limited ways (as in multiple-choice or true–false tests).

22. How do projective tests differ from objective tests?

Projective tests present ambiguous stimuli and allow the test-taker to give a range of responses that reflect individual differences.

KEY TERMS

- Acculturation (p. 447)
- Anal stage (p. 427)
- Analytical psychology (p. 428)
- Antisocial personality (p. 434)
- Aptitude (p. 448)
- Archetypes (p. 429)
- Behavior-rating scale (p. 447)
- Clinical scales (p. 450)
- Collective unconscious (p. 429)
- Collectivist (p. 446)
- Competencies (p. 438)
- Conditional positive regard (p. 442)
- Conditions of worth (p. 443)
- Conscious (p. 425)
- Creative self (p. 429)
- Defense mechanism (p. 425)
- Displaced (p. 428)
- Drive for superiority (p. 429)
- Ego (p. 425)
- Ego identity (p. 430)
- Electra complex (p. 428)
- Encode (p. 438)
- Erogenous zone (p. 426)
- Eros (p. 426)
- Existentialism (p. 441)
- Expectancies (p. 437)
- Extraversion (p. 432)
- Fixation (p. 427)
- Forced-choice format (p. 449)
- Genital stage (p. 428)
- Humanism (p. 441)
- Id (p. 425)
- Identification (p. 426)
- Incest taboo (p. 428)
- Individual psychology (p. 429)
- Individualist (p. 446)
- Inferiority complex (p. 429)
- Introversion (p. 432)
- Latency (p. 428)
- Libido (p. 426)
- Modeling (p. 438)
- Moral principle (p. 426)
- Neuroticism (p. 432)
- Objective test (p. 448)
- Oedipus complex (p. 428)
- Oral stage (p. 427)
- Person variables (p. 437)
- Personality (p. 424)
- Phallic stage (p. 427)
- Pleasure principle (p. 425)
- Preconscious (p. 425)
- Projective test (p. 451)
- Psychic structure (p. 425)
- Psychoanalysis (p. 425)
- Psychodynamic theory (p. 426)
- Psychosexual development (p. 426)
- Psychosocial development (p. 429)
- Reality principle (p. 425)
- Reality testing (p. 451)
- Reciprocal determinism (p. 437)
- Repression (p. 425)
- Response set (p. 450)
- Self-actualization (p. 441)
- Self-efficacy expectations (p. 438)
- Self-ideal (p. 443)
- Social-cognitive theory (p. 437)
- Sociocultural perspective (p. 446)
- Standardized test (p. 448)
- Subjective value (p. 437)
- Superego (p. 426)
- Trait (p. 431)
- Unconditional positive regard (p. 442)
- Unconscious (p. 425)
- Validity scales (p. 450)

ACTIVE LEARNING RESOURCES



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MAJOR TOPICS

Gender Stereotypes: What Does It Mean to Be Female or to Be Male?

Gender Differences

Gender-Typing: On Becoming a Woman or a Man

Sexual Motivation and Sexual Orientation: Pressing the START Button and Finding Direction

Interpersonal Attraction: On Liking and Loving

The Four S's: Sexual Response, Sexual Behavior, Sexual Dysfunctions, and Sex Therapy

Sexual Coercion: Confounding Sex and Aggression

FEATURES

In Profile: Sandra Lipsitz Bem

Concept Review: Gender-Typing

Controversy in Psychology: Is the Human Sex Drive Affected by Pheromones?

In Profile: Charlotte J. Patterson

A Closer Look—Diversity: Ethnicity and Sexual Orientation

A Closer Look—Research: When It Comes to Sex, Red May Mean “Go”

Self-Assessment: Sternberg’s Triangular Love Scale

Self-Assessment: Cultural Myths That Create a Climate That Supports Rape

Life Connections: Preventing HIV/AIDS and Other Sexually Transmitted Infections

TRUTH OR FICTION

- T F** Men are more aggressive than women.
- T F** Members of ethnic minority groups in the United States are more accepting of homosexuality than European Americans are.
- T F** Beauty is in the eye of the beholder.
- T F** When you're smiling, people perceive you as more attractive.
- T F** Opposites attract.
- T F** Not only the sex organs but also the earlobes swell when people are sexually aroused.
- T F** Education has a liberating influence on sexual behavior.
- T F** Most Americans believe that some women like to be talked into sex.
- T F** Women say no to sex even if they really want to have sex.
- T F** The majority of college women who have been victims of date rape do not report the assault to police or campus authorities.



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Off the misty coast of Ireland lies the small island of Inis Beag. From the air, it is a green jewel, warm and inviting. At ground level, things are somewhat cooler.

For example, the residents of Inis Beag do not believe that women experience orgasm. The woman who chances to find pleasure in sex is considered deviant. Premarital sex is all but unknown. Women engage in sexual relations to conceive children and to appease their husbands' carnal cravings. They need not worry about being called on for frequent performances, however, because the men of Inis Beag believe, erroneously, that sex saps their strength. Sex on Inis Beag is carried out in the dark—both literally and figuratively—and with nightclothes on. The man lies on top in the so-called missionary position. In accordance with local concepts of masculinity, he ejaculates as fast as he can. Then he rolls over and falls asleep.

If Inis Beag does not sound like your cup of tea, you may find the atmosphere of Mangaia more congenial. Mangaia is a Polynesian pearl of an island, lifting lazily from the blue waters of the Pacific. It is on the other side of the world from Inis Beag—in more ways than one.

From an early age, Mangaian children are encouraged to get in touch with their sexuality through masturbation. Mangaian adolescents are expected to engage in sexual intercourse. They may be found on secluded beaches or beneath the swaying fronds of palms diligently practicing techniques learned from village elders. Mangaian women are expected to reach orgasm several times before their partners do. Young men want their partners to reach orgasm, and they compete to see who is more effective at bringing young women to multiple orgasms.

So on the island of Inis Beag, a woman who has an orgasm is considered deviant, whereas on Mangaia, multiple orgasms are the norm (Rathus et al., 2011). If we take a quick tour of the world of sexual diversity, we also find that

- Nearly every society has an incest taboo, but some societies believe that a brother and sister who eat at the same table are engaging in a mildly sexual act and forbid it.
- What is considered sexually arousing varies enormously among different cultures. Women's breasts and armpits stimulate a sexual response in some cultures but not in others.
- Kissing is nearly universal in the United States but unpopular in Japan and unknown in some cultures in Africa and South America. Upon seeing European

visitors kissing, a member of an African tribe remarked, “Look at them—they eat each other’s saliva and dirt.”

- Sexual exclusiveness in marriage is valued highly in most parts of the United States, but among the people of Alaska’s Aleutian Islands, it is considered good manners for a man to offer his wife to a house guest.

What turns people on? What makes the sex drive click? What springs people’s hearts into their mouths, tightens their throats, and stirs feelings of desire? Is it the sight of a lover undressing, a .jpg file on a website, a sniff of some velvety perfume, a sip of wine? Some people become aroused by remembrances of lovers past. Some are stimulated by fantasies of flings with strangers.

People vary greatly in the cues that excite them sexually and in the frequency with which they experience sexual thoughts and feelings. Many factors contribute to the sex drive. Later, we will see that sex hormones play their part in sexual arousal. In adolescence, when we are flooded with sex hormones, we may seem perpetually aroused or arousable. Yet some people rarely or never entertain sexual thoughts or fantasies. A person’s cultural setting affects his or her sex drive as much as hormones. For example, the residents of Inis Beag and Mangaia have similar anatomical features and endocrine systems but vastly different attitudes toward sex. Cultural beliefs influence their sexual behavior and the pleasure they find—or do not find—in sex. Sexual motivation may be natural, but this natural function is strongly influenced by religious and moral beliefs, cultural tradition, folklore, and superstition.

Despite our cultural backgrounds, the human world—with few exceptions—is made up of women and men. We therefore begin our discussion of gender and sexuality by asking what it means to be a woman or a man and how (most) children develop behavior patterns that most societies label as feminine or masculine. We then discuss interpersonal attraction and explore the various factors that lead us to be romantically attracted to males or females (or sometimes, to both). The directionality of our feelings of attraction—toward females or males—is termed our *sexual orientation*. We will examine the research concerning why most but not all of us are attracted to individuals of the other gender. We will see that our sex drives are connected with sex hormones and that our bodies—whether female or male—tend to respond in more or less similar ways to sexual stimulation. Finally, we turn our attention to a couple of negative but important areas of human sexuality: sexual coercion and sexually transmitted infections. It is important that we understand forms of sexual coercion like rape and sexual harassment and what we can do about them. This chapter’s Life Connections feature is “Preventing HIV/AIDS and Other Sexually Transmitted Infections” (STIs). For most people throughout the world, HIV/AIDS remains a lethal issue, and for millions of the rest of us, STIs cause distressing illnesses that too frequently leave us incapable of conceiving and bearing children.

But let’s begin our tale with a fascinating question: What, if anything, is masculine about being male or feminine about being female? This may sound like a trick question, but very soon you will see that it is quite serious. In fact, I sometimes think that the more questions we try to answer, the more puzzles we create.

How Powerful Is the Sex Drive? The sex drive is quite strong among adolescents and young adults, when sex hormones are at their peak. However, the modes of sexual expression people choose—and whether they express sexual impulses at all—are greatly influenced by cultural factors.



GENDER STEREOTYPES: WHAT DOES IT MEAN TO BE FEMALE OR TO BE MALE?

“Why Can’t a Woman Be More Like a Man?” You may recognize this song title from the musical *My Fair Lady*. In the song, Henry Higgins laments that women are emotional and fickle, whereas men are logical and dependable.

The excitable woman is a stereotype. **Question 1: What are gender-role stereotypes? Stereotypes** are fixed, conventional ideas about a group of people that can give rise to prejudice and discrimination. A **gender** stereotype is a fixed, conventional idea about how men and women ought to behave. Higgins’s stereotypes reflect cultural beliefs. Cultural beliefs about men and women involve clusters of stereotypes called **gender roles**. The logical man is a gender-role stereotype. Gender-role stereotypes define the ways men and women are expected to behave within a given culture.

Sandra Lipsitz Bem (1993) writes that three beliefs about women and men have prevailed throughout the history of Western culture:

1. Women and men have basically different psychological and sexual natures.
2. Men are the superior, dominant gender.
3. Gender differences and male superiority are “natural.”

These beliefs have tended to polarize our views of women and men. It is thought that gender differences in power and psychological traits are natural, but what does “natural” mean? Throughout most of history, people viewed naturalness in terms of religion, or God’s scheme of things (Bem, 1993). For the past century or so, naturalness has been seen in biological, evolutionary terms—at least by most scientists. But these views ignore cultural influences.

How do males and females differ? How are they alike? The anatomical differences between women and men are obvious and are connected with the biological aspects of reproduction. To reproduce, women and men have to be biologically different. Biologists have a relatively easy time describing and interpreting physical gender differences.

Stereotype A fixed, conventional idea about a group.

Gender The psychological state of being male or female.

Gender role A cluster of behaviors that characterizes traditional female or male behaviors within a cultural setting.

In Profile

She doesn’t buy into gender-role stereotypes or into traditional distinctions among heterosexuals, gay people, and bisexuals. Cornell professor Sandra Bem, in the preface of her book *The Lenses of Gender*, writes,

Although I lived monogamously with a man I loved for over 27 years, I am not now and never have been a “heterosexual.” But neither have I ever been a “lesbian” or a “bisexual.”

What I am—and have been for as long as I can remember—is someone whose sexuality and gender have never seemed to mesh with the available cultural categories. (1993, p. vii)

Since earliest childhood, she adds, her temperament and behavior have fallen outside the traditional categories of masculine and feminine. She has never been particularly tough-minded or nurturant.

In the early 1970s, much of Bem’s research focused on psychological androgyny—the notion that both males and females

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can possess a combination of masculine and feminine personality traits. At the time, many theorists thought that psychological androgyny was a good thing because it freed women to engage in traditionally masculine behaviors (for example, being self-assertive) and freed men to engage in traditionally feminine behaviors (for example, being nurturant). But critics of this research argued that the concept of androgyny lends credence to gender polarization. If we say that someone has both masculine and feminine traits, are we not suggesting that masculinity and femininity are “givens”—fixed and natural personality structures rather than cultural inventions?

Bem’s interests then turned to gender polarization and resultant gender inequalities. She argues that viewing men and women as opposites reinforces male dominance. She looks forward to the day when “biological sex [will] no longer be at the core of individual identity and sexuality” (1993, p. 196).



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Sandra Lipsitz Bem.



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Getting Ready for Female and Male Twins What do these children have to look forward to in terms of gender-role stereotypes?

Throughout history and in many cultures, it has also been assumed that women and men must differ in personality to fulfill different roles in the family and society (Guzzetti, 2010; Lippa, 2009). But the task of psychologists who explore these differences is more complex and is wrapped up with cultural and political issues. Psychological gender differences are not as obvious as biological gender differences. In fact, women and men may well be more alike than different psychologically. On the other hand, stereotypes of what it means to be masculine or feminine are widespread (see Table 13.1 ■). For example, in their survey of 30 countries, John Williams and Deborah Best (1994) found that the traits *active*, *adventurous*, *aggressive*, *arrogant*, and *autocratic* are more likely to be ascribed to men. Women are more likely to be seen as *fearful*, *affectionate*, *appreciative*, and *emotional*.

GENDER DIFFERENCES

The study of gender differences directly connects with students. Students are female or male, and there are key questions about what it means to be female or to be male. **Question 2: Are there psychological differences between females and males?** If so, what are they? Psychologists search out such gender differences in terms of research into cognitive skills, personality, and social behavior.

Gender Differences in Cognitive Skills

It was once a dominant myth in Western culture that males were more intelligent than females because of their greater knowledge of world affairs and their skill in science and industry. However, that apparent greater male knowledge and skill did not reflect differences in cognitive ability. Rather, it reflected the systematic exclusion of females from world affairs, science, and industry. For example, assessments of intelligence do not show overall gender differences in cognitive abilities (Halpern et al., 2007). However, reviews of the research suggest that girls are somewhat superior to boys in verbal abilities, such as vocabulary, the ability to generate sentences and words that are similar in meaning to other words, spelling, knowledge of foreign languages, and pronunciation (W. Johnson & Bouchard, 2007). Girls seem to acquire language somewhat faster than boys do. Also, in the United States, far more boys than girls have reading problems ranging from reading below grade level to severe disabilities (Haworth et al., 2009a).

LearningConnections • GENDER STEREOTYPES: WHAT DOES IT MEAN TO BE FEMALE OR TO BE MALE?

ACTIVE REVIEW (1) _____ are fixed, conventional ideas about a group of people. (2) _____-role stereotypes define behavioral expectations of men and women. (3) Throughout Western history, women and men have been seen as having (similar or different?) psychological and sexual natures. (4) Gender polarization has historically worked mostly to the disadvantage of (women or men?).

REFLECT AND RELATE Do people in your family or community think of males or females as being superior to the

other? If so, where do these views come from? What are your views? Why?

CRITICAL THINKING Do you think of males and females as being the “opposite” of one another? If so, in what ways?



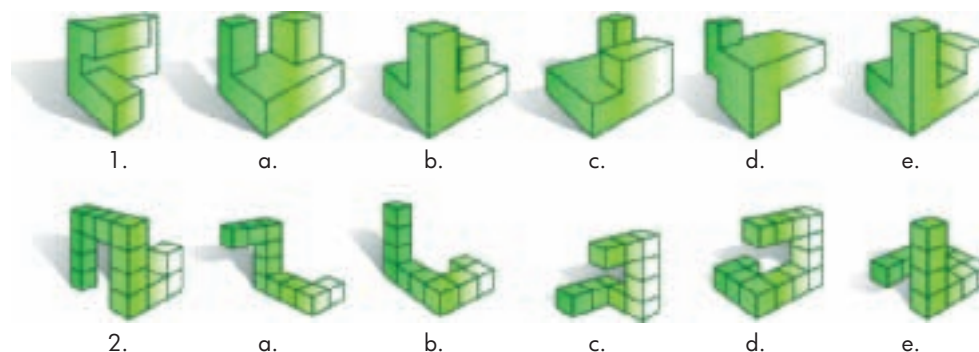
Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Table 13.1 ■ Gender-Role Stereotypes around the World

Stereotypes of Males		Stereotypes of Females	
Active	Opinionated	Affectionate	Nervous
Adventurous	Precise	Appreciative	Patient
Aggressive	Quick	Cautious	Pleasant
Arrogant	Rational	Changeable	Prudish
Autocratic	Realistic	Charming	Self-pitying
Capable	Reckless	Complaining	Sensitive
Coarse	Resourceful	Complicated	Sentimental
Conceited	Rigid	Confused	Sexy
Confident	Robust	Dependent	Shy
Determined	Sharp-witted	Dreamy	Softhearted
Disorderly	Show-off	Emotional	Sophisticated
Enterprising	Steady	Excitable	Submissive
Hardheaded	Stern	Fault-finding	Suggestible
Individualistic	Stingy	Fearful	Superstitious
Inventive	Stolid	Fickle	Talkative
Loud	Tough	Foolish	Timid
Obnoxious	Unscrupulous	Forgiving	Touchy
		Frivolous	Unambitious
		Fussy	Understanding
		Gentle	Unstable
		Imaginative	Warm
		Kind	Weak
		Mild	Worrying
		Modest	

Psychologists John Williams and Deborah Best (1994) found that people in 30 nations around the world tended to agree on the nature of masculine and feminine gender-role stereotypes. Men are largely seen as more adventurous and hardheaded than women. Women are generally seen as more emotional and dependent.
Source: From "Cross-Cultural Views of Women and Men," by J. E. Williams and D. L. Best in *Psychology and Culture*, ed. W. J. Lonner and R. Malpass. Published by Allyn and Bacon, Boston, MA. © 1994 by Pearson Education. Reprinted by permission of the publisher.

Visual-spatial ability refers to the ability to visualize objects or shapes and to mentally manipulate and rotate them. This ability is important in such fields as art, science, and engineering and in activities such as reading maps (Ceci et al., 2009). Boys begin to outperform girls on many types of visual-spatial tasks starting at age 8 or 9, and the difference persists into adulthood (Jaušovec & Jaušovec, 2009; W. Johnson & Bouchard, 2007, 2009; Kosciak et al., 2009). One study compared the navigation strategies of 90 male and 104 female university students (Dabbs et al., 1998). In giving directions, men more often referred to miles and directional coordinates (north, south, east, and west). Women were more likely to refer to landmarks and turning right or left. Psychological tests of spatial ability assess skills such as mentally rotating figures in space (see Figure 13.1 ■) and finding figures embedded within larger designs (see Figure 13.2 ■).

**Figure 13.1 ■ Rotating Figures in**

Space In this test, individuals are asked which of the figures, a through e, would look like the first figure if it were rotated.

Males as a group tend to outperform females on spatial-relations tasks such as these. However, females do about as well as males when they receive training in the task.
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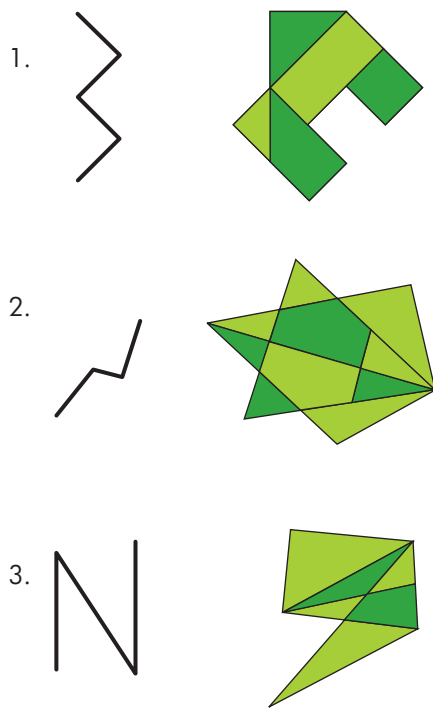


Figure 13.2 ■ Items from an Embedded-Figures Test

Where there is more societal stratification based on gender, and thus more inequality of opportunity, girls will report less positive attitudes and . . . will perform less well on mathematics achievement tests than will their male peers. Yet, where there is greater gender equity, gender similarities in math will be evident.

NICOLE M. ELSE-QUEST, MARCIA C. LINN, AND JANET S. HYDE

For half a century or more, it has been believed that males outperform females in mathematics, and research has tended to support that belief (Halpern et al., 2007). For example, in a review of 100 studies involving more than 3 million individuals, Janet Hyde and her colleagues (1990) found a slight superiority for girls in computational skills in the elementary and middle school years, but boys began to perform better in word problems in high school and college. She found no gender differences in understanding math concepts at any age. However, a more recent study by Hyde and her colleagues (2008) of some 7 million second through eleventh graders found no gender differences for performance in mathematics on standardized tests. The complexity of the test items apparently made no difference.

An analysis of the literature by Nicole Else-Quest and her colleagues (2010) found that the gender gap in math is greater in nations where women have fewer opportunities. The researchers examined the results of studies of nearly half a million students aged 14–16 drawn from 69 nations. Overall, the differences in achievement in math were small, but they were smallest in countries where women had as much schooling as men and were well represented in governing positions.

Nevertheless, most Americans continue to have different expectations for boys and girls, and these expectations may still dissuade girls from entering fields in science and math (Hyde & Mertz, 2009). Perhaps because of these different expectations, Carol Dweck (2007) and her colleagues found that girls appeared more vulnerable than boys to losing their self-confidence when faced with difficult math problems. Another study found that mathematically gifted sixth-grade girls fared poorly when they were overly perfectionist or anxious about taking tests, especially tests that were timed (Tsui & Mazziocco, 2007). Many female adolescents are apparently vulnerable to feeling threatened by the stereotype that males are better than females at math, especially when they are under pressure. The threat is experienced as anxiety that distracts them from the tasks at hand and impairs their performance (Muzzatti & Agnoli, 2007).

What, then, shall we conclude about gender differences in cognitive abilities? First, it appears that girls show greater verbal ability than boys do, but boys show greater visual-spatial skills (Halpern et al., 2007). However, gender differences in cognitive skills are group differences, not individual differences. That is, the difference in, say, reading skills between a male who reads well and a male who is dyslexic is greater than the average group gender difference in reading ability. Moreover, despite group differences, millions of females exceed the average American male in visual-spatial skills. Similarly, despite group differences, millions of males exceed the average American female in writing, spelling, and articulation. Hundreds of thousands of American women perform well in domains that had once been considered masculine, such as medicine and law. Men produce their Shakespeares, and women produce their Madame Curies.

Gender Differences in Personality

Gender differences in personality appear to be greater than those in cognitive skills (Else-Quest et al., 2006, 2010; Hyde, 2005). Statistical analyses of multiple studies show that men are generally more assertive and take more risks than women, whereas women tend to be more anxious and tender-minded than men (McCrae et al., 2005). These gender differences can initially be detected in early childhood and tend to remain consistent throughout adulthood (Else-Quest et al., 2006; McCrae et al., 2005).

A recent study investigated gender differences in personality in 55 nations, with a sample size of 17,637 (Schmitt et al., 2008). Responses to the Big Five Inventory revealed that women reported higher levels of neuroticism, extraversion, agreeableness, and conscientiousness than men did in most nations. As is the case with gender differences in math (Else-Quest et al., 2010), gender differences in personality were smaller in cultures where women's opportunities came closest to equaling men's—more prosperous, healthy, and egalitarian nations. The researchers found that greater levels of human development—which are measured by longer and healthier lives, equal access to education, and income—were the key nation-level predictors of large gender differences in personality. They hypothesize that the higher levels of equality and development allow women's and men's personalities to diverge according to natural tendencies.

Gender Differences in Social Behavior

There are key gender differences in areas of social behavior such as sex and aggression. According to almost any measure used, men show more interest in sex than women do (Lippa, 2009; Petersen & Hyde, 2010). Women are more likely to want to combine sex with a romantic relationship (Petersen & Hyde, 2010). Men also report being more interested than women in casual sex and in multiple sex partners (Petersen & Hyde, 2010).

Although there are exceptions, in most cultures it is the males who march off to war and battle for glory (and sneaker commercials). **Truth or Fiction Revisited:** Generally speaking, the research evidence seems to show that males behave more aggressively than females (Archer & Parker, 2006; Crofoot & Wrangham, 2010). Females are more likely to empathize with the victim—to put themselves in the victim’s place (Proverbio et al., 2010; Yamasue et al., 2008). Empathy encourages helping behavior, not aggression.

Gender Differences in Mate Selection

How important to you is your partner’s physical appearance? Cross-cultural reviews of the research on strategies for mate selection find that women tend to place greater emphasis than men on traits such as professional status, consideration, dependability, kindness, and fondness for children. Men tend to place relatively greater emphasis on physical allure, cooking ability (can’t they turn on the microwave oven themselves?), even thrift (Confer et al., 2010; Schmitt, 2008).

Susan Sprecher and her colleagues (1994) surveyed more than 13,000 Americans, attempting to represent the ethnic diversity in the United States. They asked how willing their subjects would be to marry someone who was older, younger, of a different religion, unlikely to hold a steady job, not good-looking, and so on. Each item was answered by checking off a 7-point scale in which 1 meant “not at all willing” and 7 meant “very willing.” Women were more willing than men to marry someone who was not good-looking (see Figure 13.3 ■). But they were less willing to marry someone who was unlikely to hold a steady job.

There are thus some intriguing patterns of gender differences. The process by which these differences develop is termed *gender-typing*. In the following section, we explore several possible sources of gender-typing: evolution, the organization of the brain, sex hormones, and experience.

How willing would you be to marry someone who . . .

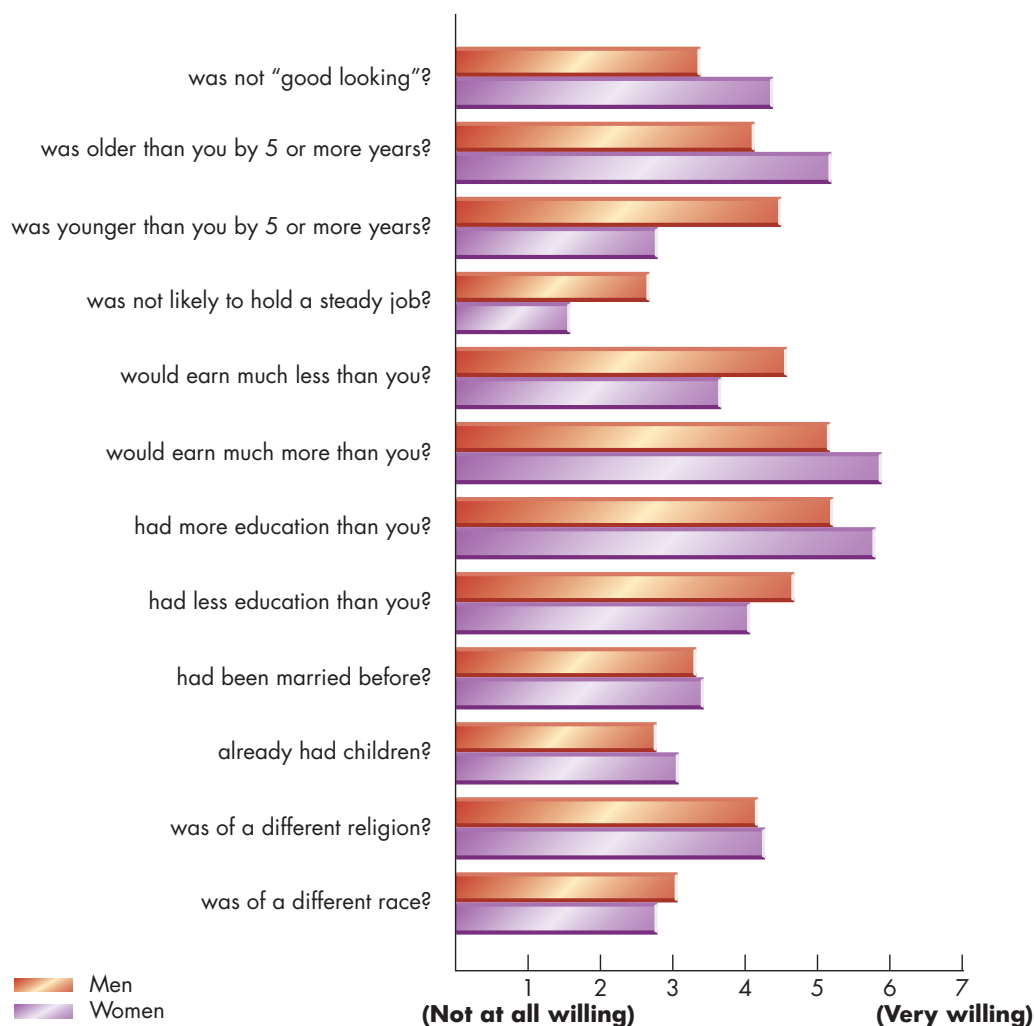


Figure 13.3 ■ Gender Differences in Mate Preferences Susan Sprecher and her colleagues found that men are more willing than women to marry someone who is several years younger and less well educated. Women, on the other hand, are more willing than men to marry someone who is not good-looking and who earns more money than they do.

ACTIVE REVIEW (5) (Girls or Boys?) are somewhat superior in verbal abilities. (6) (Girls or Boys?) are somewhat superior in visual-spatial abilities. (7) (Women or Men?) tend to be more aggressive and interested in sex.

REFLECT AND RELATE What messages have you received about whether females or males are superior in verbal abilities, visual-spatial skills, and math?

CRITICAL THINKING Why do you think some people believe it is “politically correct” to minimize gender differences in cognitive skills and personality?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

GENDER-TYPING: ON BECOMING A WOMAN OR A MAN

We find the nature–nurture controversy alive and well in the area of **gender-typing**—that is, the issue of how (most) girls develop to behave in a stereotypically feminine manner and how (most) boys develop to behave in a stereotypically masculine manner. Before entering this discussion, we should note that many scholars find the very existence of the debate invalid because it begins with the assumption that there *are* stereotypical feminine and masculine patterns of behavior. We will keep that criticism in mind, but we also need to review the body of literature that psychologists and other scientists have created on the issue of gender-typing. That literature addresses the roles of nature and nurture in gender-typing.

Nature and Gender-Typing

Question 3: What is the role of nature in gender-typing? We begin this discussion with an overview of nature in gender-typing—that is, the role of sex hormones, evolution and heredity, and the organization of the brain.

THE ROLE OF SEX HORMONES

Researchers are interested in determining the amount of testosterone in the bodily fluids of fetuses so that they can relate the quantity of the hormone to the gender of the individual and also to the behavior of the individual after birth. They do not draw blood directly from the fetus to do so. Instead, because testosterone is diffused into fetal amniotic fluid through the skin of the fetus, and later by fetal urination, researchers can draw a sample of the amniotic fluid of the fetus. Examining the amniotic fluid enables them to estimate the amount of testosterone in the fetus itself.

The amount of testosterone in amniotic fluid is variable in both genders but higher on average in males than females. Studies attempting to correlate the variability of fetal testosterone with subsequent gender-typed play in boys and girls have shown mixed results, with many studies finding no relationship (e.g., Knickmeyer et al., 2005; van de Beek et al., 2009). However, one study conducted by Bonnie Auyeung and her colleagues (2009) did find a relationship. In that study, fetal testosterone was measured in the amniotic fluid in 212 pregnant women and related to the subsequent gender-typed behavior of their children at the age of 8 1/2 years. The correlation between testosterone and masculine-typed play was positive and large enough not to be considered due to chance variation.

However, children in Auyeung’s sample were certainly old enough to have been influenced by the gender-role expectations of their caregivers, their educators, and society at large. Other studies show that children display gender-typed preferences at very early ages. One study found that children show gender-typed play by the age of 13 months (Knickmeyer et al., 2005). Another study investigated the gender-typed visual preferences of 30 human infants at the early ages of 3 to 8 months (Alexander et al., 2009). The researchers assessed interest in a toy truck and a doll by using eye-tracking technology

*Your Daddy’s rich
And your Ma is good lookin’,
So hush, little baby,
Don’t you cry.*

“SUMMERTIME”
(FROM *PORGY & BESS*)

Gender-typing The process by which people acquire a sense of being female or male and acquire the traits considered typical of females or males within a cultural setting.

to indicate the direction of visual attention. They found that girls showed a visual preference for the doll over the truck (that is, they made a greater number of visual fixations on the doll), and boys showed a visual preference for the truck. These gender differences appear to strengthen the case for the role of prenatal sex hormones because there has been relatively little time for social influences to take effect among 3- to 8-month-old infants. At such an early age, infants are not even aware of their own gender.

THE ROLES OF EVOLUTION AND HEREDITY

According to evolutionary psychologists such as David Buss (2009a) and David Schmitt (2008), gender differences were fashioned by natural selection in response to problems in adaptation that were repeatedly encountered by humans over thousands of generations. The evolutionary process is expressed through structural differences between males and females, as are found in the brain, and through differences in body chemistry, as are found in the endocrine system.

According to the evolutionary perspective, men's traditional roles as hunters and warriors and women's roles as caregivers and gatherers of fruits and vegetables are bequeathed to us in our genes (Confer et al., 2010). Men are better suited to war and the hunt because of physical attributes passed along since ancestral times. Upper-body strength, for example, would have enabled them to throw spears and overpower adversaries. Men also possess perceptual-cognitive advantages, such as superior visual-motor skills, that favor aggression. Visual-motor skills would have enabled men to aim spears or bows and arrows.

Women, it is argued, are genetically predisposed to be empathic and nurturant because these traits enabled ancestral women to respond to children's needs and to enhance the likelihood that their children would flourish and eventually reproduce, thereby transmitting their own genetic legacy to future generations (Confer et al., 2010). Prehistoric women thus tended to stay close to home, care for the children, and gather edible plants, whereas men ventured from home to hunt and raid their neighbors' storehouses.

Why do males tend to place relatively more emphasis than females on physical appearance in mate selection? Why do females tend to place relatively more emphasis on personal factors such as financial status and reliability? Evolutionary psychologists believe that evolutionary forces favor the survival of women who desire status in their mates and men who emphasize physical allure because these preferences provide reproductive advantages. Some physical features such as cleanliness, good complexion, clear eyes, strong teeth and healthy hair, firm muscle tone, and a steady gait are universally appealing to both males and females (Buss, 2009a). Perhaps such traits have value as markers of better reproductive potential in prospective mates. According to the "parental investment model," a woman's appeal is more strongly connected with her age and health, both of which are markers of reproductive capacity (Confer et al., 2010). The value of men as reproducers, however, is more intertwined with factors that contribute to a stable environment for child rearing—such as social standing and reliability (Schmitt, 2008). For such reasons, evolutionary psychologists speculate that these qualities may have grown relatively more alluring to women over the millennia (Schmitt, 2008).

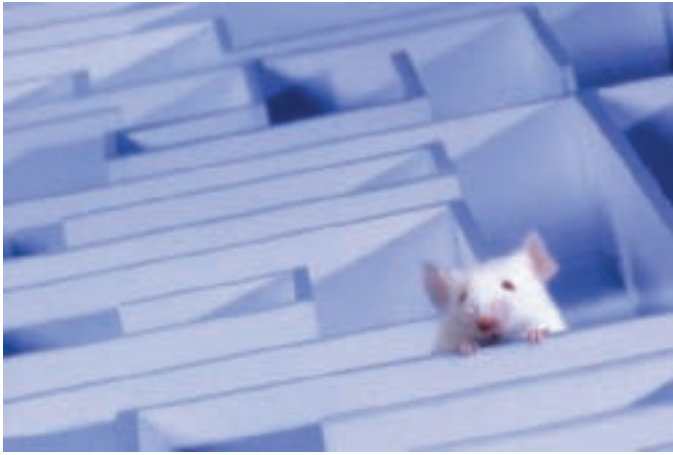
The evolutionary perspective is steeped in controversy (Confer et al., 2010). Although scientists do not dispute the importance of evolution in determining physical attributes, many are reluctant to attribute complex social behaviors and gender roles to heredity. The evolutionary perspective implies that stereotypical gender roles—men as breadwinners and women as homemakers, for example—reflect the natural order of things. Critics contend that, among humans, biology is not destiny. The human brain has also evolved to where it is today, and the brain permits us to make choices.

THE ROLE OF PRENATAL BRAIN ORGANIZATION

Researchers have also sought the origins of gender-typed behavior in the organization of the brain. Is it possible that the cornerstone of gender-typed behavior is laid in the brain before the first breath is taken?

— ■ —
*Sex without love is a meaningless
experience, but as far as
meaningless experiences go, it's
pretty [darn] good.*

WOODY ALLEN
— ■ —



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Why Don't Male Rats Ask Questions While Navigating Mazes? Although the title of this caption is intended to be humorous, we can note that rats ask nothing because they do not use language. On the other hand, research shows that gender differences in hemispheric specialization are associated with superior maze-learning ability in male rats.

The hemispheres of the brain appear specialized to carry out certain functions (Brugger et al., 2009; Haier et al., 2009). In most people, the left hemisphere (“left brain”) appears more essential to verbal functions, such as speech. The right hemisphere (“right brain”) appears specialized to perform visual-spatial tasks. Testosterone in the brains of male fetuses spurs greater growth of the right hemisphere and slows the rate of growth of the left hemisphere (Cohen-Bendahan et al., 2005; Siegel-Hinson & McKeever, 2002). This difference may partly explain men’s superiority at spatial-relations tasks, such as interpreting road maps and visualizing objects in space, as well as preferences for childhood toys. Hemispheric specialization also leads to superior maze learning by male rats in contrast with female rats.

Might boys’ inclinations toward aggression and rough-and-tumble play also be prenatally imprinted in the brain? Some theorists argue that prenatal sex hormones may masculinize or feminize the brain by creating predispositions that are consistent with gender-role stereotypes, such as rough-and-tumble play and aggressive behavior in males (Cohen-Bendahan et al., 2005).

The gender differences in activity preferences of children are also found in rhesus monkeys. For example, male rhesus juveniles and boys are more likely than female rhesus juveniles and girls to engage in rough-and-tumble play (Wallen & Hassett, 2009). Researchers also introduced wheeled toys and plush toys into a 135-member rhesus monkey troop and found that male monkeys, like boys, showed consistent, strong preferences for the wheeled toys, whereas female monkeys, like girls, showed greater flexibility in preferences, sometimes playing with the plush toys and sometimes playing with the wheeled toys (Hassett et al., 2008). If we can generalize these cross-species findings, we might infer that such preferences in humans can develop in the absence of human gender-typed socialization experiences.

Nurture and Gender-Typing

Question 4: What is the role of nurture in gender-typing? Just as there is no single view of nature and gender-typing, so is there no single view of nurture and gender-typing. Let’s see what three psychological theories have to say about the topic: psychodynamic theory, social-cognitive theory, and gender-schema theory.

PSYCHODYNAMIC THEORY

Sigmund Freud explained the development of gender-typed behavior in terms of identification. Appropriate gender-typing, in Freud’s view, requires that boys come to identify with their fathers and girls with their mothers. Identification is completed, in Freud’s view, as children resolve the Oedipus complex (called the *Electra complex* in girls).

According to Freud, the Oedipus complex occurs during the phallic period of psychosexual development, from the ages of 3 to 5. During this period, the child develops incestuous wishes for the parent of the other gender and comes to perceive the parent of the same gender as a rival. The complex is resolved by the child’s forsaking incestuous wishes for the parent of the other gender and identifying with the parent of the same gender. Through identification with the same-gender parent, the child comes to develop preferences and behavior patterns that are typically associated with that gender. But children display stereotypical gender-typed behaviors earlier than Freud would have predicted. As noted earlier, babies show visual preferences for gender-typed toys at 3 to 8 months (Alexander et al., 2009). During the 1st year, boys are more independent than girls. Girls are more quiet and restrained. Because of their lack of empirical support, many researchers believe that Freud’s views are now of historical interest only.

SOCIAL-COGNITIVE THEORY

Social-cognitive theorists explain the development of gender-typed behavior in terms of processes such as observational learning, identification, and socialization (Golombok

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et al., 2008; Zosuls et al., 2009). Children observe the behavior of adult role models and may come to assume that their behavior should conform to that of adults of the same gender. In social-cognitive theory, identification is seen as a continuous learning process in which rewards and punishments influence children to imitate adult models of the same gender. In identification, the child not only imitates the behavior of the model but also tries to become broadly like the model.

Socialization is thought to play a role in gender-typing (Golombok et al., 2008;



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Zosuls et al., 2009). Almost from the moment a baby comes into the world, she or he is treated in ways that are consistent with gender stereotypes. Parents tend to talk more to baby girls, and fathers especially engage in more roughhousing with boys. When children are old enough to speak, caregivers and even other children begin to tell them how they are expected to behave. Parents may reward children for behavior they consider gender appropriate and punish (or fail to reinforce) them for behavior they consider inappropriate for their gender. Girls are encouraged to practice caregiving behaviors, which are intended to prepare them for traditional feminine adult roles. Boys are handed Legos or doctor sets to help prepare them for traditional masculine adult roles.

Fathers generally encourage their sons to develop assertive, instrumental behavior (that is, behavior that gets things done or accomplishes something) and their daughters to develop nurturant, cooperative behavior. Fathers are likely to cuddle their daughters gently. They are likely to carry their sons like footballs or toss them into the air. Fathers also tend to use heartier and harsher language with their sons, such as “How’re yuh doin’, Tiger?” and “Hey you, get your keester over here.” Being a nontraditionalist, I made sure to toss my young daughters into the air, which raised immediate objections from the relatives, who chastised me for being too rough. This, of course, led me to modify my behavior. I learned to toss my daughters into the air when the relatives weren’t around.

In traditional households, boys are more likely to receive toy cars, guns, and athletic equipment and to be encouraged to compete aggressively from an early age. Girls are spoken to more often, whereas boys are handled more frequently and more roughly.

But parental roles in gender typing are apparently changing. With more mothers working outside the home in our society, daughters are exposed to more women who represent career-minded role models than was the case in earlier generations. More parents today are encouraging their daughters to become career minded and to engage in strenuous physical activities, such as organized sports. Many boys today are exposed to fathers who take a larger role than men used to in child care and household responsibilities.

Social-cognitive theorists also believe that aggression is largely influenced by socialization. Boys are permitted, even encouraged, to engage in more aggressive behavior than girls.

GENDER-SCHEMA THEORY

Gender-schema theory proposes that children develop a **gender schema** as a means of organizing their perceptions of the world (Bem, 1993). A gender schema is a cluster of mental representations about masculine and feminine physical qualities, behaviors, and personality traits. Gender gains prominence as a schema for organizing experience because of society’s emphasis on it.

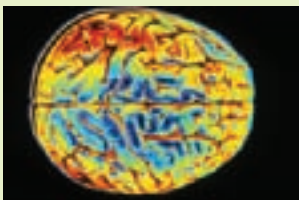
Once children acquire a gender schema in early childhood, they begin to judge themselves according to traits considered appropriate for their gender (Grace et al., 2008; Most et al., 2007). In doing so, they blend their developing self-concepts with the prominent gender schema of their culture. Children with self-concepts that are

Acquiring Gender Roles How do gender roles develop? What contributions do evolutionary and genetic factors make? What is the role of experience? Social-cognitive theory notes that children obtain information as to what kinds of preferences and behaviors are considered masculine or feminine in their cultures. This information plus some use of rewards and punishments by family members and others apparently encourages most children to imitate the behavior of people of the same gender. But is learning the whole story, or does learning interact with evolutionary and genetic factors to fashion likes and dislikes and patterns of behavior?

Gender-schema A concept of the distribution of behavior patterns into feminine and masculine roles that motivate and guide the gender-typing of the child.

Nature and Gender-Typing

Deals with the roles of evolution, heredity, and biology in gender-typing.



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Perspective	Key Points	Comments
Evolution and heredity	Psychological gender differences were fashioned by natural selection in response to problems in adaptation that were repeatedly encountered by humans over thousands of generations. The evolutionary process is expressed, for example, through gender differences in mate selection.	Evolutionary psychologists suggest that evolutionary forces favor the survival of women who desire status in their mates and of men who emphasize physical allure because these preferences provide reproductive advantages. A woman's allure is more strongly connected with her age and health, both of which are markers of reproductive capacity. But the value of men as reproducers is more connected with factors that contribute to a stable environment for child rearing—such as social status and dependability.
Organization of the brain	Brain-imaging research suggests that the hemispheres of the brain may be more specialized in males than in females. Use of language is usually based in the left hemisphere, and men with damage to the left hemisphere are more likely to experience language difficulties than women with similar damage. Spatial relations are usually based more in the right than the left hemisphere, but men with damage to the right hemisphere are more likely to have problems with spatial relations than women with similar injuries.	Gender differences in brain organization might help explain why women tend to excel in language skills that require some spatial organization, such as reading, spelling, and articulation. It may also partly explain why men tend to excel at more specialized spatial-relations tasks such as reading road maps and mentally rotating objects.
Sex hormones	Sex hormones may “masculinize” or “feminize” the brain during prenatal development by creating predispositions consistent with some gender-role tendencies.	Male rats are generally superior to females in maze-learning ability, a task that requires spatial skills. Female rats that are exposed to androgens in the uterus (e.g., because they have several male siblings in the uterus with them) or soon after birth learn maze routes as rapidly as males, however. Male rats also roam larger distances and mark larger territories than most females do. Men are generally more aggressive than women, and aggression appears connected with testosterone, at least in part.

consistent with the prominent gender schema of their culture are likely to develop higher self-esteem than children whose self-concepts are inconsistent. Jack learns that muscle strength is a characteristic associated with “manliness.” He is likely to think more highly of himself if he perceives himself as embodying this attribute than if he does not. Jill is likely to discover that the dimension of kindness–cruelty is more crucial than strength–weakness to the way women are perceived in society.

According to gender-schema theory, once children come to see themselves as female or male, they begin to seek information concerning gender-typed traits and try to live up to them (Tenenbaum et al., 2010). Jack will retaliate when provoked because boys are expected to do so. Jill will be “sugary and sweet” if such is expected of little girls.

Nurture and Gender-Typing

Deals with theories in psychology—e.g., psychodynamic theory, learning theory, and cognitive theory—and related research.



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Perspective	Key Points	Comments
Psychodynamic theory	The acquisition of gender roles is explained in terms of identification. Gender-related behaviors remain flexible until the age of 5 or 6, but resolution of the Oedipus and Electra complexes at those ages leads to adoption of the preferences and behaviors of parent figures of the same gender.	Research evidence reveals that boys and girls are inclined to develop gender-typed preferences for toys and activities earlier than predicted by psychodynamic theory.
Learning theories	Behaviorists explain gender-typing in terms of the selective reinforcement of behavior patterns deemed appropriate for boys and girls within a given culture. Social-cognitive theory asserts that reinforcement encourages gender-typing by providing information as to what other people deem appropriate behavior and that children learn much of what is considered masculine or feminine by observational learning.	Parents, especially fathers, tend to reinforce or reward children for what they see as gender-appropriate behavior. Research in favor of the role of observational learning evidence shows that children's views of what is masculine and feminine are related to those of their parents. Moreover, research shows that children learn how behaviors are gender-typed by observing the relative frequencies with which males and females perform them.
Gender-schema theory	Cultures tend to polarize females and males by organizing social life around mutually exclusive gender roles. Children come to accept the polarizing scripts and attempt to construct identities that are consistent with the "proper" script. Children develop a sense of being male or female by about the age of 3 and seek information about what is considered appropriate for them. Children's self-esteem becomes wrapped up in the ways they measure up to the gender schema.	Most boys in our culture learn early to hold a high opinion of themselves if they excel in sports. Research evidence suggests that polarized female-male scripts serve as cognitive anchors within Western culture. For example, children tend to distort their memories of their observations to conform to the gender schema of their cultures.



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But gender-schema theory cannot explain why boys and girls tend to show visual preferences for gender-typed toys before they are 1 year old (Alexander et al., 2009).

Today, most scholars would agree that both nature and nurture affect most areas of behavior and mental processes—including the complex processes in gender-typing. The Concept Review above summarizes some of the key points about the various approaches to gender-typing.

When we speak of sex, we are not only referring to a person's anatomic sex—that is, her or his being female or being male. We are also referring to sexual behavior. In the following section, we explore what motivates sexual behavior—what fuels it and the directions it takes.

ACTIVE REVIEW (8) According to _____ theory, gender differences were fashioned by means of natural selection. (9) Testosterone in the brains of male fetuses spurs greater growth of the (left or right?) hemisphere. (10) Social-cognitive theorists note that children learn what is considered masculine or feminine by means of _____ learning. (11) According to _____-schema theory, children accept their culture's roles for them without realizing it. (12) Children's self-_____ then becomes wrapped up in how well they fit the gender schema of their culture.

REFLECT AND RELATE Did your parents or caregivers expose you to any particular early learning experiences to ensure that you would develop to be a “proper” woman or man? Explain.

CRITICAL THINKING Evaluate the evidence. Does the research evidence suggest that there is a role for nature in gender-typing? Does it show that there is a role for nurture?



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SEXUAL MOTIVATION AND SEXUAL ORIENTATION: PRESSING THE START BUTTON AND FINDING DIRECTION

In a TV situation comedy, a mother referred to her teenage son as “a hormone with feet.” She recognized that her son had become obsessed with sex, which is normal enough for adolescents in our culture. It is also now widely understood that the adolescent preoccupation with sex is strongly related to the surge in sex hormones that occurs at puberty. The phrase “a hormone with feet” implies movement as well as motivation, and movement means direction. We will see that sex hormones tend to propel us in certain directions as well as provide the driving force. **Question 5: How do sex hormones affect sexual motivation?**

Hormones and Sexual Motivation: Adding Fuel to the Fire

Sex hormones can be said to fuel the sex drive. Research with men who produce little testosterone—due to age or health problems—shows that their sex drive is increased when they receive testosterone replacement therapy (Muraleedharan et al., 2010). The most common sexual problem among women is lack of sexual desire or interest, and the sex drive in women is also connected with testosterone levels (Downey, 2009). Although men produce 7 to 10 times the testosterone produced by women, women produce androgens (“male” sex hormones) in the adrenal glands and the ovaries. Testosterone injections, patches, or pills can heighten the sex drive in women who do not produce enough of it (Brand & van der Schouw, 2010).

Sex hormones promote the development of male and female sex organs and regulate the menstrual cycle. They also have activating and organizing effects on sexual behavior. They affect the sex drive and promote sexual response; these are **activating effects**. Female mice, rats, cats, and dogs are receptive to males only during **estrus**, when female sex hormones are plentiful. During estrus, female rats respond to males by hopping, wiggling their ears, and arching their backs with their tails to one side, thus enabling males to penetrate them. But as noted by Kimble (1988),

if we were to observe this same pair of animals one day [after estrus], we would see very different behaviors. The male would still be interested (at least at first), but his advances would not be answered with hopping, ear wiggling, and [arching of the back]. The female would be much more likely to “chatter” her teeth at the male

Activating effect The arousal-producing effects of sex hormones that increase the likelihood of sexual behavior.

Estrus The periodic sexual excitement of many female mammals as governed by levels of sex hormones.

Controversy in Psychology IS THE HUMAN SEX DRIVE AFFECTED BY PHEROMONES?

Pheromones have been found across the animal kingdom, sending messages between courting lobsters, alarmed aphids, suckling rabbit pups, mound-building termites and trail-following ants.

—T. Wyatt, 2009

For centuries, people have searched for a love potion—a magical formula that could make other people fall in love with you or be strongly attracted to you. Some scientists suggest that such potions may already exist in the form of chemical secretions known as **pheromones**. **Question 6: What are pheromones?** Pheromones are odorless chemicals that may enhance people's moods, have effects on fertility, and provide a basis for sexual communication below the level of conscious awareness (Wyatt, 2009). They are detected through a “sixth sense”—the *vomer nasal organ (VNO)*. People possess such an organ, located in the mucous lining of the nose (Touhara & Vosshall, 2009; Wyatt, 2009). The VNO is theorized to detect pheromones and communicate information about them to the hypothalamus, where certain pheromones might affect sexual response (Cutler, 1999). People use pheromones in many ways. Infants might use them to recognize

their mothers, and adults might respond to them in seeking a mate. Research clearly shows that lower animals use pheromones to stimulate sexual response, organize food gathering, maintain pecking orders, sound alarms, and mark territories (Wyatt, 2009).

So, what about humans? In a typical study, Winnifred Cutler and her colleagues (1998) had men wear a suspected male pheromone, whereas a control group wore a placebo. At the end of the study, the men using the pheromone increased their frequency of sexual intercourse with their female partners but did not increase the frequency of masturbation. The researchers conclude that the substance increased the sexual attractiveness of the men to their partners.

A couple of double-blind studies exposed men and women to certain steroids (androstadienone produced by males and estratetraenol produced by females) suspected of being pheromones. They found that both steroids enhanced the moods of women but not of men; the substances also apparently reduced feelings of nervousness and tension in women but, again, not in men (Grosser et al., 2000; Jacob & McClintock, 2000). The findings about estratetraenol are not terribly

surprising. This substance is related to estrogen, and women tend to function best during ovulation, when estrogen levels are highest (Ross et al., 2000).

Possibly, pheromones enhance the moods of women and thus make them more receptive to sexual advances. Still, pheromones do not directly stimulate sexual behavior in humans as they do with lower animals. Perhaps the higher we climb the evolutionary ladder, the less important is the role of instinctive behavior.



Ah, for the Sake of Science! Research suggests that pheromones in men's sweat can amp up the heart rate of women, put them in a better mood, and help stimulate sexual arousal. (No, this does not mean that men should discontinue showering.)

(a sure sign of hostility if you are a rat). If the male were to be slow to grasp her meaning, she might turn away from him and kick him in the head, mule fashion. Clearly, it is over between them. (p. 271)

The Controversy in Psychology above suggests that pheromones, like hormones, may play a role in human sexual behavior.

Sexual Orientation: Which Way Is Love?

Sex hormones have not only activating effects but also directional or **organizing effects**. That is, they predispose lower animals toward masculine or feminine mating patterns. Sex hormones are thus likely candidates for influencing the development of sexual orientation (De Rooij et al., 2009). **Question 7: What is sexual orientation?**

One's **sexual orientation** refers to the direction of his or her sexual and romantic interests—toward people of the other gender or toward people of the same gender. The great majority of people have a *heterosexual* orientation. That is, they are sexually attracted to, and interested in forming romantic relationships with, people of the other gender. However, some people have a **homosexual** orientation. They are attracted to and interested in forming romantic relationships with people of their own gender. Males with a homosexual orientation are referred to as *gay males*. Females with a homosexual orientation are referred to as *lesbians*. *Bisexual* people are attracted to both females and males.

Pheromone A chemical secretion detected by other members of the same species that stimulates a certain kind of behavior.

Organizing effect The directional effect of sex hormones—for example, along typical male or female patterns of mating.

Sexual orientation The directionality of one's sexual and romantic interests; that is, whether one is sexually attracted to, and desires to form a romantic relationship with, members of the other gender or of one's own gender.

Homosexual Referring to people who are sexually aroused by, and interested in forming romantic relationships with, people of the same gender. (Derived from the Greek *homos*, meaning “same,” not from the Latin *homo*, meaning “man.”)

In Profile

How would you determine whether having lesbian or gay parents affects the development of gender identity (one's sense of being female or male), gender-typed behavior (behavior considered to be feminine or masculine in our society), or sexual orientation (heterosexual, homosexual, or bisexual)? When it comes to the study of cause and effect, the ideal research method is the experiment—particularly experiments in which participants are assigned at random to different treatments (in this case, having heterosexual or lesbian and gay parents) and are blind to the treatment they are receiving (that is, the sexual orientation of their parents). One could then assess measures of the children's gender identity, gender-typed behavior, and sexual orientation with some hope of ferreting out cause and effect.

But we cannot run such experiments nor, presumably, would we want to do so. Ethics and insurmountable practical problems prevent researchers from randomly assigning children to parents. Nor would children be blind—throughout their childhood and adolescent years—to the sexual orientations of their parents. Therefore, we have selection factors in such research. The children, that is, are already assigned to their biological or adoptive parents. Even so, we can use correlational research to determine whether there are relationships between parents' sexual orientation and their children's development.

Charlotte J. Patterson has conducted such research and was winner of the American Psychological Association's Award for Distinguished Contributions to Research in Public Policy in 2009—"as the world's expert on psychological research on children and youths raised by lesbian and gay parents" (American Psychological Association, 2009d). Patterson (2009a, 2009b) notes that civic leaders, politicians, religious leaders, and even parents have wondered whether the gender development of children reared by lesbian or gay parents is "compromised." To be sure, she criticizes the desirability of research in this area because it seems to assume that homosexuality is an illness or disability. Yet the American Psychological Association and the American Psychiatric Association do not consider homosexuality to represent a disease or disorder. Nevertheless, she acknowledges that there remains a demand for children to conform to traditional gender-typed behavior, and she is thus one of the key researchers to work in this area.

Patterson (2009b, pp. 730–731) summarizes her research findings as follows: "Research has generally failed to identify important differences in the development of gender identity or gender role behavior as a function of parental sexual orientation. . . . The great majority of children with lesbian or gay parents grow up to identify as heterosexual." Nor, Patterson



CHARLOTTE J. PATTERSON

© Charlotte J. Patterson

(2009a, 2009b) finds, does the sexual orientation of the parents affect children's development as individuals, their mental health, the development of their competencies, their self-concept, their sense of being in control over their lives, their moral judgment, their adjustment in school, the development of behavior problems, or their intelligence test scores. In short, the sexual orientation of the parents does not seem to have important effects on the children.

The American Psychological Association (2009d, p. 725) specified that "Since the early 1990s [Patterson] has worked tirelessly, conducting carefully designed research on [families with lesbian or gay parents] using the most rigorous scientific methods. Her early analytic syntheses of the literature on the subject greatly influenced other researchers in child and family development as well as policymakers. By encouraging researchers working in human development fields to focus on developmental aspects of sexual orientation, she has changed the entire field. Her work has touched the lives of countless families."

Patterson is a professor of psychology at the University of Virginia, where she teaches courses in child development and on the psychology of sexual orientation. Since receiving a doctorate in psychology from Stanford University in 1975, she has engaged in research in developmental psychology and published research articles and several books. She served, or is serving, on the editorial boards of nine journals and was a member of the Psychosocial Development, Risk, and Prevention grant review study section of the National Institutes of Health.



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Were These Children Assigned at Random to Their Parents? Of course not. However, the inability to randomly assign children to parents, and the fact that children are not (usually) blind to the traits of their parents, suggests that it is difficult to draw conclusions about the effects of parents' traits and behaviors on their children.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Charlotte J. Patterson.

The concept of sexual orientation differs from that of *sexual activity*. Engaging in sexual activity with people of one's own gender does not necessarily mean that one has a homosexual orientation. Sexual activity between males sometimes reflects limited sexual opportunities. For example, adolescent males may manually stimulate one another while fantasizing about girls.

THE ORIGINS OF SEXUAL ORIENTATION

About 7% of American women and men define themselves as being “other than heterosexual,” but about twice as many say they have had oral sex with a person of the same gender (Herbenick et al., 2010a, 2010b, 2010c; Reece et al., 2010). Theories of the origins of sexual orientation look at both nature and nurture—the biological makeup of the individual and environmental factors. Some theories bridge the two. **Question 8: What do we know about the origins of gay male and lesbian sexual orientations?**

Let’s begin our search for the psychological roots of sexual orientation with psychodynamic theory because of its historical importance. Freudian theory attributes the individual’s sexual orientation to identification with male or female figures, particularly one’s father or mother. Freud believed that homosexuality represented an abnormal resolution of the Oedipus and Electra complexes at the age of 5 or 6 (Friedman & Downey, 2008). Many psychoanalysts attributed faulty resolution of the Oedipus complex to a “classic pattern” of family life that involves a “close-binding” mother and a “detached-hostile” father. In such a setting, boys are more likely to identify with their mothers than with their fathers. Evidence for this view is sketchy, however, relying on a number of case studies. Also, many gay males show a pattern of “gender nonconformity”—for example, interest in playthings associated with girls—long before the age of 5 or 6 (Bem, 2008; Dawood et al., 2009; Lippa, 2008). Another sticking point is that many gay males have good relationships with both parents. Besides, many heterosexuals develop in homes that seem to fit the “classic pattern.”

Social-cognitive theorists look for the roles of factors such as reinforcement and observational learning. From this perspective, reinforcement of sexual behavior with members of one’s own gender—as in reaching orgasm with them when members of the other gender are unavailable—might affect one’s sexual orientation. Similarly, childhood sexual abuse by someone of the same gender could lead to a pattern of sexual activity with people of one’s own gender and affect sexual orientation. Observation of others engaged in enjoyable male–male or female–female sexual encounters could also affect the development of sexual orientation. But critics point out that most individuals become aware of their sexual orientation before they experience sexual contacts with other people of either gender (Savin-Williams & Cohen, 2007). Moreover, in a society that generally condemns homosexuality, young people are unlikely to believe that male–male or female–female relationships will have positive effects for them.

There is evidence for genetic factors in sexual orientation (Dawood et al., 2009; Ramagopalan et al., 2010). About 52% of identical (MZ) twin pairs are “concordant” (in agreement) for a gay male sexual orientation compared with 22% for fraternal (DZ) twins and 11% for adoptive brothers (Dawood et al., 2009). Monozygotic (MZ) twins fully share their genetic heritage, whereas dizygotic (DZ) twins, like other pairs of siblings, overlap 50%.

In a search for possible differences in the brain among heterosexuals, gay men, and lesbians, Swedish researchers (Savic & Lindström, 2008) conducted MRI scans of the brains of 90 subjects—50 heterosexual men and women and 40 gay men and lesbians. They found that the brains of the heterosexual men and the lesbians were slightly asymmetrical; the right hemisphere was slightly larger than the left hemisphere. Other studies have found that the right hemisphere is usually larger in men than women and that its relative size may be connected with gender differences in spatial-relations ability



A Lesbian Couple with Their Child Research suggests that the sexual orientation of parents has no effect on the psychological well-being and sexual orientation of their children (Patterson 2009a, 2009b).

On his psychoanalytic perspective:

Analysis very often shows that a little girl, after she has had to relinquish her father as a love-object, will bring her masculinity into prominence and identify herself with her father ... instead of with her mother... In both sexes the relative strength of the masculine and feminine sexual dispositions is what determines whether the outcome of the Oedipus situation shall be an identification with the father or with the mother.

SIGMUND FREUD

ETHNICITY AND SEXUAL ORIENTATION

Gay males and lesbians frequently suffer the slings and arrows of an outraged society. Because of societal prejudices, it is difficult for many young people to come to terms with an emerging lesbian or gay male sexual orientation. You might assume that people who have been subjected to prejudice

and discrimination—members of ethnic minority groups in the United States—would be more tolerant of a lesbian or gay male sexual orientation.

Truth or Fiction Revisited:

However, members of ethnic minority groups in the United States tend to be less tolerant of homosexuals than European Americans are (Brooks et al., 2009; Heath & Goggin, 2009).

Homosexuals in ethnic minority groups are often pressured to keep their sexual orientations a secret or to move to communities where they can live openly without sanction.

Within traditional Latino and Latina American culture, the family is the primary social unit. Men are expected to support and defend the family, and women are expected to be submissive, respectable, and deferential. Because women are traditionally expected to remain virgins until marriage, men sometimes engage in male–male sexual behavior without consider-

ing themselves gay (Barbosa et al., 2010). Because Latino and Latina American culture tends to deny the sexuality of women, lesbians are doubly condemned—because they are lesbians and because they are confronting others with their sexuality. Moreover, because lesbians are independent of men, many Latino and Latina American heterosexuals view Latina American lesbians as threats to the tradition of male dominance (Barbosa et al., 2010).

Asian American cultures emphasize respect for elders, obedience to parents, and sharp distinctions in gender roles (Liu, 2010). The topic of sex is generally taboo within the family. Traditional Asian Americans, like Latino and Latina Americans, tend to assume that sex is unimportant to women. Women are also considered less important than men. Open admission of a lesbian or gay male sexual orientation is often seen as rejection of traditional cultural roles and a threat to the continuity of the family line (Liu, 2010). For all these reasons, it is not surprising that Asian American college students report being more homophobic than their European American counterparts.

Because many African American men have had difficulty finding jobs, gender roles among African Americans have been more flexible than those found among European Americans and most other ethnic minority groups (Chisholm & Greene, 2008). Nevertheless, the African American community appears to strongly reject gay men and lesbians, often pressuring them to remain secretive about their sexual orientations (Bates, 2010; Calzo & Ward, 2009; Heath & Goggin, 2009). Greene (2000) hypothesizes a number of reasons for African American hostility toward homosexuals. One is allegiance to Christianity and biblical scripture. Another is internalization of the dominant culture's stereotyping of African Americans as highly sexual beings. That is, many African Americans may wish to assert their sexual "normalcy."

Prior to European colonization, sex may not have been discussed openly by Native Americans, but it was generally seen as a natural part of life. Individuals who incorporated both traditional feminine and masculine styles were generally accepted and even admired. The influence of the religions of colonists led to greater rejection of homosexuals and pressure to move off the reservation to the big city (Adams & Phillips, 2006; Balsam et al., 2004). Native American lesbians and gay men, like Asian American lesbians and gay men, thus often feel doubly removed from their families.

If any generalization is possible, it may be that lesbians and gay men find more of a sense of belonging in the gay and lesbian communities than in their ethnic communities.



© Plush Studios/Bill Hertz/Getty Images

Ethnicity and Sexual Orientation Despite their own experiences with prejudice and discrimination, members of ethnic minority groups in the United States are less accepting of lesbian and gay male sexual orientations than European Americans are.

(Andreano & Cahill, 2009; Hugdahl et al., 2006). (Researchers control for the typically larger brains of males.)

This difference in the sizes of the hemispheres was not found among the brains of gay men and heterosexual women. The researchers also measured the blood flow to the amygdala, an area of the brain involved in the emotional response to threats. They found that the amygdala was wired similarly in gay men and heterosexual women and also in lesbians and heterosexual men (see Figure 13.4 ■). The researchers admitted that their methodology cannot show whether the differences in brain shape and

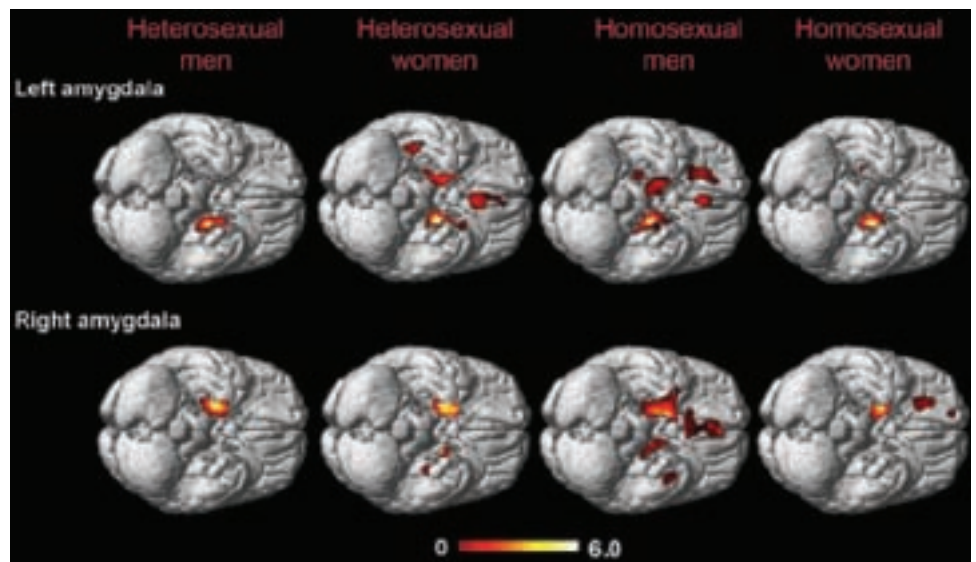


Figure 13.4 ■ PET Scans of the Amygdalas of Heterosexuals and Homosexuals The amygdalas of homosexual men and heterosexual women appear to have similar patterns of blood flow, as shown by PET scanning. Moreover, the patterns of blood flow of the amygdalas of homosexual women and heterosexual men also appear to be similar.

interconnectivity are inherited or due to environmental factors such as exposure to testosterone in the womb. Nor can they conclude that the differences in the brain are responsible for sexual orientation. But even at this stage in the research, it would appear that the brains of heterosexuals and gay males and lesbians *might* differ in ways that are consistent with their sexual orientations.

RESEARCH WITH NONHUMANS

In many families of animals, such as rodents, there is little room for thinking about sex and deciding whether an individual will pursue sexual relationships with males or females. Sexual orientation comes under the almost complete governance of sex hormones (Henley et al., 2010; Piffer et al., 2009). Furthermore, much sexual orientation is determined by whether the brains and sex organs of fetuses are bathed in large doses of testosterone in the uterus. In male fetuses, testosterone is normally produced by the developing testes. Yet female fetuses may also be exposed to testosterone. They can be flooded with testosterone naturally if they share the uterus with many male siblings. Researchers can also inject male sex hormones into the uterus. When female embryos are bathed in testosterone, the sex organs become masculinized in appearance, and their brains become organized in the male direction, creating a tendency toward female–female mating efforts and other masculine-typed behavior patterns at maturity (Phoenix, 2009). Basically, the rodents become male, although they are infertile.

BACK TO HUMANS

It has been demonstrated repeatedly that sex hormones predispose lower animals toward stereotypical masculine or feminine mating patterns. But sexual orientation has not been reliably connected with adolescent or adult levels of sex hormones in humans (Lonstein & Auger, 2009). But might sex hormones influence the developing human embryo and fetus in the way that they affect rodents? The evidence is somewhat mixed, and this possibility continues to receive intensive study (Dawood et al., 2009). And if prenatal hormone levels affect the sexual orientation of the fetus, what causes the fluctuation in hormone levels? Hormone levels in utero can be affected by genetic factors, maternal stress, drinking alcohol, and other factors—some suspected, many completely unknown. Is it possible that the brains of some gay males were feminized and the brains of some lesbians masculinized during prenatal development (Garcia-Falgueras & Swaab, 2010)?

We conclude by confessing that much about the development of sexual orientation remains speculative. There are possible roles for prenatal exposure to certain hormones. Exposure to these hormones, in turn, may be related to genetic factors, use of drugs (prescribed and illicit), and even maternal stress. Moreover, the possibility that childhood experiences play a role has not been ruled out. But the interactions among these factors largely remain a mystery.

*Bisexuality immediately doubles
your chances for a date on
Saturday night.*

WOODY ALLEN

LearningConnections • SEXUAL MOTIVATION AND SEXUAL ORIENTATION: PRESSING THE START BUTTON AND FINDING DIRECTION

ACTIVE REVIEW (13) The hormone _____ is connected with sex drive in both males and females. (14) Sex hormones have activating and _____ effects on sexual behavior. (15) A person's sexual _____ involves whether he or she is sexually attracted to, and interested in forming romantic relationships with, people of the same or the other gender. (16) According to _____ theory, one's sexual orientation is tied to one's early history of reinforcement for sexual activity. (17) Twin studies (do or do not?) support a role for genes in sexual orientation. (18) Sex hormones (do or do not?) predispose lower animals toward stereotypical masculine or feminine mating patterns. (19) _____ are odorless chemicals that are detected through the vomeronasal organ.

REFLECT AND RELATE Have you heard the term *sexual preference*? Do you believe that people prefer or decide whether to be heterosexual or homosexual? Have you changed your opinion as a result of reading this text?

CRITICAL THINKING In general, people who attribute sexual orientation to biological causes are more accepting of gay male and lesbian sexual orientations. Why do you think this is so?

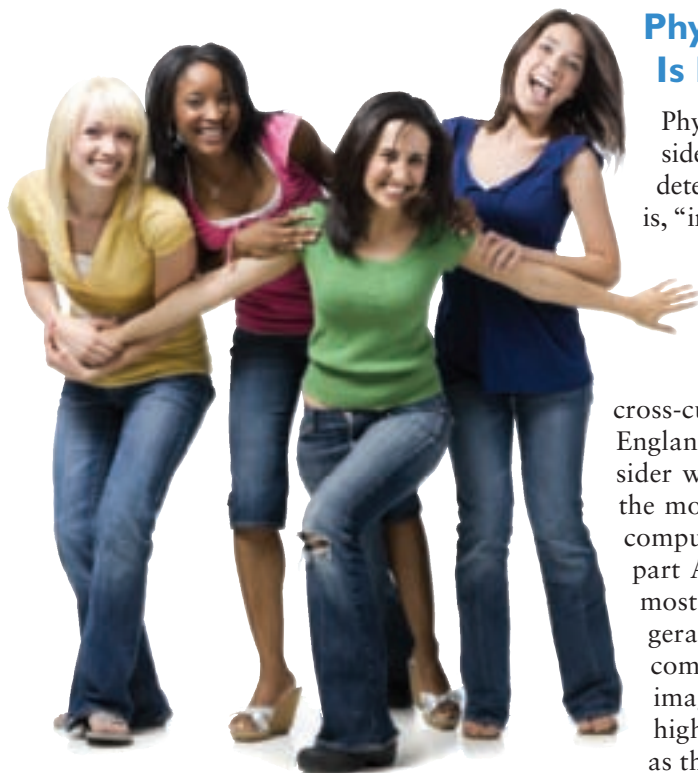


Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

INTERPERSONAL ATTRACTION: ON LIKING AND LOVING

Attraction In social psychology, an attitude of liking or disliking (negative attraction).

Sexual interactions usually take place within relationships. Feelings of **attraction** can lead to liking, perhaps to loving, and to a more lasting relationship. **Question 9: What factors contribute to attraction in our culture?** Among the factors contributing to attraction are physical appearance, similarity, and reciprocity.



Physical Appearance: How Important Is Looking Good?

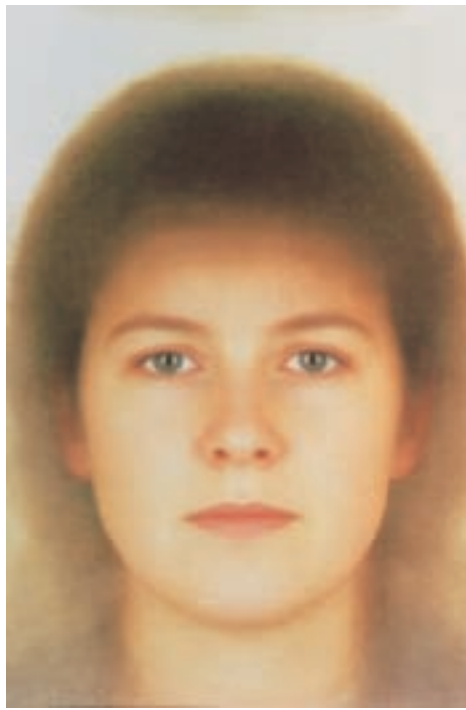
Physical appearance is a key factor in attraction and in the consideration of romantic partners (Sprecher et al., 2008). What determines physical allure? Are our standards subjective—that is, “in the eye of the beholder”? Or is there general agreement on what is appealing?

Truth or Fiction Revisited: Although there may be individual preferences, it does not seem that standards for beauty are so flexible that they are fully “in the eye of the beholder.” Many standards for beauty appear to be cross-cultural (Buss, 2009a). For example, a study of people in England and Japan found that both British and Japanese men consider women with large eyes, high cheekbones, and narrow jaws the most attractive (Perret, 1994). In his research, Perret created computer composites of the faces of 60 women and, as shown in part A of Figure 13.5 ■, of the 15 women who were rated the most attractive. He then used computer enhancement to exaggerate the differences between the composite of the 60 and the composite of the 15 most attractive women. He arrived at the image shown in part B of Figure 13.5. Part B, which shows higher cheekbones and a narrower jaw than part A, was rated as the more attractive image. Similar results were found for the image of a Japanese woman. Works of art suggest that the ancient

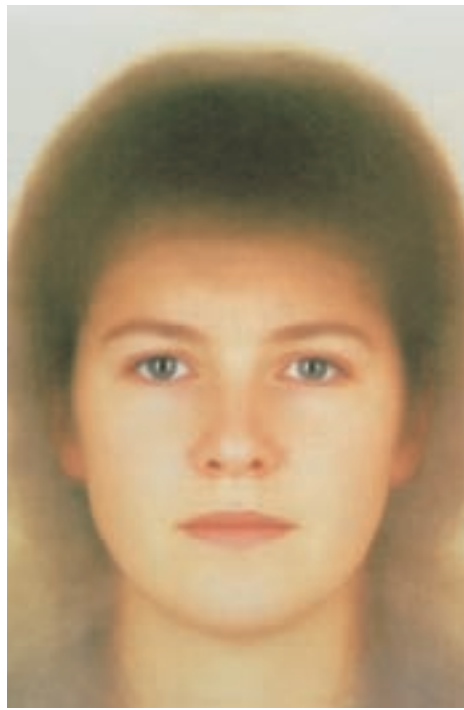
Greeks and Egyptians favored similar facial features.

In our society, tallness is an asset for men (Furnham, 2009; Kurzban & Weeden, 2005). Although women may be less demanding than men concerning a variety of

Looking Good How important is physical attractiveness in interpersonal attraction and social and vocational success?



A.



B.

Figure 13.5 ■ What Features Contribute to Facial Attractiveness? In both England and Japan, features such as large eyes, high cheekbones, and narrow jaws contribute to perceptions of the attractiveness of women. Part A shows a composite of the faces of 15 women rated as the most attractive of a group of 60. Part B is a composite in which the features of these 15 women are exaggerated—that is, developed further in the direction that separates them from the average of the entire 60.

© Science Photo Library/Photo Researchers, Inc.

physical features, height—that is, tallness—is more important to women in the selection of dates and mates than it is to men.

Although preferences for facial features may transcend time and culture, preferences for body weight and shape may be more culturally determined. For example, plumpness has been valued in many cultures. Grandmothers who worry that their granddaughters are starving themselves often come from cultures where stoutness is acceptable or desirable. In contemporary Western society, there is pressure on both genders to be slender (Furnham, 2009). Women generally favor men with a V-taper—broad shoulders and a narrow waist.

An examination of the Internet dating profiles of 5,810 Yahoo personal ads shows that “thin” is more “in” in the expressed preferences for partners of European Americans and males (Glasser et al., 2009). European American males are more likely than African American and Latino American males to want to date slender and buff women. African American and Latino American men are significantly more likely to be interested in women with large or thick bodies.

“PRETTY IS AS PRETTY DOES?”

Truth or Fiction Revisited: People are perceived as more attractive when they are smiling (Meier et al., 2010; Penton-Voak & Chang, 2008). When you’re smiling, observers expect to have positive social interactions with you (Harker & Keltner, 2001). There is thus ample reason to, as the song goes, “put on a happy face” when you are meeting people or looking for a date.

Other aspects of behavior also affect interpersonal attraction. Women who are shown videotapes of prospective dates or asked to describe ideal partners tend to prefer men who are outgoing, assertive, and confident (Burger & Cosby, 1999).

The Attraction-Similarity Hypothesis: Do “Opposites Attract” or Do “Birds of a Feather Flock Together”?

Although we may rate highly attractive people as most desirable, most of us are not left to blend in with the wallpaper. According to the **attraction-similarity hypothesis**, we tend to date people who are similar to ourselves in physical attractiveness rather than the local Robert Pattinson or Zoe Saldana look-alike. **Truth or Fiction Revisited:** Despite the familiar saying “Opposites attract,” it seems that people who are similar are more likely than opposites to be attracted to one another (Montoya et al., 2008; van Straaten et al., 2009).

Attraction-similarity hypothesis The view that in the formation of interpersonal relationships, people tend to choose persons similar to themselves in attractiveness and attitudes.

A CLOSER LOOK • RESEARCH

WHEN IT COMES TO SEX, RED MAY MEAN “GO”

When you go to buy a box of Valentine’s Day candy, what color will the box be? Green? Blue? The answer, of course, is red. What is the most popular color of women’s lipstick? Yellow? Brown? Again, the answer is red (Elliot et al., 2007). Red has been the most popular lipstick color since the hot days that saw the construction of the pyramids in ancient Egypt (Elliot & Niesta, 2008). Red is similarly the most popular color for women’s lingerie. At a traffic light, the color red means stop. But when it comes to men being attracted to women, the color red more likely means go.

But why is the color red associated with feelings of attraction? Could the answer be cultural conditioning? Anthropologists have found evidence that females used red ochre as a face and body paint in rituals carried out before the dawn of history (Lee, 2006). We find red used in ancient myths and folklore as a symbol of passion and fertility (Hutchings, 2004). Red has been associated with lust in literature, most notably in Nathaniel Hawthorne’s novel of illicit romance and



Why Did They Deck Her Out in Red? Cultural conditioning and the human biological heritage provide two good answers.

consequences—*The Scarlet Letter*. Red has been used as a symbol of prostitution for centuries, as in the term *red-light district*.

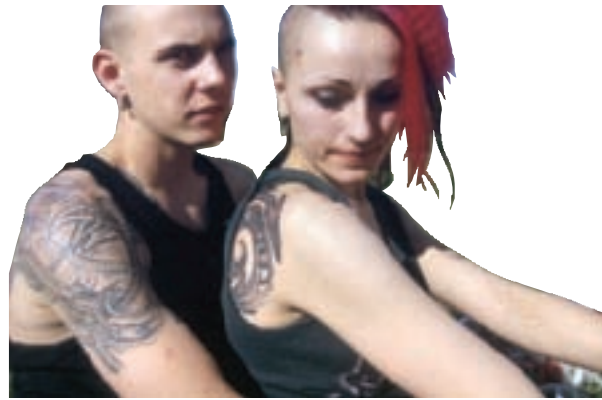
The link between red and physical attraction may also be rooted in our biological heritage. Many nonhuman female primates, including baboons, chimpanzees, gorillas, and rhesus monkeys, show reddened genital regions and sometimes on their chest and face when they are nearing ovulation—the time of the month when they are fertile (Barelli et al., 2008). Reddening of the skin is caused by elevated estrogen levels (relative to progesterone), which increase the flow of blood under the surface of the skin. It is widely believed that reddish skin tones are a sexual signal that attracts mates (Huchard et al., 2009). Research has found that male primates are in fact especially attracted to females when they display red, as shown by attempts at sexual relations (Waitt et al., 2006).

As in the case of other female primates, women’s estrogen levels relative to progesterone are elevated near ovulation, enhancing the flow of blood beneath the surface of the skin (Lynn et al., 2007). At this time of the month, women also tend to choose clothing that leaves more skin visible (Durante et al., 2008) and are more readily sexually aroused (Rupp et al., 2009). They are more likely to “blush.” For men, then, as with other male primates, the reddening of a woman’s skin at the time of ovulation may be a sexual signal. Moreover, men are more likely to find women attractive when they display red artificially, as in their clothing, in their accessories, and directly on their bodies in the form of lipstick and makeup.

Andrew Elliot and Daniela Niesta (2008) ran a series of experiments in which men did, indeed, rate the same woman as more attractive when her photograph was shown against a red background compared with a variety of other background colors. One experiment revealed that the red-related difference in attractiveness was found in male raters but not in female raters. As you can see in Figure 13.6 ■, male raters found women more attractive when they were shown with red backgrounds as opposed to white, but female raters did not show the same preference.



Figure 13.6 ■ Rated Attractiveness of a Woman Shown in a Photograph as a Function of the Color of the Background of the Photo and the Sex of the Rater



The Attraction-Similarity Hypothesis Do opposites attract, or do we tend to pair off with people who are similar to us in level of physical attractiveness, attitudes, and tastes? From looking at these couples, it seems that similarity often runs at least skin deep.

The quest for similarity extends beyond physical attractiveness. Our marital and sex partners tend to be similar to us in race/ethnicity, age, level of education, and religion (Amodio & Showers, 2005). Note that 95% of marriages and nearly 90% of cohabiting unions were between partners of the same race at the time of the 2000 U.S. census (Batson et al., 2006). Even so, highly educated people are more likely than poorly educated people to marry people of other races (Batson et al., 2006).

Why do most people have partners from the same background as their own? One reason is that marriages are made in the neighborhood and not in heaven (Sprecher & Felmlee, 2008). We tend to live among people who are similar to us in background, and we therefore come into contact with them more often than with people from other backgrounds. Another reason is that we are drawn to people whose attitudes are similar to ours (Fehr, 2008). People from similar backgrounds are more likely to have similar attitudes.

Other Factors in Attraction: Reciprocity and the Nearness of You?

Has anyone told you how good-looking, brilliant, and mature you are? That your taste is refined? That all in all, you are really something special? If so, have you been impressed by his or her fine judgment? **Reciprocity** is a powerful determinant of attraction (Fehr, 2008). We tend to return feelings of admiration. We tend to be more open, warm, and helpful when we are interacting with strangers who seem to like us (Sprecher et al., 2008).

Deb Levine (2000), writing in the journal *CyberPsychology and Behavior*, compares attraction online (“virtual attraction”) with attraction in the real world. She notes that proximity, or nearness, is a factor online and offline, but proximity online can mean visiting the same chat room a number of times even though individuals live thousands of miles apart. Self-disclosure and reciprocity occur more quickly online, perhaps because people think they are operating from a safe distance. It is more difficult, she asserts, to check out similarities in interests because people are more or less free to present themselves as they wish. She suggests that people exchange biographies and photos within a month or so of when they meet online and meet in person, if possible, to dispel unrealistic expectations.

Whether online or offline, feelings of attraction are influenced by factors such as physical appearance and similarity. Let’s explore what we mean when we say that feelings of attraction have blossomed into love.

Love: The Emotion That Launched a Thousand Ships?

Love—the ideal for which we make great sacrifice. Love—the sentiment that launched a thousand ships and led to the Trojan War in Homer’s epic poem *The Iliad*. Through the millennia, poets have sought to capture love in words. Dante, the Italian poet,

*One should always be in love.
That is the reason one should
never marry.*

OSCAR WILDE

One is very crazy when in love.

SIGMUND FREUD

Reciprocity In interpersonal attraction, the tendency to return feelings and attitudes that are expressed about us.

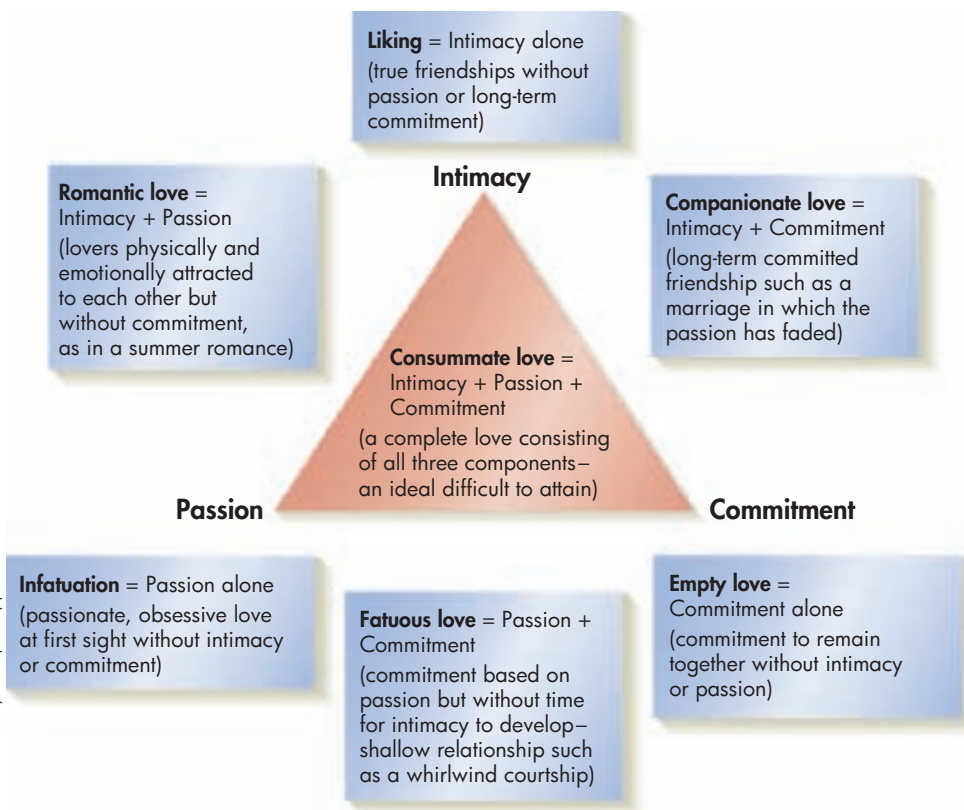


Figure 13.7 ■ The Triangular Model of Love According to this model, love has three components: intimacy, passion, and commitment. The ideal of consummate love consists of romantic love plus commitment. Source: From *The Psychology of Love*, R. J. Sternberg and M. J. Barnes, eds. Copyright © 1988 Yale University Press. Reprinted by permission.

Triangular model of love Sternberg's view that love involves combinations of three components: intimacy, passion, and commitment.

Intimacy Close acquaintance and familiarity; a characteristic of a relationship in which partners share their inmost feelings.

Passion Strong romantic and sexual feelings.

Commitment A pledge or obligation.

Consummate love The ideal form of love within Sternberg's model, which combines passion, intimacy, and commitment.

Romantic love An intense, positive emotion that involves sexual attraction, feelings of caring, and the belief that one is in love.

wrote of “the love that moves the sun and the other stars.” The Scottish poet Robert Burns wrote that his love was like “a red, red rose.” Love is beautiful and elusive. Passion and romantic love are also lusty, surging with sexual desire (Berscheid, 2009). **Question 10: Just what is love?**

There are a number of theories about the nature of love. We will discuss Robert Sternberg's (1988) **triangular model of love**, which can be thought of as a love triangle. This love triangle does not refer to two men wooing the same woman. It refers to Sternberg's view that love can include combinations of three components: intimacy, passion, and commitment (see Figure 13.7 ■).

Intimacy refers to a couple's closeness, to their mutual concern and sharing of feelings and resources. **Passion** means romance and sexual feelings. **Commitment** means deciding to enhance and maintain the relationship. Passion is most crucial in short-term relationships. Intimacy and

commitment are more important in enduring relationships. The ideal form of love combines all three: **consummate love**. Consummate love is made up of romantic love plus commitment.

Romantic love is characterized by passion and intimacy. Passion involves fascination (preoccupation with the loved one), sexual craving, and the desire for exclusiveness (a special relationship with the loved one). Intimacy involves caring—championing the interests of the loved one, even if it entails sacrificing one's own. People are cognitively biased toward evaluating their dating partners positively (Loving & Agnew, 2001). In plain English, we idealize the people we love. People tend to pay attention to information that confirms their romantic interests. Romantic lovers often magnify each other's positive features and overlook their flaws.

To experience romantic love in contrast to attachment or sexual arousal, one must be exposed to a culture that idealizes the concept. In Western culture, romantic love blossoms in fairy tales about Sleeping Beauty, Cinderella, Snow White, and all their princes charming. It matures with romantic novels, television tales and films, and the personal accounts of friends and relatives about dates and romances.

THE AFFECTIVE SHIFT HYPOTHESIS

Men are generally more reluctant than women to make commitments in their romantic relationships (Buss, 2009a; Confer et al., 2010). The **affective shift hypothesis**, developed by evolutionary psychologist David Buss (2007), offers one possible explanation of men's lesser willingness to commit themselves to relationships. In a study of nearly 200 subjects, Buss found that women tend to experience greater feelings of love and commitment—a positive affective shift—after first-time sex than men do. But not all men are alike. (Really.) As a group, men are more likely than women to be interested in short-term relationships and multiple sex partners. In fact, it seems accurate to say that men with high numbers of sex partners tend to experience a negative affective shift following first-time sex. The negative shift in feelings motivates them to end the relationship and curbs tendencies toward making a commitment. However, men with fewer sex partners and more of an interest in developing long-term relationships also tend to experience the positive affective shift after first-time sex.

SELF ASSESSMENT

Sternberg's Triangular Love Scale

Which are the strongest components of your love relationship? Intimacy? Passion? Commitment? All three components? Two of them? To complete the following scale, fill in the blank spaces with the name of the person you love or care about deeply. Then rate your agreement with each of the items by using a 9-point scale in which 1 = not at all, 5 = moderately, and 9 = extremely. Use points between to indicate intermediate levels of agreement between these values. Then consult the scoring key in the Appendix.

INTIMACY COMPONENT

- ___ 1. I am actively supportive of _____'s well-being.
- ___ 2. I have a warm relationship with _____.
- ___ 3. I am able to count on _____ in times of need.
- ___ 4. _____ is able to count on me in times of need.
- ___ 5. I am willing to share myself and my possessions with _____.
- ___ 6. I receive considerable emotional support from _____.
- ___ 7. I give considerable emotional support to _____.
- ___ 8. I communicate well with _____.
- ___ 9. I value _____ greatly in my life.
- ___ 10. I feel close to _____.
- ___ 11. I have a comfortable relationship with _____.
- ___ 12. I feel that I really understand _____.
- ___ 13. I feel that _____ really understands me.
- ___ 14. I feel that I can really trust _____.
- ___ 15. I share deeply personal information about myself with _____.

PASSION COMPONENT

- ___ 16. Just seeing _____ excites me.
- ___ 17. I find myself thinking about _____ frequently during the day.
- ___ 18. My relationship with _____ is very romantic.
- ___ 19. I find _____ to be very personally attractive.
- ___ 20. I idealize _____.
- ___ 21. I cannot imagine another person making me as happy as _____ does.
- ___ 22. I would rather be with _____ than with anybody else.

- ___ 23. There is nothing more important to me than my relationship with _____.
- ___ 24. I especially like physical contact with _____.
- ___ 25. There is something almost "magical" about my relationship with _____.
- ___ 26. I adore _____.
- ___ 27. I cannot imagine life without _____.
- ___ 28. My relationship with _____ is passionate.
- ___ 29. When I see romantic movies and read romantic books, I think of _____.
- ___ 30. I fantasize about _____.

COMMITMENT COMPONENT

- ___ 31. I know that I care about _____.
- ___ 32. I am committed to maintaining my relationship with _____.
- ___ 33. Because of my commitment to _____, I would not let other people come between us.
- ___ 34. I have confidence in the stability of my relationship with _____.
- ___ 35. I could not let anything get in the way of my commitment to _____.
- ___ 36. I expect my love for _____ to last for the rest of my life.
- ___ 37. I will always feel a strong responsibility for _____.
- ___ 38. I view my commitment to _____ as a solid one.
- ___ 39. I cannot imagine ending my relationship with _____.
- ___ 40. I am certain of my love for _____.
- ___ 41. I view my relationship with _____ as permanent.
- ___ 42. I view my relationship with _____ as a good decision.
- ___ 43. I feel a sense of responsibility toward _____.
- ___ 44. I plan to continue my relationship with _____.
- ___ 45. Even when _____ is hard to deal with, I remain committed to our relationship.

Source: From *The Psychology of Love* by R. J. Sternberg and M. J. Barnes, eds. © 1989 Yale University Press. Reprinted by permissions.

Evolutionary psychologists also suggest that men may be naturally more promiscuous than women because they are the genetic heirs of ancestors whose reproductive success was connected with the number of women they could impregnate (Buss, 2007; Confer et al., 2010; Schmitt, 2008). Women, however, can produce relatively few children in their lifetimes. Thus, the theory suggests, women need to be more selective with respect to their mating partners. This controversial theory suggests that a man's "roving eye" and a woman's selectivity are embedded in their genes.

Affective shift hypothesis The view that men and women tend to experience different shifts in the emotions following initiation of sexual activity, such that women feel more love and commitment, and many men experience less love and commitment.

LearningConnections • INTERPERSONAL ATTRACTION: ON LIKING AND LOVING

ACTIVE REVIEW (20) Physical attractiveness (is or is not?) a key factor in the selection of dates and mates. (21) Cross-cultural research suggests that in many cultures, men find women with (high or low?) cheekbones more attractive. (22) According to the _____ hypothesis, we tend to date people who are similar to ourselves. (23) According to the principle of _____, we tend to return feelings of attraction and admiration. (24) According to the triangular model of love, love can include combinations of intimacy, _____, and commitment. (25) _____ love is characterized by a combination of intimacy and passion.

REFLECT AND RELATE Could you maintain a relationship with a partner whose attitudes toward religion, politics,

education, and child rearing differed significantly from your own? Would you want to? Does your answer support the view that “opposites attract” or that “birds of a feather flock together”?

CRITICAL THINKING How might the features found attractive by males and females provide humans with an evolutionary advantage? Can you think of alternative explanations as to why people tend to find these features attractive?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.



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Uh, Oh—What Will Happen if They

Make Love? According to the affective shift hypothesis, most women experience stronger feelings of love and commitment toward their partners after they make love for the first time. The picture is mixed for men. Men with few dating partners may, like most women, experience greater love and commitment. But the feelings of men with many dating partners often turn negative. That is, they want out.

Sexual response cycle Masters and Johnson’s model of sexual response, which consists of four stages or phases: excitement, plateau, orgasm, and resolution.

Vasocongestion Engorgement of blood vessels with blood, which swells the genitals and breasts during sexual arousal.

THE FOUR S’S: SEXUAL RESPONSE, SEXUAL BEHAVIOR, SEXUAL DYSFUNCTIONS, AND SEX THERAPY

Actually, there is an organization referred to as the four s’s: The Society for the Scientific Study of Sexuality (www.sexscience.org). Their aim, like the aim of this chapter, is “the advancement of knowledge about sexuality.” Do we need such knowledge? Apparently, we do. Although we may consider ourselves sophisticated about sex, it is surprising how little we know about sexual biology. For example, how many male readers know that women have different orifices for urination and sexual intercourse? How many readers know that the erect penis—sometimes referred to by the slang term “boner”—contains no bones? What are the dangers of being ignorant about the process of conception and about sexually transmitted infections (STIs)?

In this section, we fill in some gaps in knowledge. We first consider how females and males respond to sexual stimulation—that is, the so-called *sexual response cycle*. Then we discuss some forms of sexual behavior in the United States today. Next we consider some of the things that can go wrong during sexual behavior: problems in becoming sexually aroused or reaching orgasm that are known as *sexual dysfunctions*. Finally, we consider approaches to helping individuals overcome sexual dysfunctions, which are known collectively as *sex therapy*.

The Sexual Response Cycle

Although we may be more culturally attuned to focus on gender differences rather than similarities, William Masters and Virginia Johnson (1966) found that the biological responses of males and females to sexual stimulation—that is, their sexual response cycles—are quite similar. **Question 11: What is the sexual response cycle?** Masters and Johnson use the term *sexual response cycle* to describe the changes that occur in the body as men and women become sexually aroused (Figure 13.8 ■). They divide the sexual response cycle into four phases: *excitement*, *plateau*, *orgasm*, and *resolution*. Some observers argue for a fifth (initial) phase: desire (e.g., Wylie & Manoun, 2009).

The sexual response cycle is characterized by *vasocongestion* and *myotonia*. **Vasocongestion** is the swelling of the genital tissues with blood. It causes erection of the penis and swelling of the area surrounding the vaginal opening. The testes, the nipples, and—**Truth or Fiction Revisited**—even the earlobes swell as blood vessels dilate in

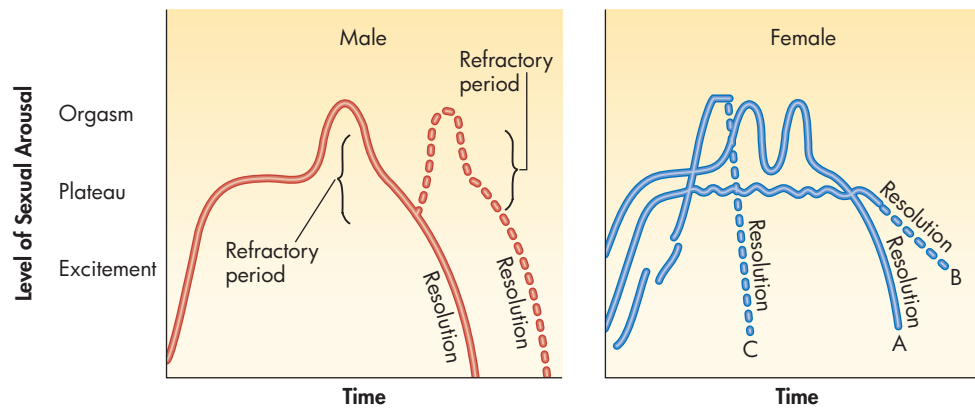


Figure 13.8 ■ Levels of Sexual Arousal during the Phases of the Sexual Response Cycle

Masters and Johnson divide the sexual response cycle into four phases: excitement, plateau, orgasm, and resolution. During the resolution phase, the level of sexual arousal returns to the prearoused state. For men, there is a refractory period following orgasm. As shown by the broken line, however, men can become rearoused to orgasm once the refractory period is past and their levels of sexual arousal have returned to preplateau levels. Pattern A for women shows a typical response cycle, with the broken line suggesting multiple orgasms. Pattern B shows the cycle of a woman who reaches the plateau phase but for whom arousal is “resolved” without reaching the orgasmic phase. Pattern C shows the possibility of orgasm in a highly aroused woman who passes quickly through the plateau phase.

these areas. **Myotonia** is muscle tension. It causes facial grimaces, spasms in the hands and feet, and then the spasms of orgasm.

Erection, vaginal lubrication, and orgasm are all reflexes. They occur automatically in response to adequate sexual stimulation. (Of course, the decision to enter a sexual relationship is voluntary.)

Vasocongestion during the **excitement phase** can cause erection in young men within a few seconds after sexual stimulation begins. The testes increase in size and become elevated. In the female, excitement is characterized by vaginal lubrication, which may start 10 to 30 seconds after sexual stimulation begins. Vasocongestion swells the **clitoris**, flattens and spreads the vaginal lips, and expands the inner part of the vagina. The breasts enlarge, and blood vessels near the surface become more prominent, taking on a reddish hue. The nipples may become erect in both genders, and heart rate and blood pressure increase.

The level of sexual arousal remains somewhat stable during the **plateau phase** of the cycle. Vasocongestion causes some increase in the circumference of the head of the penis, which also takes on a purplish hue. The testes increase in size and are elevated into position for **ejaculation**. In women, vasocongestion swells the outer part of the vagina, contracting the vaginal opening in preparation for grasping the penis. The inner vagina expands further. The clitoris withdraws beneath the clitoral hood. Breathing becomes rapid. Heart rate may increase to 100 to 160 beats per minute. Blood pressure continues to rise.

During **orgasm** in the male, muscle contractions propel the ejaculate out of the body. Sensations of pleasure tend to be related to the strength of the contractions and the amount of seminal fluid present. The first three to four contractions are generally most intense and occur at 0.8-second intervals (five contractions every 4 seconds) in both genders. Additional contractions occur more slowly. Orgasm in the female is manifested by three to fifteen contractions of the pelvic muscles that surround the vaginal barrel. As in the male, contractions produce pleasure and release sexual tension. Blood pressure and heart rate peak, with up to 180 beats per minute.

After orgasm, the body returns to its unaroused state. This is called the **resolution phase**. After ejaculation, blood is released from engorged areas so that the erection disappears. In women, orgasm also triggers the release of blood from engorged areas. Blood pressure, heart rate, and breathing return to normal levels.

Myotonia Muscle tension.

Excitement phase The first phase of the sexual response cycle, which is characterized by muscle tension, increases in the heart rate, and erection in the male and vaginal lubrication in the female.

Clitoris The female sex organ that is most sensitive to sexual sensation; a smooth, round knob of tissue that is situated above the urethral opening.

Plateau phase The second phase of the sexual response cycle, which is characterized by increases in vasocongestion, muscle tension, heart rate, and blood pressure in preparation for orgasm.

Ejaculation The process of propelling seminal fluid (semen) from the penis.

Orgasm The height or climax of sexual excitement, involving involuntary muscle contractions, release of sexual tensions, and usually, subjective feelings of pleasure.

Resolution phase The fourth phase of the sexual response cycle, during which the body gradually returns to its prearoused state.

Men enter a **refractory period** during which they cannot experience another orgasm or ejaculate. The refractory period of adolescent males may last only minutes, whereas that of men age 50 and older may last from several minutes to a day. Women do not undergo a refractory period and can become quickly rearoused to the point of repeated (multiple) orgasms if they desire and receive continued sexual stimulation.

The sexual response cycle describes what happens when females and males are exposed to sexual stimulation. But what kinds of sexual experiences do people seek? How many sex partners do they have? Who are their partners? Let's begin to answer some of these questions by reporting the results of some key surveys of sexual behavior.

Some Surveys of Sexual Behavior: Peering into Private Lives

What is normal in Inis Beag is incredibly restrained in Mangaia. What is normal in Mangaia is loose, indecent, even “out of control” in Inis Beag. The kinds of sexual behaviors that are considered normal depend on one's society. **Question 12: What do we know about the sex lives of people in the United States?** What is normal in the United States, at least in the statistical sense? There are many difficulties in gathering data, such as the refusal of many individuals to participate in research. Large-scale magazine surveys of sexual behavior invite readers to fill out and return questionnaires, but only a minority do so, and they are unlikely to represent the entire readership of the magazine. (Nor would the readership of the magazine necessarily represent the nation at large.) People who return surveys differ from those who do not in that they are more willing to disclose intimate information and are possibly also more liberal in their sexual behavior (Rathus et al., 2011).

The well-known Kinsey reports (Kinsey et al., 1948, 1953) carefully interviewed 5,300 males and 5,940 females in the United States between 1938 and 1949. Interviewers asked about sexual experiences, including masturbation, oral sex, and premarital sex. The nation was astounded to learn that the majority of males masturbated and had engaged in sexual intercourse prior to marriage. Moreover, 20% to 50% of females reported engaging in these behaviors. But Kinsey had not obtained a random sample of the population either. He chose not to do so because he expected a high refusal rate. Thus, he recruited participants from organizations and community groups, such as

Refractory period In the sexual response cycle, a period of time following orgasm during which an individual is not responsive to sexual stimulation.



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Sex (Sex?) in the 1950s The Kinsey reports showed that there was much more premarital sex than one would have expected in the late 1940s and early 1950s.

college fraternities and sororities. In general, he secured a high rate of participation. Still, his samples underrepresented people of color, people in rural areas, older people, poor people, and Catholics and Jews. There is thus no way of knowing whether Kinsey's results accurately mirrored American sexual behavior in general at the time. But the *relationships* Kinsey uncovered, such as the positive link between level of education and premarital sex, may be generalizable and seem to have held up over time.

A more recent and more accurate survey—the National Health and Social Life Survey (NHSL; Laumann et al., 1994)—interviewed 3,432 people and may offer the most accurate information we have. Of this number, 3,159 were English-speaking adults aged 18 to 59. The other 273 respondents were obtained by purposefully oversampling African American and Hispanic American households to obtain more information about these ethnic groups. The sample probably represents the overall U.S. population aged 18 to 59 quite well, but it may include too few Asian Americans, Native Americans, and Jews to offer much information about these groups. The NHSL team identified sets of households in various locales and obtained an overall participation rate of close to 80%.

The NHSL considered the sociocultural factors of gender, level of education, religion, and race/ethnicity in many aspects of people's sexual behavior, including their number of sex partners (see Table 13.2 ■). Males in the survey report having higher numbers of sex partners than females do. For example, one male in three (33%) reports having 11 or more sex partners since the age of 18. This compares with fewer than one woman in ten (9%). On the other hand, most people in the United States appear to limit their numbers of sex partners to a handful or fewer. This finding has been corroborated by many surveys over the years.

Level of education is connected with sexual behavior. **Truth or Fiction Revisited:** Generally speaking, it would appear that education is a liberating influence on sexual behavior. People with some college education, or who have completed college, are likely to report having more sex partners than those who attended grade school or high school only. But if education has a liberating influence on sexuality, conservative

—■—
*I'm such a good lover because
I practice a lot on my own.*

WOODY ALLEN
—■—

Table 13.2 ■ Number of Sex Partners since Age 18 as Found in the NHSL^a Study

Number of Sex Partners						
Sociocultural Factors	0	1	2–4	5–10	11–10	21+
Gender	Percents					
Male	3%	20%	21%	23%	16%	17%
Female	3	32	36	20	6	3
Education						
Less than high school	4	27	36	19	9	6
High school graduate	3	30	29	20	10	7
Some college	2	24	29	23	12	9
College graduate	2	24	26	24	11	13
Advanced degree	4	25	26	23	10	13
Religion						
None	3	16	29	20	16	16
Liberal, moderate Protestant	2	23	31	23	12	8
Conservative Protestant	3	30	30	20	10	7
Catholic	4	27	29	23	8	9
Race/Ethnicity						
European American	3	26	29	22	11	9
African American	2	18	34	24	11	11
Latino and Latina American	3	36	27	17	8	9
Asian American ^b	6	46	25	14	6	3
Native American ^b	5	28	35	23	5	5

^aNational Health and Social Life Survey, conducted by a research team centered at the University of Chicago.

^bThese sample sizes are quite small.

Source: Adapted from *The Social Organization of Sexuality: Sexual Practices in the United States* (Table 5.1C, p. 179), by E. O. Laumann, J. H. Gagnon, R.T. Michael, & S. Michaels, 1994, Chicago: University of Chicago Press.

religious experience appears to be a restraining factor. Liberal Protestants (for example, Methodists, Lutherans, Presbyterians, Episcopalians, and United Churches of Christ) and people who say they have no religion report higher numbers of sex partners than Catholics and conservative Protestants (for example, Baptists, Pentecostals, Churches of Christ, and Assemblies of God).

Ethnicity is also connected with sexual behavior. The research findings in Table 13.2 suggest that European Americans and African Americans have the highest numbers of sex partners. Latino and Latina Americans, who report having fewer partners, are mostly Catholic. Perhaps Catholicism provides a restraint on sexual behavior. Asian Americans would appear to be the most sexually restrained ethnic group. However, the sample sizes of Asian Americans and Native Americans are relatively small, and thus, the information about the sexual behavior of these groups is limited.

The NHLS found that 63% of the men and 42% of the women sampled reported masturbating during the past year. Women may be less motivated to masturbate than men are, or they may be more responsive to cultural constraints (Chivers et al., 2007).

Surveys find that about half of the high school students in the United States are sexually active. According to the National Survey of Family Growth (Mosher et al., 2005), the number of adolescents who have had vaginal intercourse increases each year between the ages of 15 and 19.

Sexual Dysfunctions

Now that we have described common patterns of sexual behavior, we should note that not everyone becomes sexually aroused by the same kinds of stimulation. In fact, a number of people experience serious sexual problems or *dysfunctions*. **Question 13: What are sexual dysfunctions?**

Sexual dysfunctions are persistent or recurrent problems in becoming sexually aroused or reaching orgasm. Many people will be troubled by a sexual dysfunction at one time or another. Let's take a look at the main types of sexual dysfunctions and their causes.

TYPES OF SEXUAL DYSFUNCTIONS

Sexual dysfunctions include hypoactive sexual desire disorder, female sexual arousal disorder, male erectile disorder, orgasmic disorder, premature ejaculation, dyspareunia, and vaginismus. The frequencies of these problems in the general population are presented in Table 13.3 ■.

In **hypoactive sexual desire disorder**, a person lacks interest in sexual activity and frequently reports a lack of sexual fantasies. This diagnosis exists because it is assumed that sexual fantasies and interests are normal responses that may be blocked by anxiety or other factors.

Sexual dysfunction A persistent or recurrent problem in becoming sexually aroused or reaching orgasm.

Hypoactive sexual desire disorder A sexual dysfunction in which people lack sexual desire.

Table 13.3 ■ Sexual Dysfunctions Reported within the Past Year, According to the NHLS

	Men	Women
Pain during sex (<i>dyspareunia</i>)	3.0%	14.4%
Sex not pleasurable	8.1	21.2
Unable to reach orgasm (<i>orgasmic disorder</i>)	8.3	24.1
Lack of interest in sex (<i>hypoactive sexual desire disorder</i>)	15.8	33.4
Anxiety about performance ^a	17.0	11.5
Reaching climax too early (<i>premature ejaculation</i> , in the male)	28.5	10.3
Unable to keep an erection (<i>male erectile disorder</i> , also called <i>erectile dysfunction</i> , or <i>ED</i>) ^b	10.4	—
Having trouble lubricating (<i>female sexual arousal disorder</i>)	—	18.8

^aAnxiety about performance is not itself a sexual dysfunction. However, it figures prominently in sexual dysfunctions.

^bOther studies show that as many as half or more of men in middle and late adulthood have difficulty obtaining or maintaining an erection.

Source: Adapted from Tables 10.8A and 10.8B, pages 370 and 371, in Laumann, E. O., Gagnon, J. H., Michael, R. T., & Michaels, S. (1994). *The social organization of sexuality: Sexual practices in the United States*. Chicago: University of Chicago Press.

In women, sexual arousal is characterized by lubrication of the vaginal walls. Sexual arousal in men is characterized by erection. Almost all women sometimes have difficulty becoming or remaining lubricated. Almost all men have occasional difficulty attaining or maintaining an erection through intercourse. When these events are persistent or recurrent, they are considered dysfunctions (**female sexual arousal disorder** and **male erectile disorder**).

In **orgasmic disorder**, the man or woman, though sexually excited, takes a long time to reach orgasm or does not reach it at all. Orgasmic disorder is more common among women than among men. In **premature ejaculation**, the male ejaculates after minimal sexual stimulation, too soon to permit his partner or himself to enjoy sexual relations fully. Other dysfunctions include **dyspareunia** (painful sexual activity) and **vaginismus** (involuntary contraction of the muscles surrounding the vaginal opening, which makes entry painful and/or difficult).

Because not everyone experiences sexual dysfunctions, researchers have sought to determine why some do and others do not. **Question 14: What are the origins of sexual dysfunctions?**

CAUSES OF SEXUAL DYSFUNCTIONS

Some sexual dysfunctions reflect biological problems. Lack of desire, for example, can be due to diabetes or to diseases of the heart and lungs. Fatigue can reduce sexual desire and inhibit orgasm. Depressants such as alcohol, narcotics, and tranquilizers can also impair sexual response. For example, Eric Rimm (2000) of the Harvard School of Public Health studied 2,000 men and found that erectile dysfunction was connected with a large waist, physical inactivity, and drinking too much alcohol (or not having any alcohol!). The common condition among these men may be high cholesterol levels. Cholesterol can impede the flow of blood to the penis just as it impedes the flow of blood to the heart. Antidepressant medication and antipsychotic drugs may also impair erectile functioning and cause orgasmic disorders (Hatzimouratidis et al., 2010).

Physically or psychologically painful sexual experiences, such as rape, can block future sexual response (Brotto & Klein, 2010). Moreover, a sexual relationship is usually no better than other aspects of a relationship or marriage. Couples who have difficulty communicating are at a disadvantage in expressing their sexual desires.

Cognitive psychologists point out that irrational beliefs and attitudes can contribute to sexual dysfunctions. If we believe that we need a lover's approval at all times, we may view a disappointing sexual episode as a catastrophe. If we demand that every sexual encounter be perfect, we set ourselves up for failure.

In most cases of sexual dysfunction, the physical and psychological factors we have outlined lead to yet another psychological factor—**performance anxiety**, or fear of not being able to perform sexually. People with performance anxiety may focus on past failures and expectations of another disaster rather than enjoying present erotic sensations and fantasies. Performance anxiety can make it difficult for a man to attain erection yet also spur him to ejaculate prematurely. It can prevent a woman from becoming adequately lubricated and can contribute to vaginismus.

Sex Therapy

Question 15: How are sexual dysfunctions treated? Sexual dysfunctions are generally treated by means of **sex therapy**, which refers to a collection of mainly cognitive and behavior therapy techniques. Sex therapy is largely indebted to the pioneering work of Masters and Johnson (1970), although other therapists have developed important techniques. Sex therapy generally focuses on:

1. *Reducing performance anxiety.* Therapists frequently prescribe that clients engage in activities such as massage or petting under “nondemand” circumstances for a while to reduce performance anxiety. Nondemand activity means sexual arousal and intercourse are not expected at first. Reduced anxiety allows natural reflexes such as erection, lubrication, and orgasm to occur.
2. *Changing self-defeating attitudes and expectations.* Clients are shown how expectations of failure can raise anxiety levels and become self-fulfilling prophecies.

Female sexual arousal disorder A sexual dysfunction in which females fail to become adequately aroused sexually to engage in sexual intercourse.

Male erectile disorder A sexual dysfunction in which males fail to obtain erections that are adequate for sexual intercourse.

Orgasmic disorder A sexual dysfunction in which people have persistent or recurrent problems in reaching orgasm.

Premature ejaculation Ejaculation that occurs before the couple are satisfied with the duration of sexual relations.

Dyspareunia A sexual dysfunction characterized by persistent or recurrent pain during sexual intercourse. (From roots meaning “badly paired.”)

Vaginismus A sexual dysfunction characterized by involuntary contraction of the muscles surrounding the vagina, preventing entry by the penis or making entry painful.

Performance anxiety Anxiety concerning one's ability to perform, especially when performance may be evaluated by other people.

Sex therapy A collective term for short-term cognitive-behavioral models for treatment of sexual dysfunctions.

3. *Teaching sexual skills.* Clients may be taught how to provide each other with adequate sexual stimulation. In the case of premature ejaculation, they may also be shown how to delay ejaculation by means such as the stop-and-go method (pausing when the male becomes too aroused).
4. *Enhancing sexual knowledge.* Some problems are connected with ignorance or misinformation about biological and sexual functioning.
5. *Improving sexual communication.* Partners are taught ways of showing each other what they like and do not like.

Moreover, biological treatments are available for various problems. For example, the drugs Viagra and Levitra help men attain erection by relaxing the muscles surrounding the blood vessels in the penis, allowing more blood to flow in and the erection to harden. The drug Uprima facilitates erection by acting on the erection center in the brain. Several drugs are under development to facilitate sexual arousal and orgasm in both males and females, but some women also use Viagra today. Antidepressant drugs, which can impede orgasm, are sometimes prescribed to help men with premature ejaculation (Hatzimouratidis et al., 2010). Readers interested in learning more about sex therapy are advised to consult a human sexuality textbook, contact their state's psychological association, or ask their professors, college counseling centers, or personal physicians.

Sexual dysfunctions are one category of problems in sexual interaction. Let's now consider a darker side of human interaction: sexual coercion.

LearningConnections • THE FOUR S'S: SEXUAL RESPONSE, SEXUAL BEHAVIOR, SEXUAL DYSFUNCTIONS, AND SEX THERAPY

ACTIVE REVIEW (26) According to Masters and Johnson, human sexual response overall is characterized by vasocongestion and _____. (27) Masters and Johnson divide the sexual response cycle into four phases: _____, _____, _____, and _____. (28) The results of surveys of sexual behavior are suspect because people who return them are probably more (liberal or conservative?) in their sexual behavior. (29) A high level of education has a (liberating or constraining?) effect on premarital sex. (30) Women with female sexual _____ disorder have difficulty lubricating. (31) Men with persistent difficulty attaining or maintaining an erection have male _____ disorder. (32) Sex therapy generally focuses on

reducing _____ anxiety, changing self-defeating attitudes, teaching sexual skills, enhancing sexual knowledge, and improving communication.

REFLECT AND RELATE What do you experience when you become sexually aroused? Do your own experiences match the description of Masters and Johnson?

CRITICAL THINKING What cultural attitudes and expectations heighten the stress of premature ejaculation?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

SEXUAL COERCION: CONFOUNDING SEX AND AGGRESSION

Sexual coercion includes rape and other forms of sexual pressure. It also includes *any* sexual activity between an adult and a child. Even when children cooperate, sexual relations with children are coercive because of the power adults wield over children and because children are below the legal age of consent.

As many as one in four women in the United States has been raped (Koss, 1993, 2003). Parents regularly encourage their daughters to be wary of strangers and places where they could fall prey to rapists. Certainly, the threat of rape from strangers is real enough. Yet four of five rapes are committed by acquaintances (M. D. Clark & Carroll, 2008; Rozee & Koss, 2001).

Date rape is a pressing concern on college campuses, where thousands of women have been victimized and there is much controversy over what exactly constitutes rape. More than one of three of a sample of college men from California and Ohio admitted

to coercing women into sexual activity by means of arguments, pressure, or force (Hall et al., 2000). About one man in seven had coerced a woman into sexual intercourse by means of arguments, pressure, or force. Consider one woman's account of date rape from the author's files:

I first met him at a party. He was really good looking, and he had a great smile. I wanted to meet him, but I wasn't sure how. I didn't want to appear too forward. Then he came over and introduced himself. We talked and found we had a lot in common. I really liked him. When he asked me over to his place for a drink, I thought it would be OK. He was such a good listener, and I wanted him to ask me out again.

When we got to his room, the only place to sit was on the bed. I didn't want him to get the wrong idea, but what else could I do? We talked for a while, and then he made his move. I was so startled. He started by kissing. I really liked him, so the kissing was nice. But then he pushed me down on the bed. I tried to get up, and I told him to stop. He was so much bigger and stronger. I got scared, and I started to cry. I froze, and he raped me.

It took only a couple of minutes, and it was terrible; he was so rough. When it was over, he kept asking me what was wrong, like he didn't know. He had just forced himself on me, and he thought that was OK. He drove me home and said he wanted to see me again. I'm so afraid to see him. I never thought it would happen to me.

Rape is common—far too common. **Question 16: Why do men rape women?**

MYTHS ABOUT RAPE

You would not be blamed if somebody shot you when you were walking down the street or punched you when you were sitting in class. These behaviors would be recognized as the crimes of violence they are. Yet women are frequently blamed when they are raped, and rape is also a crime of violence. Women are especially likely to be blamed for whatever happens to them if they dress provocatively or use “bad” language.

Most people in the United States believe in a number of myths about rape—myths that blame the victim and have the effect of supporting rape. For example, many Americans believe that the woman is partly responsible for rape if she dresses provocatively (Chapleau et al., 2008; Hockett et al., 2009). They are unlikely to be sympathetic if such a

CONTROVERSY IN PSYCHOLOGY WHY DO MEN RAPE WOMEN?

Why do men force women into sexual activity? Sex is not the only reason. Many social scientists argue that rape is often a man's way of expressing social dominance over, or anger toward, women (Thompson, 2009). With some rapists, violence appears to enhance sexual arousal. They therefore seek to combine sex and aggression (DiGiorgio, 2007).

Evolutionary psychologists suggest that prior to civilization, males who were more sexually aggressive were more likely to transmit their genes to future generations (G. R. Brown, 2009; Buss, 2009a). There thus remains a tendency for males to be more sexually aggressive than females. Although the evolutionary perspective may view sexual coerciveness in men as natural, evolutionary psychologists generally agree that rape is inexcusable and criminal in modern society and that human males can *choose* not to be aggressive.

However, many social critics contend that American culture also *socializes*

men into becoming rapists by reinforcing males for aggressive and competitive behavior (G. R. Brown, 2009). The date rapist could be viewed as asserting culturally expected dominance over women.

There are also powerful cognitive contributors to rape. For example, research shows that college men frequently perceive a date's protests as part of an adversarial sex game (Flood & Pease, 2009). One male undergraduate said “Hell, no” when asked whether a date had consented to sex. He added, “but she didn't say no, so she must have wanted it, too.... It's the way it works.” Consider the comments of the man who victimized the woman whose story appeared earlier in the section:

I first met her at a party. She looked really hot, wearing a sexy dress that showed off her great body. We started talking right away. I knew that she liked me by the way she kept smiling and touching my arm while she was speaking. She seemed

pretty relaxed so I asked her back to my place for a drink.... When she said yes, I knew that I was going to be lucky!

When we got to my place, we sat on the bed kissing. At first, everything was great. Then, when I started to lay her down on the bed, she started twisting and saying she didn't want to. Most women don't like to appear too easy, so I knew that she was just going through the motions. When she stopped struggling, I knew that she would have to throw in some tears before we did it.

She was still very upset afterwards, and I just don't understand it! If she didn't want to have sex, why did she come back to the room with me? You could tell by the way she dressed and acted that she was no virgin, so why she had to put up such a big struggle I don't know.

Another cognitive factor in rape is belief in stereotypical myths about rape.

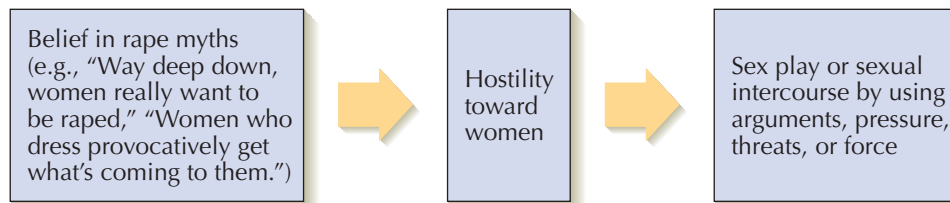


Figure 13.9 ■ A Common Pathway to Sexual Aggression A statistical technique called path analysis reveals the powerful cognitive aspects of sexual aggression. Belief in rape myths, such as the idea that women really want to be raped or that women who dress provocatively get what's coming to them, increases hostility toward women. Hostility toward women, in turn, is a common characteristic of rapists.

“bold” woman complains of being raped. **Truth or Fiction Revisited:** It is also true that most Americans believe that some women like to be talked into sex. Does the existence of this widespread belief encourage men to pressure their dates into sex?

Other myths include the notions that “women say no when they mean yes” and “rapists are crazed by sexual desire” (Chapleau et al., 2008; Hockett et al., 2009). Still another myth is that deep down inside, women *want* to be raped. **Truth or Fiction Revisited:** *It is not true that women say no when they mean yes.* Myths such as these foster a social climate that encourages rape. Such myths deny the impact of the assault and transfer blame onto the victim. Men, including the most fundamentalist clergy, who support traditional, rigidly defined gender roles, are more likely to blame the victims of rape (Flood & Pease, 2008; Suarez & Gadalla, 2010). The myths contribute to a social climate that can be lenient toward rapists and unsympathetic toward victims. Moreover, the myths lead to hostility toward women, which in turn can lead to rape (Durán et al., 2010; see Figure 13.9 ■). **Truth or Fiction Revisited:** Because of the tendency to blame the victim, most college victims of date rape do *not* inform police or campus authorities of the assault (Fisher et al., 2003).

If you want to learn whether you harbor some of the more common myths about rape, complete the nearby self-assessment on cultural myths that create a climate that supports rape.

SELF ASSESSMENT

Cultural Myths That Create a Climate That Supports Rape

The following statements are based on a questionnaire by Martha Burt (1980). Read each statement and indicate whether you believe it is true or false by circling the T or the F. Then turn to the key in the Appendix to learn about the implications of your answers.

- | | | | | | |
|---|---|---|---|---|--|
| T | F | 1. A woman who goes to the home or apartment of a man on their first date implies that she is willing to have sex. | T | F | 8. Women who get raped while hitchhiking get what they deserve. |
| T | F | 2. Any female can get raped. | T | F | 9. A woman who is stuck-up and thinks she is too good to talk to guys on the street deserves to be taught a lesson. |
| T | F | 3. One reason women falsely report a rape is because they need to call attention to themselves. | T | F | 10. Many women have an unconscious wish to be raped and may then unconsciously set up a situation in which they are likely to be attacked. |
| T | F | 4. Any healthy woman can successfully resist a rapist if she really wants to. | T | F | 11. If a woman gets drunk at a party and has intercourse with a man she's just met there, she should be considered “fair game” to other males at the party who want to have sex with her too, whether she wants to or not. |
| T | F | 5. When women go around braless or wearing short skirts and tight tops, they are just asking for trouble. | T | F | 12. Many women who report a rape are lying because they are angry and want to get back at the man they accuse. |
| T | F | 6. In the majority of rapes, the victim is promiscuous or has a bad reputation. | T | F | 13. Many, if not most, rapes are merely invented by women who discovered they were pregnant and wanted to protect their reputation. |
| T | F | 7. If a girl engages in necking or petting and she lets things get out of hand, it is her own fault if her partner forces sex on her. | | | |

PREVENTING RAPE

The aftermath of rape can include physical harm, anxiety, depression, sexual dysfunction, sexually transmitted infection, and/or pregnancy (Elklit & Christiansen, 2010; Yuan et al., 2006). **Question 17: How can we prevent rape?** From a sociocultural perspective, prevention of rape involves publicly examining and challenging the widely held cultural attitudes and ideals that contribute to rape. The traditions of male dominance and rewards for male aggression take a daily toll on women. One thing we can do is encourage colleges and universities to require students to attend lectures and seminars on rape. The point is to debunk myths about rape and for men to learn that “no” means “no” despite the widespread belief that some women like to be talked into sex.

On a personal level, there are things women can do to protect themselves.

- List only first initials in the telephone directory or on the mailbox.
- Use dead-bolt locks.
- Keep windows locked and obtain iron grids for first-floor windows.
- Keep entrances and doorways brightly lit.
- Have keys ready for the front door or the car.
- Do not walk alone in the dark.
- Avoid deserted areas.
- Never allow a strange man into your apartment or home without checking his credentials.
- Drive with the car windows up and the doors locked.
- Do not talk to strange men in the street.

And consider the following suggestions for avoiding date rape:

- Communicate your sexual limits to your date. Tell your partner how far you would like to go so that he will know what the limits are.
- Meet new dates in public places and avoid driving with a stranger or a group of people you’ve just met.
- Be firm in refusing a sexual overture. The more definite you are, the less likely your partner will be to misinterpret your wishes.
- Trust your gut-level feelings. Many victims of acquaintance rape said afterward that they had a strange feeling about the man but failed to pay attention to it.

If you have broken off a relationship with someone you don’t really like or feel good about, don’t let him into your place.

LearningConnections • SEXUAL COERCION: CONFOUNDING SEX AND AGGRESSION

ACTIVE REVIEW (33) Most rapes are committed by (strangers or acquaintances?). (34) Many social scientists argue that rape mainly has to do with (sexual desire or power?).

REFLECT AND RELATE Some evolutionary psychologists speculate that sexual aggression may be natural for men. If they are correct, does society have a right to expect that

men will control harmful behavior, even if it “goes against the grain” of their genes?

CRITICAL THINKING How do American cultural beliefs have the effect of supporting rape?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections PREVENTING HIV/AIDS AND OTHER SEXUALLY TRANSMITTED INFECTIONS

Sexual relationships can be sources of pleasure and personal fulfillment. They also carry some risks and responsibilities. One of the risks is that of contracting HIV/AIDS or other sexually transmitted infections (STIs). Although media attention usually focuses on HIV/AIDS, other STIs are more widespread. Nearly 3 million new chlamydia infections occur each year, with the incidence among college students especially high (Kuehn, 2009). Chlamydia is a major cause of pelvic inflammatory disease, which often leads to infertility.

Most college students are informed about HIV transmission and AIDS, yet many are unaware that chlamydia can go undetected for years. A survey of 1st-year college students also found a great deal of ignorance about human papilloma virus (HPV) and genital warts (Baer et al., 2000). Although nearly all (96% of the males and 95% of the females) had heard of genital warts, only 4% of the males and 12% of the females knew that HPV caused them. Nationwide, only about 55% of women know that HPV infection is linked to cervical cancer (Massad et al., 2010).

Yet as many as 1 million new cases of HPV infection occur each year in the United States—more than syphilis, genital herpes, and AIDS combined.

One of the reasons for discussing STIs in a psychology textbook involves psychological risk factors, which are cognitive and behavioral:

- **Cognitive:** People tend to deny or underestimate their risk of infection. For example, HIV in the United States has been characterized as mainly transmitted by anal intercourse and the sharing of contaminated needles. Therefore, many Americans who do not engage in anal sex or use these drugs dismiss the threat of HIV/AIDS. Yet transmission of HIV via male–female sexual intercourse accounts for the majority of cases around the world (Higgins et al., 2010).
- **Behavioral:** Despite their knowledge of the effects of infection by HIV and other disease organisms, many people do not change their behavior in an effort to prevent infection (Kiene et al., 2010).

HIV/AIDS

AIDS is a fatal condition in which the person's immune system is so weakened that he or she falls prey to so-called opportunistic diseases. It is caused by the human immunodeficiency virus (HIV).

Transmission

HIV is transmitted by infected blood, semen, vaginal and cervical secretions, and breast milk. The first three fluids may enter the body through vaginal, anal, or oral sex with an infected partner. Other means of infection include sharing a hypodermic needle with an infected person, as is common among people who inject illicit drugs, and transfusion with contaminated blood. HIV may also be transmitted from mother to child through childbirth or breast-feeding. There is no evidence that public toilets, insect bites, or holding, hugging, living with, or attending school with an infected person transmits HIV. People today are unlikely to be infected by means of blood transfusions because blood supplies are routinely screened for HIV.

AIDS is characterized by fatigue, fever, unexplained weight loss, swollen lymph nodes, diarrhea, and in many cases, impairment of learning and memory. Among the opportunistic infections that may take hold are Kaposi's sarcoma, a cancer of the blood cells that occurs in many males who contract AIDS; PCP (pneumocystis carinii pneumonia), a kind of pneumonia; and in women, invasive cancer of the cervix.

Infection by HIV is generally diagnosed by means of blood, saliva, or urine tests. For many years, researchers were frustrated in their efforts to develop effective vaccines and treatments for HIV infection and AIDS. There is still no safe, effective vaccine, but a “cocktail” of antiviral drugs prolongs life in many infected people.

Many physicians also treat people who fear that they have been exposed to HIV with antiviral drugs to reduce the likelihood of infection. If you think that



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Having a Talk. Talking about what you are going to do to prevent sexually transmitted infections may not be easy or convenient for a couple, but it's clearly very important.

Table 13.4 ■ Overview of Sexually Transmitted Infections (STIs)

STI and Cause	Transmission	Symptoms	Diagnosis	Treatment
Gonorrhea (“clap,” “drip”): <i>Gonococcus</i> bacterium (<i>Neisseria gonorrhoeae</i>)	Vaginal, oral, or anal sex. To newborns passing through the birth canal of an infected mother.	In men, yellowish, thick discharge, burning urination. Women may be symptom-free or have vaginal discharge, burning urination, or irregular menstruation.	Clinical inspection. Culture of discharge.	Antibiotics.
Syphilis: <i>Treponema pallidum</i>	Vaginal, oral, or anal sex. Touching an infectious chancre. Congenital.	Hard, painless chancre appears at site of infection within 2–4 weeks. May progress through additional stages if untreated.	Clinical inspection or examination of fluid from a chancre. Blood test.	Antibiotics.
Chlamydia and non-gonococcal urethritis: caused by <i>Chlamydia trachomatis</i> bacterium in women	Vaginal, oral, or anal sex. To newborns passing through the birth canal of an infected mother.	Women and men may be symptom-free or frequent and painful urination and a discharge.	Analysis of cervical smear in women. Analysis of penile fluid in men.	Antibiotics.
Genital herpes: caused by Herpes simplex virus-type 2 (HSV-2)	Vaginal, oral, or anal sex.	Painful, reddish bumps around the genitals, thigh, or buttocks. Bumps become blisters that fill with pus and break, shedding viral particles. Fever, aches and pains possible.	Clinical inspection of sores. Culture and examination of fluid drawn from sore.	Antiviral drugs may provide relief and help with healing but are not cures.
HIV/AIDS: Acronym for human immunodeficiency virus, the cause of acquired immunodeficiency syndrome	Vaginal or anal sex. Infusion of contaminated blood by needle sharing or from mother to baby during childbirth. Breast-feeding.	Usually symptom-free for many years. Swollen lymph nodes, fever, weight loss, fatigue, diarrhea. Deadly “opportunistic infections.”	Blood, saliva, or urine tests detect HIV antibodies. Other tests confirm the presence of HIV itself.	There is no cure for HIV/AIDS. A “cocktail” of highly active antiviral therapy (HAART) prolongs life in many people living with HIV/AIDS.
HPV/Genital warts: caused by human papilloma virus (HPV)	Sexual contact. Contact with infected towels or clothing.	Painless warts resembling cauliflowers on the genitals or anus or in the rectum. Associated with cervical cancer.	Clinical inspection.	A vaccine can prevent infection in most young women. Warts removed by freezing, topical drugs, burning, and surgery.
Pubic lice (“crabs”): <i>Phthirus pubis</i> (an insect, not a crab)	Sexual contact. Contact with an infested towel, sheet, or toilet seat.	Intense itching in pubic area and other hairy regions to which lice can attach.	Clinical inspection.	Topical drugs containing pyrethrins or piperonal butoxide.

you may have been exposed to HIV, talk to your doctor about it immediately.

Current drug therapy has given rise to the hope that AIDS will become increasingly manageable, a chronic disease but not a terminal illness. However, treatment is expensive, and many who could benefit from it cannot afford it. In addition, some people with AIDS do

not respond to the drug cocktail, and HIV levels bounce back. *Therefore, the most effective way of dealing with AIDS is prevention.*

More information about STIs is in Table 13.4 ■. For the latest on HIV/AIDS, you can call the National AIDS Hotline at 1-800-342-AIDS. Call 1-800-344-SIDA for information in Spanish.

Or go to the CDC website: www.cdc.gov. Once you’re there, click Health Topics A–Z and then AIDS/HIV.

Preventing STIs

Prevention is the primary weapon against STIs. People need to learn about the transmission, symptoms, and effects

of STIs. They need to learn about “safer sex” techniques, including abstinence, and if they are sexually active, the use of condoms.

But knowledge may not be enough to change behavior (Parsons et al., 2000). For example, many female adolescents lack power in their relationships. Males are likely to pressure females into unwanted sexual relations or to pressure them into unprotected sexual relations (Friedman et al., 2001; Garcia-Moreno & Watts, 2000).

What can *you* do to prevent the transmission of HIV and other STI-causing organisms? A number of things.

1. *The first aspect of prevention is psychological: Don't ignore the threat of STIs.* Don't simply assume that your partner is uninfected or believe it would hurt the relationship to ask about STIs.
2. *Remain abstinent.* One way to curb the sexual transmission of HIV and other organisms that cause STIs is sexual abstinence. But what does abstinence mean? Does it mean avoiding sexual intercourse (yes) or any form of sexual activity with another person (not necessarily)? Kissing, hugging, and petting to orgasm (without coming into contact with semen or vaginal secretions) are generally considered safe in terms of HIV transmission. However, kissing can

transmit oral herpes (as shown by cold sores) and some bacterial STIs.

3. *Engage in a monogamous relationship with someone who is not infected.* Readers who do not abstain from sexual relationships or limit themselves to a monogamous relationship can do some things to make sex safer—though not perfectly safe:
4. *Be selective.* Engage in sexual activity only with people you know well. Consider whether they are likely to have engaged in the kinds of behaviors that transmit HIV or other STIs.
5. *Inspect your partner's genitals.* People who have STIs often have a variety of symptoms. Examining your partner's genitals for blisters, discharges, chancres, rashes, warts, lice, and unpleasant odors during foreplay may reveal signs of such diseases.
6. *Wash your own genitals before and after contact.* Washing beforehand helps protect your partner. Washing promptly afterward with soap and water helps remove germs.
7. *Use condoms.* *Latex* condoms (but not condoms made from animal membrane) protect a woman from having HIV-infected semen enter the vagina and a man from contact with HIV-infected vaginal secretions.

Condoms also prevent transmission of bacterial STIs. Interestingly, a recent national survey found that adolescents were more likely than adults to have used a condom the last time they had sexual intercourse (Fortenberry et al., 2010; Sanders et al., 2010). Why? It could be that sex education has had healthful effects. It could also be that adult women are more likely than teenagers to be using birth control pills, which would eliminate one reason for using condoms. The other reason, of course—preventing disease—remains extremely important.

8. *If you fear that you have been exposed to HIV or another infectious organism, talk to your doctor about it.* Early treatment is usually more effective than later treatment. There is a difference between exposure to HIV and infection by HIV; early treatment may prevent infection.
9. *When in doubt, stop.* If you are not sure that sex is safe, stop and think things over or seek expert advice.

If you think about it, the last item is rather good general advice. When in doubt, why not stop and think, regardless of whether the doubt is about your sex partner, your college major, or a financial investment?

Gender Stereotypes: What Does It Mean to Be Female or to Be Male?

1. What are gender-role stereotypes?

Cultures have broad expectations of men and women that are termed *gender-role stereotypes*. In our culture, women are expected to be gentle, dependent, kind, helpful, patient, and submissive. Men are expected to be tough, competitive, gentlemanly, and protective.

Gender Differences

2. Are there psychological differences between females and males?

Boys have historically been seen as excelling in math and spatial-relations skills, whereas girls have been viewed as excelling in language skills. However, these differences are small and growing narrower. Females are more extraverted and nurturant than males. Males are more tough-minded and aggressive than females. Men are more interested than women in casual sex and multiple sex partners. Women are more willing than men to marry someone who is not good-looking but less willing to marry someone who is unlikely to hold a steady job.

Gender-Typing: On Becoming a Woman or a Man

3. What is the role of nature in gender-typing?

According to evolutionary psychologists, gender differences were fashioned by natural selection in response to problems in adaptation that were repeatedly encountered by humans over thousands of generations. Testosterone in the brains of male fetuses spurs greater growth of the right hemisphere of the brain, which may be connected with the ability to manage spatial-relations tasks. Testosterone is also connected with aggression.

4. What is the role of nurture in gender-typing?

Psychologists have looked at nurture and gender-typing in terms of psychodynamic, social-cognitive, and gender-schema theories. Freud explained gender-typing in terms of identification with the parent of the same gender through resolution of the Oedipus complex. Social-cognitive theorists explain gender-typing in terms of the ways experience helps the individual create concepts of gender-appropriate behavior and how the individual is motivated to engage in such behavior. Social-cognitive theorists use terms such as observational learning, identification, and socialization. Gender-schema theory proposes that once children learn the gender schema of their culture, their self-esteem becomes tied up in how well they express the traits considered relevant to their gender.

Sexual Motivation and Sexual Orientation: Pressing the START Button and Finding Direction

5. How do sex hormones affect sexual motivation?

Sex hormones have activating and organizing effects on behavior. “Male” sex hormones appear to fuel the sex drive, even in women, who produce much less of them. Many female animals are receptive to males only during estrus, when female sex hormones are plentiful.

6. What are pheromones?

Pheromones are chemical secretions that are detected through the vomeronasal organ. Pheromones trigger sexual and other behaviors in many mammals, but their role in human sexuality is controversial.

7. What is sexual orientation?

Sexual orientation refers to the direction of one’s erotic interests. Heterosexual people are sexually attracted to people of the other gender and interested in forming romantic relationships with them. Homosexual people are sexually attracted to people of their own gender and interested in forming romantic relationships with them.

8. What do we know about the origins of gay male and lesbian sexual orientations?

Psychodynamic theory connects sexual orientation with improper resolution of the Oedipus and Electra complexes. Social-cognitive theorists focus on the role of reinforcement of early patterns of sexual behavior. Evidence of a genetic contribution to sexual orientation is accumulating. Sex hormones are known to have both organizing and activating effects, but research has failed to connect sexual orientation with differences in adult levels of sex hormones. However, sex hormones may play a role in determining sexual orientation during prenatal development.

Interpersonal Attraction: On Liking and Loving

9. What factors contribute to attraction in our culture?

Men seem to find large eyes and narrow jaws attractive in women. In our culture, slenderness is considered attractive in both men and women, and tallness is valued in men. We are more attracted to good-looking people. Similarity in attitudes and sociocultural factors (ethnicity, education, and so on) and reciprocity in feelings of admiration also enhance attraction. According to the attraction-similarity hypothesis, we tend to seek dates and mates at our own level of attractiveness largely because of fear of rejection.

10. Just what is love?

Sternberg’s theory suggests that love has three components: intimacy, passion, and commitment. Different kinds of love combine these components in different ways. Romantic love

is characterized by the combination of passion and intimacy. Consummate love has all three factors.

The Four S's: Sexual Response, Sexual Behavior, Sexual Dysfunctions, and Sex Therapy

11. What is the sexual response cycle?

The sexual response cycle describes the body's response to sexual stimulation. It is generally characterized by vasocongestion and myotonia and consists of four phases: excitement, plateau, orgasm, and resolution. Excitement is characterized by erection in the male and lubrication in the female. Orgasm is characterized by muscle contractions and the release of sexual tension. Following orgasm, males enter a refractory period during which they are temporarily unresponsive to sexual stimulation.

12. What do we know about the sex lives of people in the United States?

Males are generally more likely than females to masturbate, engage in premarital sex, and have a large number of sex partners. Education appears to have a liberating influence on sexual behavior, whereas conservative religious beliefs appear to have a constraining effect.

13. What are sexual dysfunctions?

Sexual dysfunctions are persistent or recurrent problems in becoming sexually aroused or reaching orgasm. They include hypoactive sexual desire disorder (lack of interest in sex), female sexual arousal disorder and male erectile disorder (characterized by inadequate vasocongestion), orgasmic disorder, premature ejaculation, dyspareunia (pain during

sex), and vaginismus (involuntary contraction of the muscles surrounding the vagina, impeding intercourse).

14. What are the origins of sexual dysfunctions?

Sexual dysfunctions may be caused by physical problems, negative attitudes toward sex, lack of sexual knowledge and skills, problems in the relationship, and performance anxiety.

15. How are sexual dysfunctions treated?

Sexual dysfunctions are treated by sex therapy, which focuses on reducing performance anxiety, changing self-defeating attitudes and expectations, teaching sexual skills, enhancing sexual knowledge, and improving sexual communication. There are also biological treatments that can help enhance the physical aspects of sexual response.

Sexual Coercion: Confounding Sex and Aggression

16. Why do men rape women?

Social critics argue that men are socialized into sexual aggression by being generally reinforced for aggression and competitiveness. Social attitudes such as gender-role stereotyping, seeing sex as adversarial, and myths that tend to blame the victim all help create a climate that encourages rape.

17. How can we prevent rape?

Rape can be prevented by social change and by cautionary measures such as avoiding deserted areas and—in dating—by dating in groups and being assertive in expressing one's sexual intentions and limits.

KEY TERMS

- Activating effect (p. 470)
Affective shift hypothesis (p. 480)
Attraction (p. 476)
Attraction-similarity hypothesis (p. 477)
Clitoris (p. 483)
Commitment (p. 480)
Consummate love (p. 480)
Dyspareunia (p. 487)
Ejaculation (p. 483)
Estrus (p. 470)
Excitement phase (p. 483)
Female sexual arousal disorder (p. 487)
Gender (p. 459)
Gender role (p. 459)
Gender-schema (p. 467)
Gender-typing (p. 464)
Homosexual (p. 471)
Hypoactive sexual desire disorder (p. 486)
Intimacy (p. 480)
Male erectile disorder (p. 487)
Myotonia (p. 483)
Organizing effect (p. 471)
Orgasm (p. 483)
Orgasmic disorder (p. 487)
Passion (p. 480)
Performance anxiety (p. 487)
Pheromone (p. 471)
Plateau phase (p. 483)
Premature ejaculation (p. 487)
Reciprocity (p. 479)
Refractory period (p. 484)
Resolution phase (p. 483)
Romantic love (p. 480)
Sex therapy (p. 487)
Sexual dysfunction (p. 486)
Sexual orientation (p. 471)
Sexual response cycle (p. 482)
Stereotype (p. 459)
Triangular model of love (p. 480)
Vaginismus (p. 487)
Vasocongestion (p. 482)

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14 | Stress, Health, and Coping



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MAJOR TOPICS

Stress: What It Is, Where It Comes From
Psychological Moderators of Stress
Stress and the Body: The War Within
Psychology and Health

FEATURES

Controversy in Psychology: Just How Are Daily Hassles and Life Changes Connected with Health Problems?
A Closer Look—Research: Stress in America
Self-Assessment: Are You Type A or Type B?
Self-Assessment: The Locus of Control Scale
Controversy in Psychology: “Fight or Flight” or “Tend and Befriend”? Do Men and Women Respond Differently to Stress?
Concept Review: Factors in Heart Disease and Cancer
Life Connections: Preventing and Coping with Stress, Headaches, Heart Disease, and Cancer

TRUTH OR FICTION

- T F** Because variety is the spice of life, the more change the better.
- T F** Going on vacation is stressful.
- T F** Searching for social approval or perfection is an excellent way of making yourself miserable.
- T F** “A merry heart doeth good like a medicine.”
- T F** At any given moment, countless microscopic warriors within our bodies are carrying out search-and-destroy missions against foreign agents.
- T F** Blowing things out of proportion can give you a headache.

- T F** African Americans are more likely than European Americans to contract cancer and more likely to die from it when they do.
- T F** People who exercise regularly live 2 years longer, on average, than their sedentary counterparts.
- T F** Ketchup (ketchup?) is a health food.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

Katrina came through the door of a home in a New Orleans suburb at 10 o'clock on Monday morning. She didn't knock. She flowed underneath the door and then she began to come in through the windows, the rising waters of a tempest whose winds had tossed torrents against the shore at close to 150 miles per hour.

Gail, a nurse, and her husband Earl, a machinist, had socked away some money for the future and nearly owned their one-story brick home free and clear. They had been looking forward to spending more time with their grandchildren.

But in minutes, Katrina changed their lives forever. Before they fully comprehended what was happening, water was sloshing up against their waists. The front door normally opened out, but Katrina held it shut. Gail and Earl managed to climb out a window against Katrina's onrushing fury.

Gail and Earl, like many of their neighbors, owned a boat—a 17-foot Sunbird. They slogged through the sudden river and the pouring rain to where the boat was parked under the roof of their carport. They pulled themselves up onto it, and then they realized that the ignition keys were still in the house.



© AP Photo/Eric Gay

Gail and Earl looked at each other. Earl knew what he had to do. He slid back into the water. There was no more reaching the ground to walk through it. He swam back to the house. Once he was in the house, the water continued to rise.

“The boat was just about touching the roof of the carport,” Gail said. “I’m screaming for him to hurry up. Because if we got stuck under there, you know, we would have died” (Herbert, 2005).

Somehow, Earl found the keys and worked his way back to the boat, and they got the engine going. By the time they left the carport, the water was up to the roof of the house. They could barely see through the rain, much less maneuver, but they managed to move the boat two blocks to the shelter of the roof of the drive-through lane of a bank. But about an hour later, they had to return to the storm because the boat was bouncing up against the roof of the drive-through.

Fortunately, the rain eased and Gail and Earl piloted the Sunbird out across the alien waterscape. There was no refilling the engine with gasoline. The gas stations were underwater. Even locating themselves was an eerie experience because the street signs were underwater. Cars and trucks bobbed by like strange logs in a stream.

Then it dawned on them that people around them were screaming for help. Drenched people stood on rooftops or leaned out of upper story windows, waving and yelling. Gail and Earl took as many as they could in the Sunbird and found their way to a shelter in a local high school.

Then they turned about and went out for more people. Others—police, firefighters, civilians—were also out in boats doing their part. Local officials managed to find them gasoline. They rode the waters and ferried people to the shelter for 2 days, bringing in 150. Hungry, unwashed despite the flooding, and exhausted, Gail and Earl themselves were then evacuated to Baton Rouge, where they rested for a couple of days before making their way to relatives in Florida. It never occurred to them that they were heroes.

Their home is gone. So, too, are their jobs. They lost a car and a truck. Yet they were lucky. “If we did not have family,” Gail said, “we’d be living under a bridge.”

When asked how the ordeal had affected her psychologically, Gail said, “Don’t ask me now. It’s too early.” Later, she added, “Listen, everybody’s depressed and kind of still in shock. Everybody who’s been through this thing. It’s hard to believe it happened” (Herbert, 2005).

Disasters like Katrina take an emotional as well as a physical toll (Mason et al., 2010; Weems et al., 2010). Studies of communities devastated by earthquakes—such as Haiti in 2010—oil spills, fires, tsunamis, hurricanes, and other disasters suggest that most survivors eventually come to live with their memories and their grief. But many have a bundle of symptoms that we call *posttraumatic stress disorder* (see Chapter 15): lingering nightmares, flashbacks, depression, and irritability that suggest deeper effects of stress.

This chapter is about stress—its origins, its psychological and physical effects, and ways of coping. **Question 1: What is stress?**

STRESS: WHAT IT IS, WHERE IT COMES FROM

In physics, stress is defined as a pressure or force exerted on a body. Tons of rock pressing on the earth, one car smashing into another, a rubber band stretching—all are types of physical stress. Psychological forces, or **stressors**, also press, push, or pull. We may feel “crushed” by the weight of a big decision, “smashed” by adversity, or “stretched” to the point of snapping. In the case of the victims of Katrina, physical events had both psychological and physical consequences. As we will see throughout the chapter, those psychological consequences can also affect our health.

Psychologists define **stress** as the demand made on an organism to adapt, cope, or adjust. Some stress is healthful and necessary to keep us alert and occupied. Stress researcher Hans Selye (1907–1982) referred to such healthful stress as **eustress**. We

Stressor An event that gives rise to feelings of stress.

Stress The demand that is made on an organism to adapt, cope, or adjust.

Eustress (YOU-stress). Stress that is healthful.

may experience eustress when we begin a sought-after job or try to choose the color of an iPod. But intense or prolonged stress, such as that caused by Hurricane Katrina or by social or financial problems, can overtax our ability to adjust, affect our moods, impair our ability to experience pleasure, and harm the body (Gotlib & Joormann, 2010; Saul et al., 2008).

Stress is one of the key topics in health psychology. **Question 2: What is health psychology?** **Health psychology** studies the relationships between psychological factors (for example, attitudes, beliefs, situational influences, and behavior patterns) and the prevention and treatment of physical health problems. Health psychologists investigate how

- psychological factors such as stress, behavior patterns, and attitudes can lead to or aggravate illness;
- people can cope with stress;
- stress and **pathogens** (disease-causing organisms such as bacteria and viruses) interact to influence the immune system;
- people decide whether to seek health care; and
- psychological interventions such as health education (concerning nutrition, smoking, and exercise, for example) and behavior modification can contribute to physical health.

In this chapter, we consider sources of stress, factors that moderate the impact of stress, and the body's response to stress. We consider various physical health issues that overlap with the science of psychology, including headaches, heart disease, and cancer. We have seen how disasters create stress. Let's consider less severe but more common sources of stress: daily hassles, life changes, conflict, irrational beliefs, and Type A behavior.

Health psychology The field of psychology that studies the relationships between psychological factors (e.g., attitudes, beliefs, situational influences, and behavior patterns) and the prevention and treatment of physical illness.

Daily hassles Notable daily conditions and experiences that are threatening or harmful to a person's well-being.

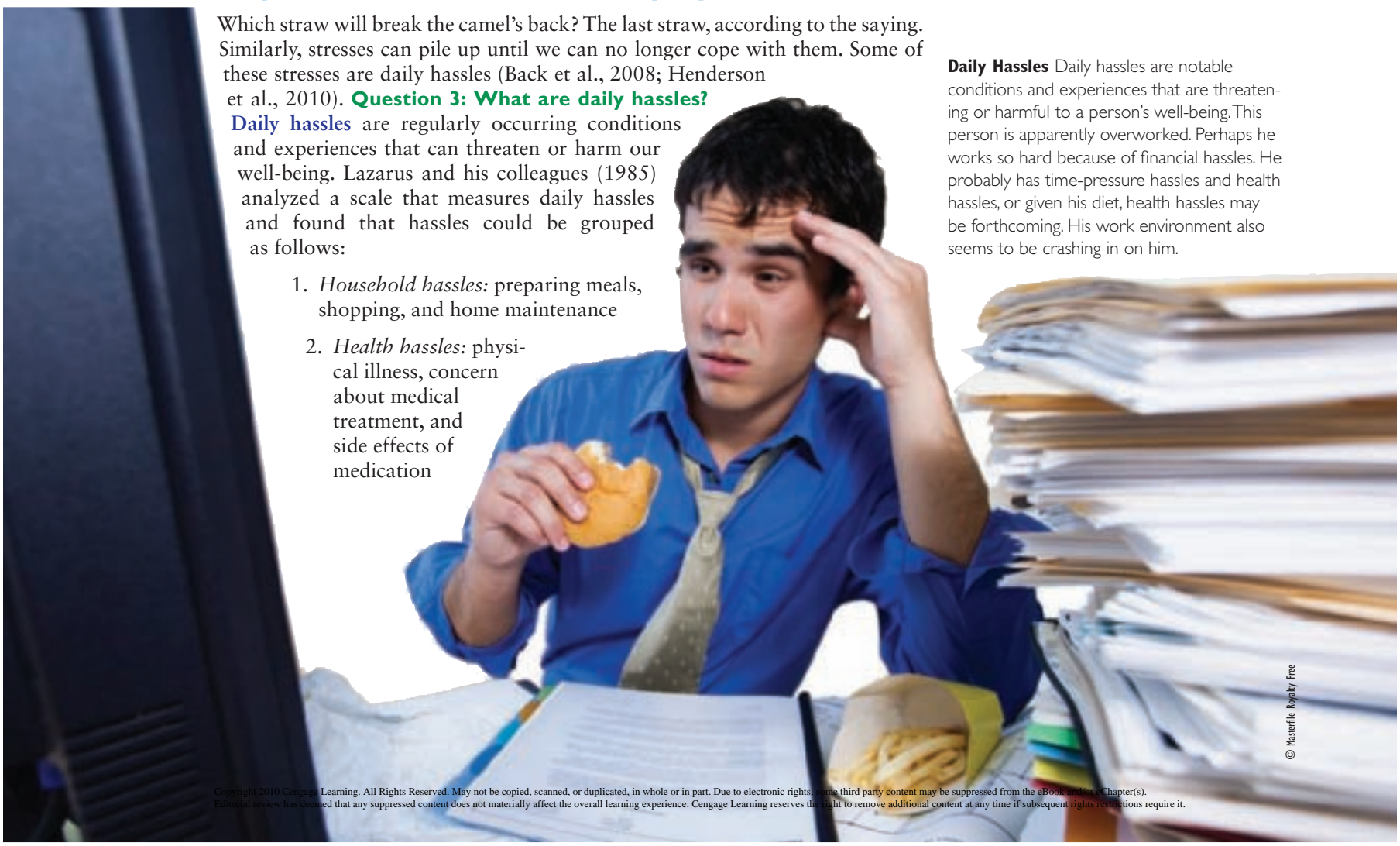
Daily Hassles: The Stress of Everyday Life

Which straw will break the camel's back? The last straw, according to the saying. Similarly, stresses can pile up until we can no longer cope with them. Some of these stresses are daily hassles (Back et al., 2008; Henderson et al., 2010). **Question 3: What are daily hassles?**

Daily hassles are regularly occurring conditions and experiences that can threaten or harm our well-being. Lazarus and his colleagues (1985) analyzed a scale that measures daily hassles and found that hassles could be grouped as follows:

1. *Household hassles*: preparing meals, shopping, and home maintenance
2. *Health hassles*: physical illness, concern about medical treatment, and side effects of medication

Daily Hassles Daily hassles are notable conditions and experiences that are threatening or harmful to a person's well-being. This person is apparently overworked. Perhaps he works so hard because of financial hassles. He probably has time-pressure hassles and health hassles, or given his diet, health hassles may be forthcoming. His work environment also seems to be crashing in on him.



3. *Time-pressure hassles*: having too many things to do, too many responsibilities, and not enough time
4. *Inner concern hassles*: being socially isolated, lonely
5. *Environmental hassles*: crime, neighborhood deterioration, and traffic noise
6. *Financial responsibility hassles*: concern about owing money such as mortgage payments and loan installments
7. *Work hassles*: job dissatisfaction, not liking one's duties at work, and problems with coworkers
8. *Security hassles*: concerns about job security, terrorism, taxes, property investments, stock market swings, and retirement

The opposite of daily hassles are **uplifts**, such as pleasant family outings, good grades, enjoyable TV shows, and tasty meals. An Israeli study of Israeli Jews and Arabs found that uplifts were related to family satisfaction among both groups and to general life satisfaction among Jews (Lavee & Ben-Ari, 2003). Daily hassles, by contrast, are linked to variables such as nervousness, worrying, feelings of sadness, and feelings of loneliness.

Life Changes: Variety May Be the Spice of Life, but Does Too Much Spice Leave a Bad Taste?

You might think that marrying Mr. or Ms. Right, finding a good job, and moving to a better neighborhood all in the same year would propel you into a state of bliss. It might. **Truth or Fiction Revisited**: Although variety adds spice to life, *too much* variety might lead to physical illness. **Question 4: How can too much of a good thing make you ill?** It is because the events that add variety to life are changes. Even pleasant changes require adjustment. Piling one atop the other, even positive changes can lead to headaches, high blood pressure, and other health problems.

Life changes differ from daily hassles in two key ways:

1. Many life changes are positive and desirable; hassles, by definition, are negative.
2. Hassles occur regularly, whereas life changes occur at irregular intervals.

Peggy Blake and her colleagues (1984) constructed a scale to measure the impact of life changes among college students. Surveys with students revealed that death of a spouse or parent were considered the most stressful life changes (94 and 88 life-change units, respectively; see Table 14.1 ■). Academic failure (77 units) and graduation from college (68 units) were also considered highly stressful, even though graduation from college is a positive event—considering the alternative. Positive life changes such as an outstanding personal achievement (49 units) and going on vacation (30 units) also made the list. **Truth or Fiction Revisited**: Although vacations can be good for your health (Gump & Matthews, 2000), they remain a life change that requires adjustment.

Hassles, Life Changes, and Health Problems

Hassles and life changes—especially negative life changes—affect us psychologically. They can cause us to worry and can affect our moods (McLaughlin et al., 2009; O'Driscoll & Brough, 2010). Stressors such as hassles and life changes also predict health problems such as heart disease and cancer, even athletic injuries (Perna et al., 2003). Holmes and Rahe (1967) found that people who “earned” 300 or more life-change units within a year, according to their scale, were at greater risk for health problems. Eight of ten developed health problems compared with only one of three people whose totals of life-change units for the year were below 150.

*It's not stress that kills us, it is
our reaction to it.*

HANS SELYE

Uplifts Notable pleasant daily conditions and experiences.

Table 14.1 ■ Life-Change Units Connected with Various Events

Event	Life-Change Units	Event	Life-Change Units
1. Death of a spouse, lover, or child	94	21. Change in course of study, major field, vocational goals, or work status	60
2. Death of a parent or sibling	88	22. Change in own financial status	59
3. Beginning formal higher education	84	23. Beginning or ceasing service in the armed forces	57
4. Jail sentence	82	24. Change in living arrangements, conditions, or environment	55
5. Divorce or marital separation	82	25. Change in frequency or nature of sexual experiences	55
6. Unwanted pregnancy of self, spouse, or lover	80	26. Change in degree of interest in college or attitudes toward education	55
7. Abortion of unwanted pregnancy of self, spouse, or lover	80	27. Academic success	54
8. Academic failure	77	28. Change to a new college or university	54
9. Marrying or living with lover against parents' wishes	75	29. Change in number or type of arguments with roommate	52
10. Change in love relationship or important friendship	74	30. Change in responsibility at work	50
11. Change in marital status of parents	73	31. Change in amount or nature of social activities	50
12. Hospitalization of a parent or sibling	70	32. Change in routine at college or work	49
13. Graduation from college	68	33. Change in amount of leisure time	49
14. Major personal injury or illness	68	34. Outstanding personal achievement	49
15. Wanted pregnancy of self, spouse, or lover	67	35. Improvement of own health	47
16. Preparing for an important exam or writing a major paper	65	36. Change in study habits	46
17. Major financial difficulties	65	37. Change in religious affiliation	44
18. Change in academic status	64	38. Change in address or residence	43
19. Change in relationship with members of your immediate family	62	39. Change in weight or eating habits	39
20. Hospitalization of yourself or a close relative	61	40. Vacation or travel	30

Source: Adapted from *Self-Assessment and Behavior Change Manual* (pp. 43–47), by Peggy Blake, Robert Fry, and Michael Pesjack. Copyright ©1984 by Peggy Blake. Reprinted by permission of McGraw-Hill Companies.

Moreover, people who remain married to the same person live longer than people who experience marital breakups and remarry (Wood et al., 2007). Apparently, the life changes of divorce and remarriage—or the instability associated with them—can be harmful to our health.

Conflict: Darned if You Do, Darned if You Don't

Should you eat dessert or try to stick to your diet? Should you live on campus, which is more convenient, or should you rent an apartment, where you may have more independence? Choices like these can place us in conflict. **Question 5: What is conflict?** In psychology, **conflict** is the feeling of being pulled in two or more directions by opposing

Conflict Being torn in different directions by opposing motives. The emotion associated with being torn in different directions.

Controversy In Psychology JUST HOW ARE DAILY HASSLES AND LIFE CHANGES CONNECTED WITH HEALTH PROBLEMS?

Mental tensions, frustrations, insecurity, aimlessness are among the most damaging stressors, and . . . studies have shown how they cause migraine headache, peptic ulcers, heart attacks, hypertension, mental disease, suicide, or just hopeless unhappiness.

—Hans Selye

The links between daily hassles, life changes, and health problems are supported by research. But what leads to what? Although it may appear obvious that hassles and life changes should *cause* health problems, what is obvious can be incomplete, even wrong. In this case, researchers are not certain that stress causes illness. Let's consider a number of limitations in the research on the connections between daily hassles, life changes, and health problems:

1. *The nature of the links.* The nature of the links between daily hassles, life changes, and illness is open to question. It may seem logical that daily hassles and life changes cause health problems, but other explanations of the data are also possible (see Figure 14.1 ■). One possible explanation is that people who are *predisposed* toward medical or psychological problems encounter more hassles and amass more life-change units (Ewedemi & Linn, 2006; Harkness & Stewart, 2009). For example, undiagnosed medical disorders may contribute to sexual problems, arguments with spouses or in-laws, changes in living conditions and personal habits, and changes in sleeping habits.

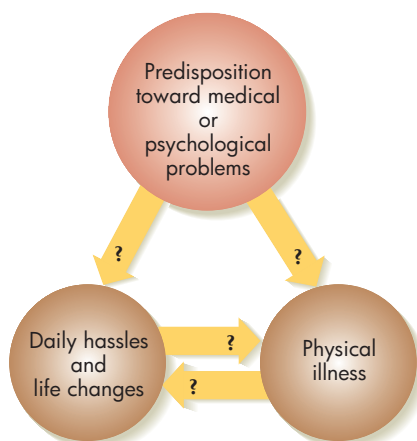


Figure 14.1 ■ What Are the Relationships among Daily Hassles, Life Changes, and Physical Illness? Do daily hassles and life events cause illness, or do people who are predisposed toward medical or psychological problems encounter or generate more hassles and amass more life-change units?

2. *Positive versus negative life changes.* Other aspects of the research on the relationship between life changes and illness have also been challenged. For instance, *positive* life changes may be less disturbing than daily hassles and negative life changes, even though the number of life-change units assigned to them is high (Lefcourt et al., 1981). Consider item 33 in Table 14.1: “Change in amount of leisure time.” It apparently requires as much adaptation

to gain leisure time as to lose leisure time, but would you personally find both outcomes equally stressful?

3. *Personality differences.* People with different personalities respond to stress in different ways. People who are easygoing or psychologically hardy are less likely to become ill under the impact of stress. Optimism also helps people cope with stress. An optimistic outlook helps people marshal social support and find other ways of coping with stress (Brydon et al., 2009; Feder et al., 2010).
4. *Cognitive appraisal.* The same event can have different meanings to different people and be a source of stress to some and of uplift to others (Buchanan et al., 2010; David et al., 2010). Pregnancy, for example, can be a positive or negative life change depending on whether you want and are prepared to have a child. We appraise the hassles, traumatic experiences, and life changes that we encounter. In responding to them, we take into account their perceived danger, our values and goals, our beliefs in our coping ability, our social support, and so on. The same event will be less taxing to someone with greater coping ability and support than to someone who lacks these advantages.

Despite these methodological flaws, hassles and life changes require adjustment. It seems wise to be aware of hassles and life changes and how they may affect us.

motives. Conflict is frustrating and stressful. Psychologists often classify conflicts into four types: approach–approach, avoidance–avoidance, approach–avoidance, and multiple approach–avoidance.

Classic experimental research by Neal E. Miller (1944) and others suggests that the **approach–approach conflict** (see Figure 14.2 ■, part A) is the least stressful type. Here, each of two goals is desirable, and both are within reach. You may not be able to decide between pizza or tacos or a trip to Nassau or Hawaii. I recently had such a conflict in which I was “forced” to choose between triple-chocolate fat-free frozen yogurt and coffee-chocolate-chip fat-free frozen yogurt. Such conflicts are usually resolved by making a decision (I took the triple-chocolate!). Those who experience this type of conflict may vacillate until they make a decision, as shown by college students who do not make decisions but spend a great deal of time thinking about their conflicting goals.

Avoidance–avoidance conflict (see Figure 14.2, part B) is more stressful because you are motivated to avoid each of two negative goals. However, avoiding one of them requires approaching the other. You may be fearful of visiting the dentist but also afraid that your teeth will decay if you do not make an appointment and go. You

Approach–approach conflict A type of conflict in which the goals that produce opposing motives are positive and within reach.

Avoidance–avoidance conflict A type of conflict in which the goals are negative, but avoidance of one requires approaching the other.

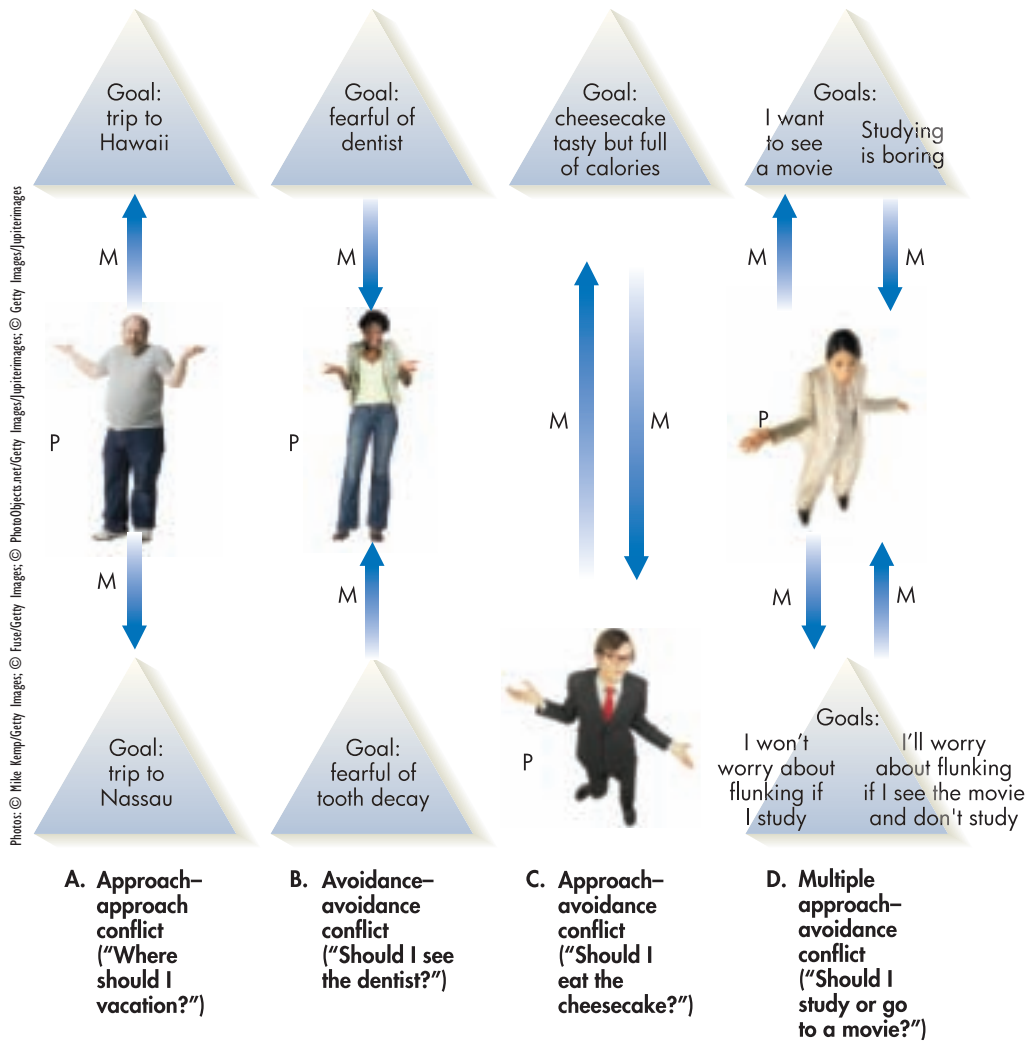


Figure 14.2 ■ Models for Conflict Part A shows an approach–approach conflict in which a person (P) has motives (M) to reach two goals (G) that are desirable, but approach of one requires exclusion of the other. Part B shows an avoidance–avoidance conflict in which both “goals” are negative, but avoiding one requires approaching the other. Part C shows an approach–avoidance conflict in which the same goal has desirable and undesirable properties. Part D shows a double approach–avoidance conflict, which is the simplest kind of multiple approach–avoidance conflict. In a multiple approach–avoidance conflict, two or more goals have mixed properties.

may not want to contribute to the Association for the Advancement of Lost Causes, but you fear that your friends will consider you cheap or uncommitted if you do not. Each potential outcome in an avoidance–avoidance conflict is undesirable. When an avoidance–avoidance conflict is highly stressful and no resolution is in sight, some people withdraw from the conflict by focusing on other matters or doing nothing. Highly conflicted people have been known to refuse to get up in the morning and start the day.

When the same goal produces both approach and avoidance motives, we have an **approach–avoidance conflict** (see Figure 14.2, part C). People and things have their pluses and minuses, their good points and their bad points. Cheesecake may be delicious, but oh, the calories! Goals that produce mixed motives may seem more attractive from a distance but undesirable from up close (Elliot & Mapes, 2005). Many couples repeatedly break up and then reunite. When they are apart and lonely, they may recall each other fondly and swear that they could make the relationship work if they got together again. But after they spend time together again, they may find themselves thinking, “How could I ever have believed that this so-and-so would change?”

The most complex form of conflict is the **multiple approach–avoidance conflict** in which each of several alternative courses of action has pluses and minuses. An example with two goals is shown in Figure 14.2, part D. This sort of conflict might arise on the eve of an examination, when you are faced with the choice of studying or, say, going to a film. Each alternative has both positive and negative aspects: “Studying’s a bore, but I won’t have to worry about flunking. I’d love to see the movie, but I’d just be worrying about how I’ll do tomorrow.”

Approach–avoidance conflict A type of conflict in which the same goal produces approach and avoidance motives.

Multiple approach–avoidance conflict A type of conflict in which each of a number of goals produces approach and avoidance motives.

A CLOSER LOOK • RESEARCH

STRESS IN AMERICA

Each year, the American Psychological Association has been commissioning surveys of stress in America. In 2009, Harris Interactive conducted an online survey of a nationally representative sample of Americans. The figures for gender, age, race and ethnicity, level of education, region, and household income were adjusted as necessary so that they were brought into line with their actual percentages of the American population at large.

As you see in Figure 14.3 ■, the respondents overwhelmingly reported that money and work were their major sources of stress. We will see later that “job strain” is a key contributor to heart disease. When we add in the costs of housing, which are mentioned by nearly half the sample, we find another area in which finances contribute to stress. Health is another major area of concern, mentioned in various ways by more than half of the sample. Finally, Figure 14.3 shows that intimate relationships are also a source of stress for half (51%) of the sample. One might think that intimate relationships would serve as a buffer against external sources of stress for people, *and perhaps they do*. (Life is complex.) However, these relationships can also contribute to stress.

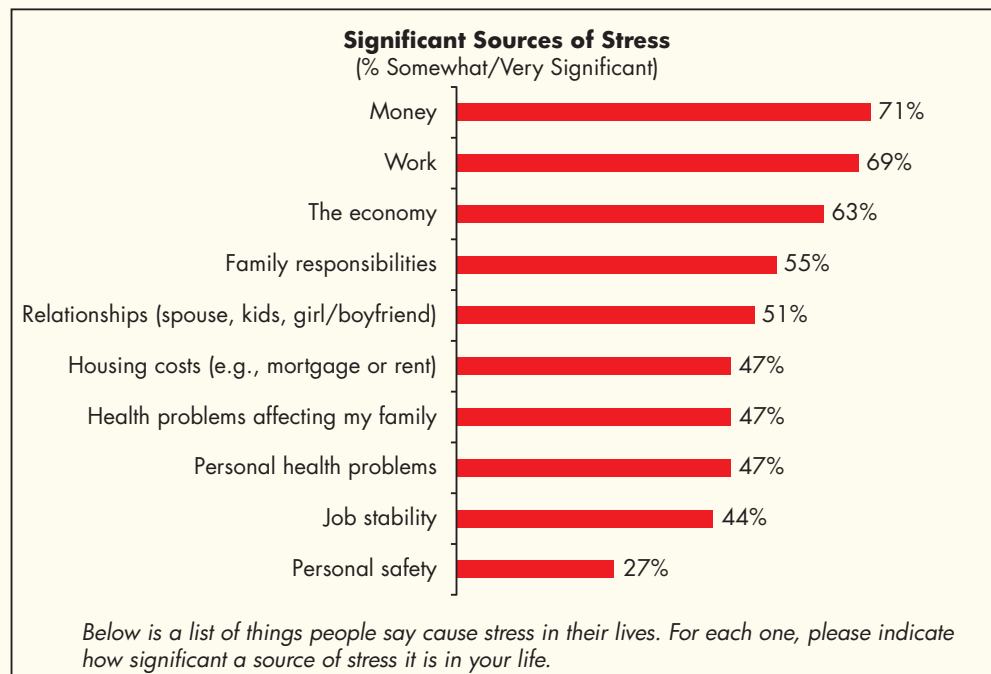


Figure 14.3 ■ Significant Sources of Stress

Source: American Psychological Association. (2009). *Stress in America 2009: Executive Summary*. (Accessed April 1, 2010). <http://www.apa.org/news/press/releases/stress-exec-summary.pdf>. Page 8. Reprinted by permission.

Respondents reported many symptoms of stress, both physical and psychological. Nearly half the respondents (45%) reported that stress made them irritable or angry. Stress made more than two in five respondents (43%) tired, and about one-third (34%)

All forms of conflict entail motives that aim in opposite directions. When one motive is much stronger than the other—such as when you feel starved and are only slightly concerned about your weight—it will probably not be too stressful to act in accordance with the powerful motive—in this case, to eat. When each conflicting motive is powerful, however, you may experience stress and confusion about the proper course of action. At such times, you need to make a decision. Yet decision making can also be stressful, especially when there is no clear correct choice.

Research has connected internal conflict with various health problems (Freitas et al., 2009). In one study (Emmons & King, 1988), the researchers enlisted 88 college undergraduates and surveyed their personal goals and the degree of conflict experienced between them. They used diaries to assess the students’ emotional lives and physical symptoms. Students who reported more conflict and more ambivalence about conflict more often reported feeling anxious and depressed, reported more physical complaints, and made significantly more visits to the college health center over the course of 2 years.

Irrational Beliefs: Ten Doorways to Distress

Psychologist Albert Ellis (1913–2007) noted that our *beliefs* about events, not just the events themselves, can be stressors (David et al., 2010; Ellis, 2005). Consider a case in which a person is fired from a job and is anxious and depressed about it. It may seem logical that losing the job is responsible for the misery, but Ellis points out that an individual’s beliefs about the loss may compound his or her misery.

reported having headaches. More than one in four (27%) had indigestion, and about one in four (24%) felt tense. Two in five lacked interest in things, and about one-third felt depressed (34%) or as though they could cry (32%).

Figure 14.4 ■ shows that the most commonly reported methods of coping with stress were listening to music (49%), exercising or going for walks (44%), and reading (41%). Watching TV or movies was tied (36%) with spending time with friends or family. About one-third (32%) reported napping or praying. One in seven (14%) smoke or drank.

Not all people report that the same events cause them stress, of course. And as we see, they respond to stress in many different ways. The stress of an event reflects the meaning of the event to an individual (Buchanan et al., 2010). Pregnancy, for example, may seem like a blessing to a well-established couple who has been trying to have a child for many years, but it may seem disastrous to a single teenager without resources. We appraise events, and our responses depend on their perceived danger, our values and goals, our beliefs in our coping ability, and our social situations.



Figure 14.4 ■ Stress Management Techniques Used by Americans

Source: American Psychological Association. (2009). *Stress in America 2009: Executive Summary*. (Accessed April 1, 2010). <http://www.apa.org/news/press/releases/stress-exec-summary.pdf>. Page 8. Reprinted by permission.

Question 6: How do irrational beliefs create or compound stress? Let's examine this situation according to Ellis's A → B → C approach: Losing the job is an *activating event* (A). The eventual outcome, or *consequence* (C), is misery. Between the activating event (A) and the consequence (C), however, lie *beliefs* (B), such as these: "This job was the most important thing in my life," "What a no-good failure I am," "My family will starve," "I'll never find a job as good," "There's nothing I can do about it." Beliefs such as these compound misery, foster helplessness, and divert us from planning and deciding what to do next. The belief that "There's nothing I can do about it" fosters helplessness. The belief that "I am a no-good failure" internalizes the blame and may be an exaggeration. The belief that "My family will starve" may also be an exaggeration. We can diagram the situation like this:

Activating events → Beliefs → Consequences

or

A → B → C

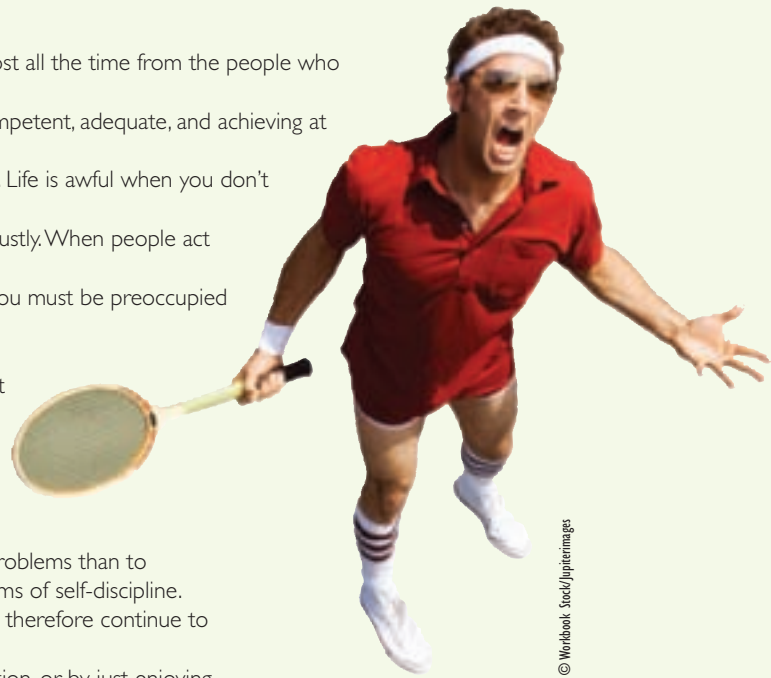
Anxieties about the future and depression over a loss are normal and to be expected. However, the beliefs of the person who lost the job such as those expressed above tend to **catastrophize** the extent of the loss and contribute to anxiety and depression—and thus, raise blood pressure (David et al., 2010; DiGiuseppe, 2009). By heightening the individual's emotional reaction to the loss and fostering feelings of helplessness, these beliefs also impair coping ability.

I told my psychiatrist that everyone hates me. He said I was being ridiculous—everyone hasn't met me yet.

RODNEY DANGERFIELD

Catastrophize To interpret negative events as being disastrous; to "blow out of proportion."

- Irrational Belief 1: You must have sincere love and approval almost all the time from the people who are important to you.
- Irrational Belief 2: You must prove yourself to be thoroughly competent, adequate, and achieving at something important.
- Irrational Belief 3: Things must go the way you want them to go. Life is awful when you don't get your first choice in everything.
- Irrational Belief 4: Other people must treat everyone fairly and justly. When people act unfairly or unethically, they are rotten.
- Irrational Belief 5: When there is danger or fear in your world, you must be preoccupied with and upset by it.
- Irrational Belief 6: People and things should turn out better than they do. It's awful and horrible when you don't find quick solutions to life's hassles.
- Irrational Belief 7: Your emotional misery stems from external pressures that you have little or no ability to control. Unless these external pressures change, you must remain miserable.
- Irrational Belief 8: It is easier to evade life's responsibilities and problems than to face them and undertake more rewarding forms of self-discipline.
- Irrational Belief 9: Your past influenced you immensely and must therefore continue to determine your feelings and behavior today.
- Irrational Belief 10: You can achieve happiness by inertia and inaction, or by just enjoying yourself from day to day.



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Source: From *Self-Assessment and Behavioral Change Manual* by Peggy Blake, Robert Fry, and Michael Pesjack, pp. 43–47. Copyright © 1984 by Peggy Blake. Reprinted by permission of McGraw-Hill Companies.

Figure 14.5 ■ Irrational Beliefs: Cognitive Doorways to Distress

Ellis proposes that many of us carry the irrational beliefs shown in Figure 14.5 ■. These irrational beliefs are our personal doorways to distress. In fact, they can give rise to problems in themselves. When problems assault us from other sources, these beliefs can magnify their effect.

Ellis finds it understandable that we would want the approval of others but irrational to believe that we cannot survive without it. It would be nice to be competent in everything we do, but it's unreasonable to *expect* it. Sure, it would be nice to serve and volley like a tennis pro, but most of us haven't the time or natural ability to perfect the game. Demanding perfection prevents us from going out on the court on weekends and batting the ball back and forth just for fun. Irrational belief 5 is a prescription for perpetual emotional upheaval. Irrational beliefs 7 and 9 lead to feelings of helplessness and demoralization. Sure, Ellis might say, childhood experiences can explain the origins of irrational beliefs, but it is our own cognitive appraisal—here and now—that causes us to be miserable.

Truth or Fiction Revisited: Research findings confirm the connections between irrational beliefs (such as excessive dependence on social approval and perfectionism) and feelings of anxiety and depression (Davies, 2008; DiGiuseppe, 2009; Wiebe & McCabe, 2002).

The Type A Behavior Pattern: Burning Out from Within?

Some people create stress for themselves through the **Type A behavior** pattern. **Question 7: What is Type A behavior?** Type A people are highly driven, competitive, impatient, and aggressive—so much so that they are prone to getting into vehicle accidents (Ben-Zur, 2002; Karlberg et al., 1998; Yamada et al., 2008). They feel rushed and under pressure and keep one eye firmly glued to the clock. They are

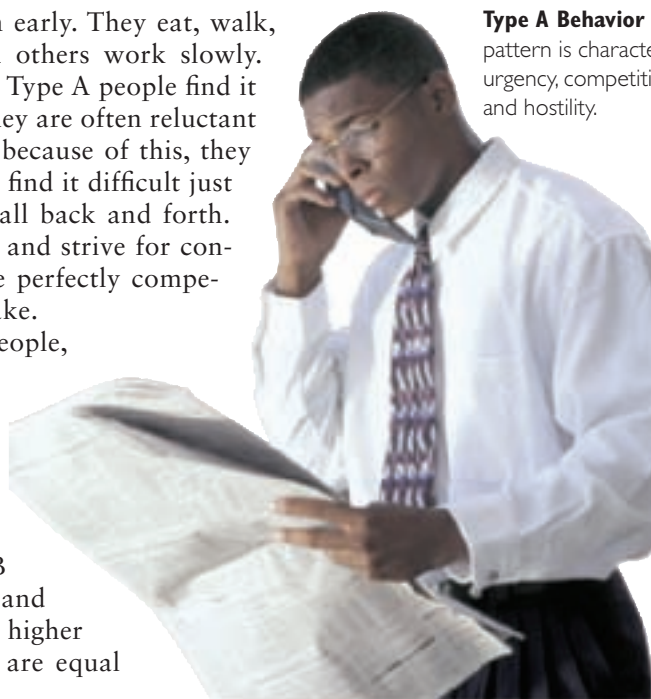
*A man should look for what is,
and not for what he thinks
should be.*

ALBERT EINSTEIN

Type A behavior Behavior characterized by hostility, competitiveness and feelings of time urgency, competition, and hostility.

not only prompt for appointments but often early. They eat, walk, and talk rapidly and become restless when others work slowly. They attempt to dominate group discussions. Type A people find it difficult to give up control or share power. They are often reluctant to delegate authority in the workplace, and because of this, they increase their own workloads. Type A people find it difficult just to go out on the tennis court and bat the ball back and forth. They watch their form, perfect their strokes, and strive for continual self-improvement. They demand to be perfectly competent and achieving in everything they undertake.

Type B people, in contrast to Type A people, relax more readily and focus more on the quality of life. They show lower blood pressure than Type A people in response to stressors, which is a key reason that Type A behavior is also referred to as the *coronary-prone behavior pattern* (Glass et al., 2007; Manuck et al., 2007). Type B people are less ambitious and less impatient, and they pace themselves. Yet Type A people earn higher grades and more money than Type Bs who are equal in intelligence.



Type A Behavior The Type A behavior pattern is characterized by a sense of time urgency, competitiveness, and hostility.

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SELF ASSESSMENT

Are You Type A or Type B?

Complete the questionnaire by placing a check mark under Yes if the behavior pattern described is typical of you and under No

if it is not. Then read the section on Type A behavior and turn to the scoring key in the Appendix.

Yes	No	Do You:	Yes	No	Do You:
___	___	1. Strongly accent key words in your everyday speech?	___	___	13. Find yourself concerned with getting more things rather than developing your creativity and social concerns?
___	___	2. Eat and walk quickly?	___	___	14. Try to schedule more and more activities into less time?
___	___	3. Believe that children should be taught to be competitive?	___	___	15. Always appear for appointments on time?
___	___	4. Feel restless when watching a slow worker?	___	___	16. Clench or pound your fists or use other gestures to emphasize your views?
___	___	5. Hurry other people to get on with what they're trying to say?	___	___	17. Credit your accomplishments to your ability to work rapidly?
___	___	6. Find it highly aggravating to be stuck in traffic or waiting for a seat at a restaurant?	___	___	18. Feel that things must be done now and quickly?
___	___	7. Continue to think about your own problems and business even when listening to someone else?	___	___	19. Constantly try to find more efficient ways to get things done?
___	___	8. Try to eat and shave, or drive and jot down notes at the same time?	___	___	20. Insist on winning at games rather than just having fun?
___	___	9. Catch up on your work while on vacations?	___	___	21. Interrupt others often?
___	___	10. Bring conversations around to topics of concern to you?	___	___	22. Feel irritated when others are late?
___	___	11. Feel guilty when you spend time just relaxing?	___	___	23. Leave the table immediately after eating?
___	___	12. Find that you're so wrapped up in your work that you no longer notice office decorations or the scenery when you commute?	___	___	24. Feel rushed?
			___	___	25. Feel dissatisfied with your current level of performance?

ACTIVE REVIEW (1) Daily _____ are regularly occurring conditions and experiences that threaten or harm our well-being. (2) Life changes, even pleasant ones, are stressful because they require _____. (3) The feeling of being pulled in two or more directions by opposing motives is called _____. (4) Albert _____ notes that our beliefs about events, as well as the events themselves, can be stressors.

REFLECT AND RELATE How many daily hassles do you experience? How many are connected with your role as a student? What can you do about them?

CRITICAL THINKING Life changes are stressful. Should people therefore avoid life changes?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

— ■ —
Man should not try to avoid stress any more than he would shun food, love or exercise.

HANS SELYE
— ■ —

PSYCHOLOGICAL MODERATORS OF STRESS

Psychological factors can influence, or *moderate*, the effects that stressors have on us. In this section, we discuss several psychological moderators of stress: self-efficacy expectations, psychological hardiness, humor, predictability and control, and social support.

Self-Efficacy Expectations: “The Little Engine That Could”

Self-efficacy is the ability to make things happen. Our **self-efficacy expectations**—our beliefs that we can bring about desired changes through our own efforts—affect our ability to withstand stress (Luszczynska et al., 2009; Pietrzak et al., 2010). **Question 8: How do our self-efficacy expectations affect our ability to withstand stress?**

In a classic experiment, Albert Bandura and his colleagues (1985) assessed subjects’ self-efficacy, exposed them to fearful stimuli, and then monitored the levels of adrenaline and noradrenaline in their bloodstreams as they did so. Adrenaline and noradrenaline are secreted when we are under stress. They arouse the body in several ways, such as accelerating the heart rate and releasing glucose from the liver.

As a result, we may have “butterflies in the stomach” and feel nervous. Excessive arousal can distract us from coping with the tasks at hand. Bandura and his colleagues found that high self-efficacy expectations are accompanied by relatively *lower* levels of adrenaline and noradrenaline in the bloodstream when we are faced with fear-inducing objects. People with higher self-efficacy expectations thus have biological as well as psychological reasons for remaining calmer.

Research has also shown that people who have higher self-efficacy expectations are less prone to be disturbed by adverse events (Maddi, 2008). People with higher self-efficacy expectations are also more likely to lose weight or quit smoking and less likely to relapse afterward (Kalavana et al., 2010; Martinez et al., 2010). They are better able to function in spite of pain (Howard et al., 2010). A study of Native Americans found that alcohol abuse was correlated with self-efficacy expectations (M. J. Taylor, 2000). That is, individuals with feelings of powerlessness were more likely to abuse alcohol, perhaps as a way of reducing the stresses in their lives.

Psychological Hardiness: Tough Enough?

Psychological hardiness also helps people resist stress (Maddi et al., 2009; Pietrzak et al., 2010). Our understanding of this phenomenon is derived largely from the pioneering work of Suzanne Kobasa (Maddi, 2008). Kobasa and her colleagues studied business executives who seemed able to resist illness despite stress.



In one phase of the research, executives completed a battery of psychological tests, and the researchers found that the psychologically hardy executives had three key characteristics. **Question 9: What characteristics are connected with psychological hardiness?** These include commitment, challenge, and control (Maddi et al., 2009):

1. *Commitment.* Psychologically hardy executives tended to involve themselves in, rather than feel alienated from, whatever they were doing or encountering.
2. *Challenge.* Psychologically hardy executives believed that change, rather than stability, is normal in life. They appraised change as an interesting incentive to personal growth, not as a threat to security.
3. *Control.* Psychologically hardy executives were high in perceived control over their lives. Hardy individuals feel and act as though they are influential, rather than helpless, in facing the various rewards and punishments of life (Pietrzak et al., 2010). Psychologically hardy people tend to have what psychologist Julian B. Rotter (1990) termed an internal **locus of control** (Weiner, 2010). The nearby Locus of Control Self-Assessment will offer you insight as to whether you see yourself as in control over your own life.

Psychologically hardy people in business and in the military are more resistant to stress because they *choose* to face it (Bartone et al., 2008; Maddi et al., 2009). They also interpret stress as making life more interesting. For example, they see a conference with a supervisor as an opportunity to persuade the supervisor rather than as a risk to their position.

Sense of Humor: “A Merry Heart Doeth Good Like a Medicine”

The idea that humor lightens the burdens of life and helps people cope with stress has been with us for millennia. Consider the biblical maxim “A merry heart doeth good like a medicine” (Proverbs 17:22).

Question 10: Is there any evidence that “A merry heart doeth good like a medicine”? Truth or Fiction Revisited: Research suggests that humor can moderate the effects of stress (Marziali et al., 2008). In early research into humor as a means of coping with stress, students completed a checklist of negative life events and a measure of mood disturbance (Martin & Lefcourt, 1983). The measure of mood disturbance also yielded a stress score. In addition, the students rated their sense of humor. They were asked to try to produce humor in an experimental stressful situation, and their ability to do so was rated by the researchers. Students who had a greater sense of humor and were capable of producing humor in the stressful experimental condition were less affected by the stress than other students. Later experimentation found that exposing students to humorous videotapes raised the level of immunoglobulin A (a measure of the functioning of the immune system) in their saliva (Lefcourt, 1997; K. L. Smith, 2009).

How does humor help people cope with stress? We are uncertain, but there are many possibilities. One is that laughter stimulates the output of endorphins, which might enhance the functioning of the immune system. Another is that the benefits of humor may be explained in terms of the positive cognitive shifts they entail and the positive emotions that accompany them. Humor also appears to be associated with social support and self-efficacy, two other factors that help us cope with stress (Marziali et al., 2008).

Predictability and Control: “If I Can Stop the Roller Coaster, I Don’t Want to Get Off”

The ability to predict a stressor apparently moderates its impact. **Question 11: How do predictability and control help us cope with stress?** Predictability allows us to brace ourselves for the inevitable and, in many cases, plan ways of coping with it.

Humor is the great thing, the saving thing. The minute it crops up, all our irritations and resentments slip away and a sunny spirit takes their place.

MARK TWAIN

Total absence of humor renders life impossible.

COLETTE

Self-efficacy expectations Our beliefs that we can bring about desired changes through our own efforts.

Psychological hardiness A cluster of traits that buffer stress and are characterized by commitment, challenge, and control.

Locus of control The place (locus) to which an individual attributes control over the receiving of reinforcers—either inside or outside the self.

SELF ASSESSMENT

The Locus of Control Scale

Psychologically hardy people tend to have an internal locus of control. They believe that they are in control of their own lives. In contrast, people with an external locus of control tend to see their fate as being out of their hands.

- | Yes | No | |
|-----|-----|---|
| ___ | ___ | 1. Do you believe that most problems will solve themselves if you just don't fool with them? |
| ___ | ___ | 2. Do you believe that you can stop yourself from catching a cold? |
| ___ | ___ | 3. Are some people just born lucky? |
| ___ | ___ | 4. Most of the time, do you feel that getting good grades means a great deal to you? |
| ___ | ___ | 5. Are you often blamed for things that just aren't your fault? |
| ___ | ___ | 6. Do you believe that if somebody studies hard enough he or she can pass any subject? |
| ___ | ___ | 7. Do you feel that most of the time it doesn't pay to try hard because things never turn out right anyway? |
| ___ | ___ | 8. Do you feel that if things start out well in the morning, it's going to be a good day no matter what you do? |
| ___ | ___ | 9. Do you feel that most of the time parents listen to what their children have to say? |
| ___ | ___ | 10. Do you believe that wishing can make good things happen? |
| ___ | ___ | 11. When you get punished, does it usually seem it's for no good reason at all? |
| ___ | ___ | 12. Most of the time, do you find it hard to change a friend's opinion? |
| ___ | ___ | 13. Do you think cheering more than luck helps a team win? |
| ___ | ___ | 14. Did you feel that it was nearly impossible to change your parents' minds about anything? |
| ___ | ___ | 15. Do you believe that parents should allow children to make most of their own decisions? |
| ___ | ___ | 16. Do you feel that when you do something wrong there's very little you can do to make it right? |
| ___ | ___ | 17. Do you believe that most people are just born good at sports? |
| ___ | ___ | 18. Are most other people your age stronger than you are? |
| ___ | ___ | 19. Do you feel that one of the best ways to handle most problems is just not to think about them? |
| ___ | ___ | 20. Do you feel that you have a lot of choice in deciding who your friends are? |
| ___ | ___ | 21. If you find a four-leaf clover, do you believe that it might bring you good luck? |

Are you an "internal" or an "external"? To learn more about your perception of your locus of control, respond to this questionnaire, which was developed by Nowicki and Strickland (1973). Place a check mark in either the Yes or the No column for each question. When you are finished, turn to the answer key in the Appendix.

- | Yes | No | |
|-----|-----|--|
| ___ | ___ | 22. Did you often feel that whether or not you did your homework had much to do with what kind of grades you got? |
| ___ | ___ | 23. Do you feel that when a person your age is angry with you, there's little you can do to stop him or her? |
| ___ | ___ | 24. Have you ever had a good luck charm? |
| ___ | ___ | 25. Do you believe that whether or not people like you depends on how you act? |
| ___ | ___ | 26. Did your parents usually help you if you asked them to? |
| ___ | ___ | 27. Have you ever felt that when people were angry with you, it was usually for no reason at all? |
| ___ | ___ | 28. Most of the time, do you feel that you can change what might happen tomorrow by what you did today? |
| ___ | ___ | 29. Do you believe that when bad things are going to happen they are just going to happen no matter what you try to do to stop them? |
| ___ | ___ | 30. Do you think that people can get their own way if they just keep trying? |
| ___ | ___ | 31. Most of the time do you find it useless to try to get your own way at home? |
| ___ | ___ | 32. Do you feel that when good things happen, they happen because of hard work? |
| ___ | ___ | 33. Do you feel that when somebody your age wants to be your enemy there's little you can do to change matters? |
| ___ | ___ | 34. Do you feel that it's easy to get friends to do what you want them to do? |
| ___ | ___ | 35. Do you usually feel that you have little to say about what you get to eat at home? |
| ___ | ___ | 36. Do you feel that when someone doesn't like you, there's little you can do about it? |
| ___ | ___ | 37. Did you usually feel it was almost useless to try in school, because most other children were just plain smarter than you were? |
| ___ | ___ | 38. Are you the kind of person who believes that planning ahead makes things turn out better? |
| ___ | ___ | 39. Most of the time, do you feel that you have little to say about what your family decides to do? |
| ___ | ___ | 40. Do you think it's better to be smart than to be lucky? |

Control—even the illusion of being in control—allows us to feel that we are not at the mercy of the fates (Folkman & Moskowitz, 2000b; Yartz et al., 2008). There is also a relationship between the desire to assume control over one’s situation and the usefulness of information about impending stressors. Predictability is of greater benefit to **internals**—that is, to people who believe they have control over the events in their lives—than to **externals**. People who want information about medical procedures and what they will experience cope better with pain when they undergo those procedures (Ludwick-Rosenthal & Neufeld, 1993; Thompson, 2009).

Social Support: On Being in It Together

People are social beings, and social support seems to act as a buffer against the effects of stress (Folkman & Moskowitz, 2000a; Pietrzak et al., 2010). The concept of social support has many definitions:

1. *Emotional concern*: listening to people’s problems and expressing feelings of sympathy, caring, understanding, and reassurance.
2. *Instrumental aid*: the material supports and services that facilitate adaptive behavior. For example, after a disaster, the government may arrange for low-interest loans so that survivors can rebuild. Relief organizations may provide food, medicine, and temporary living quarters.
3. *Information*: guidance and advice that enhance people’s ability to cope.
4. *Appraisal*: feedback from others about how one is doing. This kind of support involves helping people interpret, or “make sense of,” what has happened to them.
5. *Socializing*: simple conversation, recreation, even going shopping with another person. Socializing has beneficial effects, even when it is not oriented specifically toward solving problems.

Question 12: Is there evidence that social support helps people cope with stress? Yes, research does support the value of social support. Introverts, people who lack social skills, and people who live by themselves seem more prone to developing infectious diseases such as colds under stress (S. Cohen & Williamson, 1991; Pressman & Cohen, 2005). Social support helps people cope with the stresses of cancer and other health problems (Kahana et al., 2009). Social support helps Mexican Americans and other immigrants to cope with the stresses of acculturation (Hovey, 2000). It helps people cope with the stresses of natural disasters such as hurricanes and earthquakes (Hu et al., 2010; X. Wang et al., 2000). It has been found to help women cope with the aftermath of rape (B. S. Fisher et al., 2008). Stress is also less likely to lead to high blood pressure or alcohol abuse in people who have social support (Dennis et al., 2008; Rodriguez et al., 2008).

How does stress contribute to the development of physical health problems? In the next section, we’ll gain insight into this question by examining the effects of stress on the body.

— ■ —
One of the oldest human needs is having someone to wonder where you are when you don’t come home at night.

MARGARET MEAD

Time spent with cats is never wasted.

SIGMUND FREUD

— ■ —

Internals People who perceive the ability to attain reinforcements as largely within themselves.

Externals People who perceive the ability to attain reinforcements as largely outside themselves.

LearningConnections • PSYCHOLOGICAL MODERATORS OF STRESS

ACTIVE REVIEW (5) People with (higher or lower?) self-efficacy expectations tend to cope better with stress. (6) Psychologically hardy executives are high in _____, challenge, and control. (7) Being able to predict and control the onset of a stressor (increases or decreases?) its impact on us.

REFLECT AND RELATE Are you committed to your undertakings—including college? Do you seek or avoid

challenges? What do your answers suggest about your psychological hardiness?

CRITICAL THINKING Social support helps most people cope with stress. What does this research finding suggest about human nature?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

STRESS AND THE BODY: THE WAR WITHIN

Stress is more than a psychological event. It is more than “knowing” it is there; it is more than “feeling” pushed and pulled. Stress also has very definite effects on the body, which, as we will see, can lead to psychological and physical health problems. Stress researcher Hans Selye outlined a number of the bodily effects in his concept of the *general adaptation syndrome (GAS)*.

The General Adaptation Syndrome

Selye suggested that under stress the body is like a clock with an alarm that does not shut off until the clock shakes apart or its energy has been depleted. The body’s response to different stressors shows certain similarities whether the stressor is a bacterial invasion, perceived danger, or a major life change (Selye, 1976). For this reason, Selye labeled this response the **general adaptation syndrome (GAS)**. **Question 13: What is the general adaptation syndrome?** The GAS is a group of bodily changes triggered by stressors. These bodily changes occur in three stages: an alarm reaction, a resistance stage, and an exhaustion stage. These changes mobilize the body for action and—like the alarm that goes on ringing—can eventually wear out the body.

THE ALARM REACTION

The **alarm reaction** is triggered by perception of a stressor. This reaction mobilizes or arouses the body, biologically speaking. Early in the 20th century, physiologist Walter B. Cannon (1932) argued that this mobilization was the basis for an instinctive **fight-or-flight reaction**. But contemporary psychologists such as Thomas Scheff (2007) question whether the fight-or-flight reaction is instinctive in humans. Scheff (2007) writes, “It is generally recognized that outer behavior is not determined by instinctual drives. In this respect, humans differ from other mammals, whose behavior is largely instinctual” (p. 104). In any event, the alarm reaction involves bodily changes that are initiated by the brain and regulated by the endocrine system and the sympathetic division of the autonomic nervous system (ANS). Let’s consider the roles of these systems.

Stress has a domino effect on the endocrine system—the system of ductless glands that secretes hormones (Lupien et al., 2009; see Figure 14.6 ■). The hypothalamus secretes corticotrophin-releasing hormone (CRH). CRH causes the pituitary gland to secrete adrenocorticotrophic hormone (ACTH). ACTH then causes the adrenal cortex to secrete the hormone cortisol and other corticosteroids (steroidal hormones produced by the adrenal cortex). Corticosteroids help protect the body by combating allergic reactions (such as difficulty breathing) and producing inflammation. (However, corticosteroids can be harmful to the cardiovascular system, which is one reason that chronic stress can impair one’s health and why athletes who use steroids to build muscle mass can experience cardiovascular problems.) Inflammation increases circulation to parts of the body that are injured. It ferries in hordes of white blood cells to fend off invading pathogens.

Two other hormones that play a major role in the alarm reaction are secreted by the adrenal medulla. The sympathetic division of the ANS activates the adrenal medulla, causing it to release a mixture of adrenaline and noradrenaline (also known as epinephrine and norepinephrine). This mixture arouses the body by accelerating the heart rate and causing the liver to release glucose (sugar). This provides the energy that fuels the fight-or-flight reaction, which activates the body so that it is prepared to fight or flee from a predator.

General adaptation syndrome

(GAS) Selye’s term for a hypothesized three-stage response to stress.

Alarm reaction The first stage of the GAS, which is triggered by the impact of a stressor and characterized by sympathetic activity.

Fight-or-flight reaction A possibly innate adaptive response to the perception of danger.

Are Their Alarm Systems Going Off as They Take Out a Loan? The alarm reaction of the general adaptation syndrome can be triggered by daily hassles and life changes—such as taking out a large loan—as well as by physical threats. When the stressor persists, diseases of adaptation may develop.



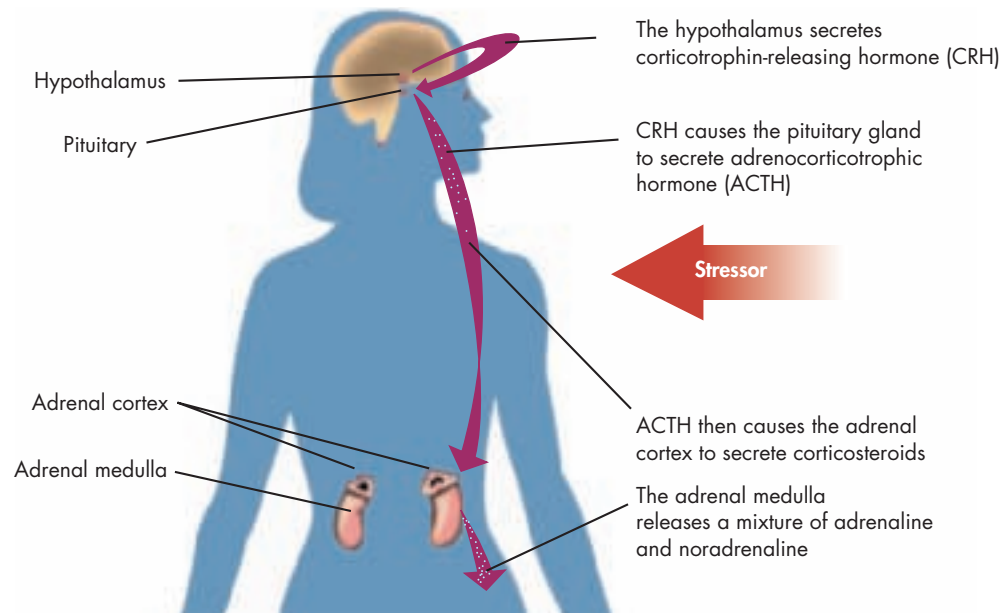


Figure 14.6 ■ Stress and the Endocrine System Stress has a domino effect on the endocrine system, leading to the release of corticosteroids and a mixture of adrenaline and noradrenaline. Corticosteroids combat allergic reactions (such as difficulty in breathing) and cause inflammation. Adrenaline and noradrenaline arouse the body to cope by accelerating the heart rate and providing energy for the fight-or-flight reaction.

Source: From RATHUS. HDEV, 1/e. Copyright © 2010 Cengage Learning.

The fight-or-flight reaction stems from a period in human prehistory when many stressors were life-threatening. It was triggered by the sight of a predator at the edge of a thicket or by a sudden rustling in the undergrowth. Today, it may be aroused when you are caught in stop-and-go traffic or learn that your mortgage payments are going to increase. Once the threat is removed, the body returns to a lower state of arousal. Many of the bodily changes that occur in the alarm reaction are outlined in Figure 14.7 ■.

We noted that many contemporary theorists do not believe that the fight-or-flight reaction is universal. In the nearby Controversy in Psychology, Shelley Taylor and her colleagues report evidence that many women experience a “tend-and-befriend” response to threats rather than a fight-or-flight response. Margaret Kemeny (2009) also observes that some people attempt to respond productively to stress by pulling back from the situation to better appraise it and conserve their resources while doing so. This response pattern to stress is described by two theories that are currently under development: *cognitive adaptation theory* and *conservation of resources theory*.

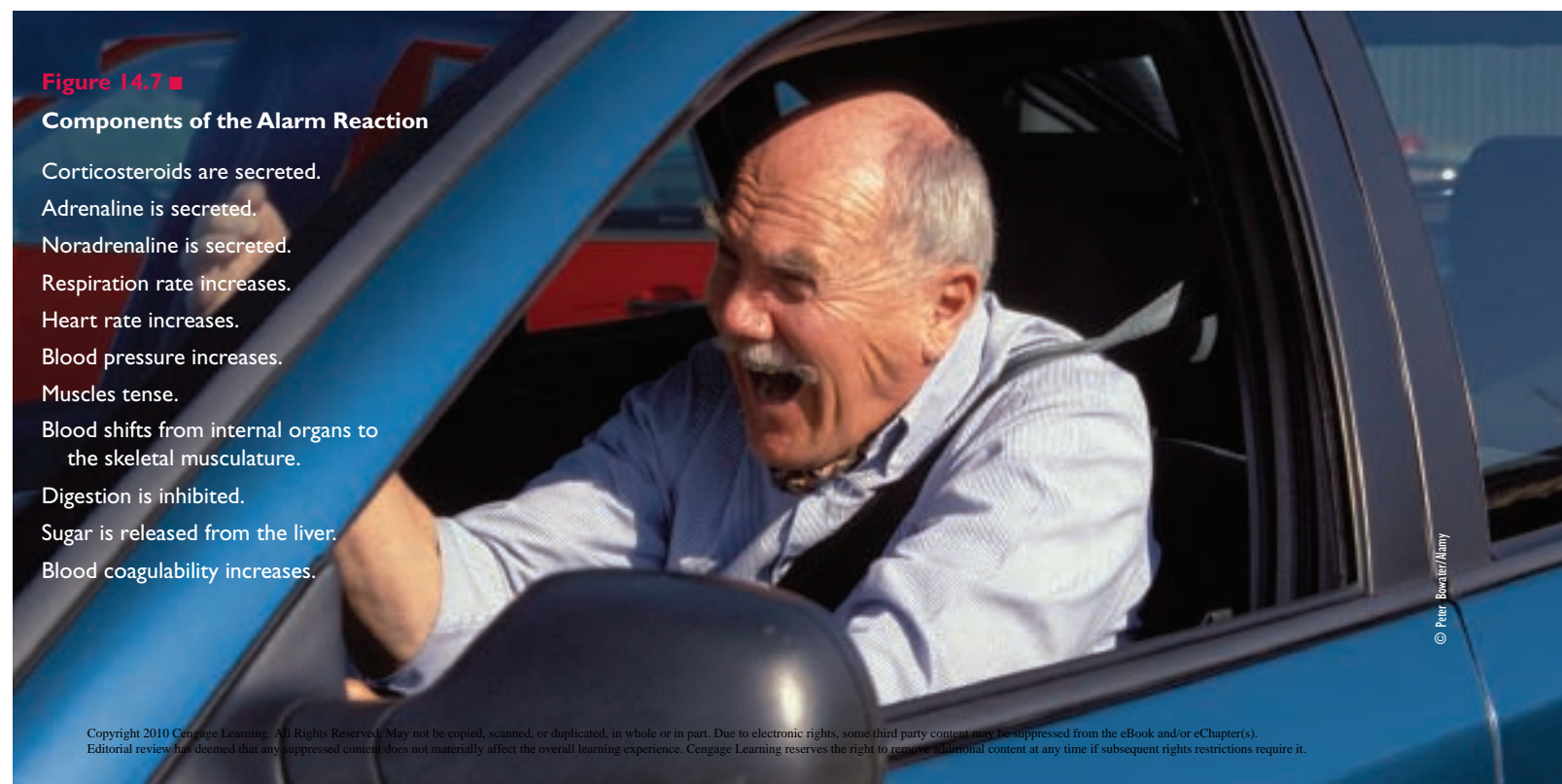


Figure 14.7 ■

Components of the Alarm Reaction

- Corticosteroids are secreted.
- Adrenaline is secreted.
- Noradrenaline is secreted.
- Respiration rate increases.
- Heart rate increases.
- Blood pressure increases.
- Muscles tense.
- Blood shifts from internal organs to the skeletal musculature.
- Digestion is inhibited.
- Sugar is released from the liver.
- Blood coagulability increases.

CONTROVERSY IN PSYCHOLOGY “FIGHT OR FLIGHT” OR “TEND AND BEFRIEND”? DO MEN AND WOMEN RESPOND DIFFERENTLY TO STRESS?

Nearly a century ago, Harvard University physiologist Walter Cannon labeled the body's response to stress the “fight-or-flight” reaction. He believed that the body was prewired to become mobilized or aroused in preparation for combat when faced with a predator or a competitor, or if the predator was threatening enough, that “discretion”—that is, a “strategic retreat”—would sometimes be the “better part of valor.” Although the biology of his day did not allow Cannon to be as precise as we can be, we now know that the fight-or-flight reaction includes bodily changes that involve the brain (perceptions, neurotransmitters), the endocrine system (hormones), and the sympathetic division of the autonomic nervous system (rapid heartbeat, rapid breathing, muscle tension). The sum of these bodily changes pumps us up to fight like demons or, when advisable, to beat a hasty retreat.

Or does it?

According to reviews of the literature by UCLA psychologist Shelley E. Taylor and her colleagues (Taylor, 2006; Taylor et al., 2000b), women under stress are more likely to tend to the kids or “interface” with family and friends than to fight or flee. Taylor explains that the study was prompted by an offhand remark of a student who had noticed that nearly all of the rats in studies of the effects of stress on animals were male. Taylor did an overview of the research on stress with humans and noted that prior to 1995, when federal agencies began requiring more equal representation of women if they were to fund research, only 17% of the subjects were female. Quite a gender gap—and one that had allowed researchers to ignore the question of whether females responded to stress in the same way as males.

Taylor and her colleagues then dug more deeply into the literature and found that “Men and women do have some reliably different responses to stress” (S. E. Taylor, 2000). The “woman’s response” to stress can be called the “tend-and-befriend” response. It involves nurturing and seeking the support of others rather than fighting or fleeing. The studies that were reviewed showed that

when females faced a predator, a disaster, or even an especially bad day at the office, they often responded by caring for their children and seeking contact and support from others, particularly other women. After a bad day at the office, men are more likely to withdraw from the family or start arguments.

This response may be prewired in female humans and in females of other mammalian species. Evolutionary psychologists might suggest that the tend-and-befriend response may have become sealed in our genes because it promotes the survival of females who are tending to their offspring. (Females who choose to fight may often die or at least be separated from their offspring—no evolutionary brass ring here.)

Gender differences in behavior are frequently connected with gender differences in hormones and other biological factors. This one is no different. Taylor (2006) points to the effects of the pituitary hormone oxytocin. Oxytocin is connected with nurturing behaviors such as affiliating with and cuddling one’s young in many mammals (S. E. Taylor, 2006). The literature also shows that when oxytocin is released during stress, it tends to have a calming effect on both rats and humans. It makes them less afraid and more social.

But wait a minute! Men also release oxytocin when they are under stress. So why the gender difference? The answer may lie in the presence of other hormones—the sex hormones estrogen and testosterone. Female have more estrogen than males do, and estrogen appears to enhance the effects of oxytocin. Males, on the other hand, have more testosterone than females, and testosterone may mitigate the effects of oxytocin by prompting feelings of self-confidence (which may be exaggerated) and fostering aggression (S. E. Taylor, 2006).

It is thus possible that males are more aggressive than females under stress because of the genetic balance of hormones in their bodies, whereas females are more affiliative and nurturant. Due to these differences, women tend to outlive men. “Men are more

likely than women to respond to stressful experiences by developing certain stress-related disorders, including high blood pressure, aggressive behavior, or abuse of alcohol or hard drugs,” Taylor added in a UCLA press release in May 2000. “Because the tend-and-befriend regulatory system may, in some ways, protect women against stress, this biobehavioral pattern may provide insights into why women live an average of seven and a half years longer than men.”

Not all psychologists agree with a biological explanation. Psychologist Alice H. Eagly (2000, 2009) allows that gender differences in response to stress may be rooted in hormones but suggests that they may also reflect learning and cultural conditioning. “I think we have a certain amount of evidence that women are in some sense more affiliative, but what that’s due to becomes the question. Is it biologically hard-wired? Or is it because women have more family responsibility and preparation for that in their development? That is the big question for psychologists” (Eagly, 2000).

A very big question, indeed.



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“Fight-or-Flight” or “Tend-and-Befriend”? Walter Cannon labeled the body's response to stress the “fight-or-flight” reaction. He thought that evolution “prewired” the body to become mobilized in preparation for combat or rapid retreat when faced with a threat. It has been assumed that this reaction applies to both men and women, but research by Shelley Taylor and her colleagues suggests that women may be prewired to take care of others (“tend”) or affiliate with others (“befriend”) when they encounter threats.

THE RESISTANCE STAGE

According to Selye’s theory, if the alarm reaction mobilizes the body and the stressor is not removed, we enter the adaptation or **resistance stage** of the GAS. Levels of endocrine and sympathetic activity are lower than in the alarm reaction but still higher than normal. (It’s as if the alarm is still on but a bit softer.) But make no mistake: The individual feels tense, and there continues to be a heavy burden on the body.

Resistance stage The second stage of the GAS, characterized by prolonged sympathetic activity in an effort to restore lost energy and repair damage; also called the *adaptation stage*.

THE EXHAUSTION STAGE

If the stressor is still not dealt with adequately, we may enter the **exhaustion stage** of the GAS. Individual capacities for resisting stress vary, but anyone will eventually become exhausted when stress continues indefinitely. The muscles become fatigued. The body is depleted of the resources required for combating stress. With exhaustion, the parasympathetic division of the ANS may predominate. As a result, our heartbeat and respiration rate slow down, and many aspects of sympathetic activity are reversed. It might sound as if we would profit from the respite, but remember that we are still under stress—possibly an external threat. Continued stress in the exhaustion stage may lead to what Selye terms “diseases of adaptation.” These are connected with constriction of blood vessels and alteration of the heart rhythm and can range from allergies to hives and coronary heart disease—and ultimately, death.

Discussion of the effects of stress on the immune system paves the way for understanding the links between psychological factors and physical illness.

Effects of Stress on the Immune System

Psychologists, biologists, and medical researchers have combined their efforts in a field of study that addresses the relationships among psychological factors, the nervous system, the endocrine system, the immune system, and disease. This field is called **psychoneuroimmunology**. One of its major concerns is the effect of stress on the immune system (Kemeny, 2009). Research shows that stress suppresses the immune system, as measured by the presence of various substances in the blood that make up the immune system (Calcagni & Elenkov, 2006).

Question 14: How does the immune system work?

The **immune system** has several functions that combat disease (Iwasaki & Medzhitov, 2010). One of these is the production of white blood cells, which engulf and kill pathogens such as bacteria, fungi, viruses, worn-out body cells, and cancerous cells. The technical term for white blood cells is **leukocytes**. **Truth or Fiction Revisited:** Leukocytes carry on microscopic warfare. They engage in search-and-destroy missions in which they “recognize” and eradicate foreign agents and unhealthy cells.

Leukocytes recognize foreign substances by their shapes. The foreign substances are termed **antigens** because the body reacts to them by generating specialized proteins, or **antibodies**. Antibodies attach themselves to the foreign substances, deactivating them and marking them for destruction. The immune system “remembers” how to battle antigens by maintaining their antibodies in the bloodstream, often for years.¹

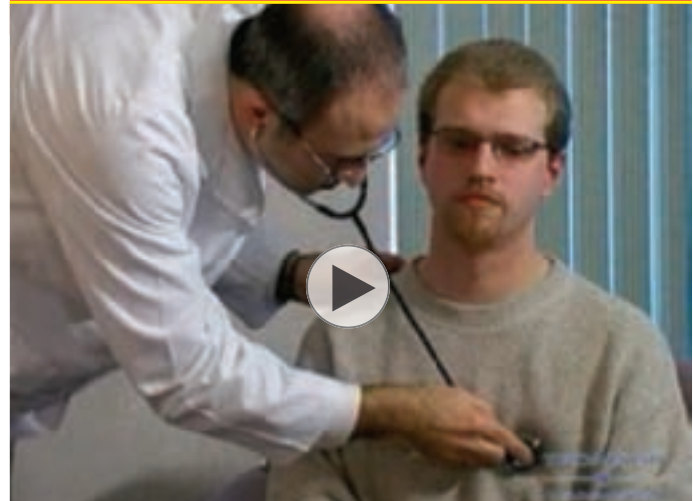
Inflammation is another function of the immune system. When injury occurs, blood vessels in the area first contract (to stem bleeding) and then dilate. Dilation increases the flow of blood, cells, and natural chemicals to the damaged area, causing the redness, swelling, and warmth that characterize inflammation. The increased blood supply also floods the region with white blood cells to combat invading microscopic life forms such as bacteria, which otherwise might use the local damage as a port of entry into the body.

Question 15: How does stress affect the functioning of the immune system?

One of the reasons stress eventually exhausts us is that it stimulates the production of corticosteroids. Steroids suppress the functioning of the immune system. Suppression has negligible effects when steroids are secreted occasionally. But persistent secretion of steroids decreases inflammation and interferes with the formation of antibodies. As a consequence, we become more vulnerable to various illnesses, including the common cold (Aich et al., 2009). By weakening the immune system, stress may also be connected with a more rapid progression of HIV infection to AIDS (Scott-Sheldon et al., 2008).

¹ A vaccination introduces a weakened form of an antigen (usually a bacterium or virus) into the body to stimulate the production of antibodies. Antibodies can confer immunity for many years, in some cases for a lifetime.

Video Connections—Health and Stress



Stress is a huge problem in our society and has far-reaching effects on our health. Watch the video to learn more about stress and health and how investigators study the link between them.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

Exhaustion stage The third stage of the GAS, characterized by weakened resistance and possible deterioration.

Psychoneuroimmunology (sigh-coe-new-row-im-you-NOLL-oh-gee). The field that studies the relationships between psychological factors (e.g., attitudes and overt behavior patterns) and the functioning of the immune system.

Immune system The system of the body that recognizes and destroys foreign agents (antigens) that invade the body.

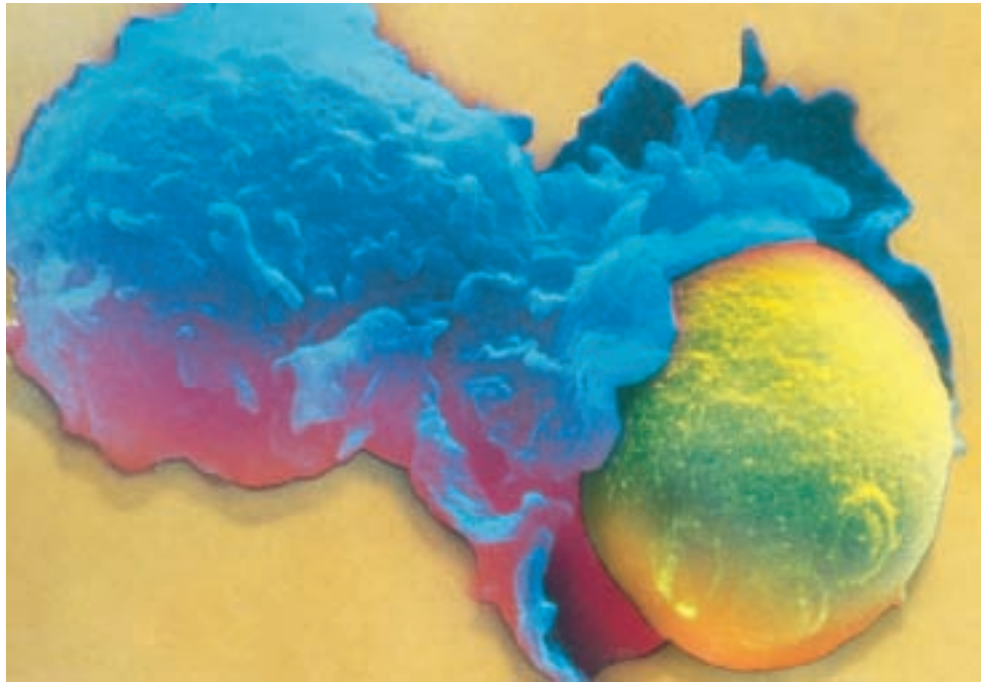
Leukocytes White blood cells. (Derived from the Greek words *leukos*, meaning “white,” and *kytos*, literally meaning “a hollow” but used to refer to cells.)

Antigen A substance that stimulates the body to mount an immune system response to it. (The contraction for *antibody generator*.)

Antibodies Substances formed by white blood cells that recognize and destroy antigens.

Inflammation Increased blood flow to an injured area of the body, resulting in redness, warmth, and an increased supply of white blood cells.

Microscopic Warfare The immune system helps us to combat disease. It produces white blood cells (leukocytes), such as that shown here, which routinely engulf and kill pathogens like bacteria and viruses.



© Biology Media/Photo Researchers, Inc.

Studies with college students have shown that the stress of exams depresses the immune system's response to the Epstein-Barr virus, which causes fatigue and other problems (Glaser et al., 1993). Students who were lonely showed greater suppression of the immune system than students who had more social support. The Epstein-Barr virus remains dormant in 90% of people who recover from an episode. Stress elevates blood levels of cortisol and adrenaline (epinephrine) and heightens the probability that the virus will be reactivated (Coskun et al., 2010).

LearningConnections • STRESS AND THE BODY: THE WAR WITHIN

ACTIVE REVIEW (8) The general adaptation syndrome has three stages: _____, resistance, and exhaustion. (9) Cannon dubbed the alarm reaction the _____ reaction. (10) Under stress, pituitary ACTH causes the adrenal cortex to release _____ that help the body respond to stress by fighting inflammation and allergic reactions. (11) Women may show a tend-and-_____ response to stress rather than fight-or-flight. (12) Two hormones that play a role in the alarm reaction are secreted by the adrenal medulla: _____ and noradrenaline. (13) The immune system produces (red or white?) blood cells, called leukocytes, that routinely engulf and kill pathogens.

REFLECT AND RELATE What do you experience in your body when you are under stress? How do those sensations fit the description of the general adaptation syndrome?

CRITICAL THINKING Prolonged stress is connected with health problems. Must you avoid stress to remain healthy, or can you do something to become psychologically hardy?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

PSYCHOLOGY AND HEALTH

The only way to keep your health is to eat what you don't want, drink what you don't like, and do what you'd rather not.

MARK TWAIN

Why do people become ill? Why do some people develop cancer? Why do others have heart attacks? Why do still others seem to be immune to these illnesses? Why do some of us seem to come down with everything that is going around, while others ride out the roughest winters with nary a sniffle? **Question 16: What is the multifactorial approach to health?** The multifactorial approach recognizes that biological, psychological, and sociocultural factors are involved in health—and illness. The likelihood of contracting an illness—be it a case of the flu or cancer—can reflect the interaction of many factors, including genetic (biological) factors.

Factors such as pathogens, injuries, age, gender, and a family history of disease may strike us as the most obvious causes of illness. Genetics, in particular, tempts some people to assume there is little they can do about their health. It is true that there are some severe health problems that are unavoidable for people with certain genes. “There is this kind of fatalistic approach to genes that the general public seems to have now—that if your mom, dad, sister or brother had something that you’re doomed to have it too,” writes Dr. Robert N. Hoover (2000) of the National Cancer Institute. However, in many cases, especially with cardiovascular problems and cancer, genes only create *predispositions* toward the health problem.

Genetic predispositions interact with the environment to express themselves (Benke & Fallin, 2010; Hunter, 2005). A problematic family medical history is not always a portent of doom. For example, genetic factors are involved in breast cancer. However, rates of breast cancer among women who have recently immigrated to the United States from rural Asia are similar to those in their countries of origin and nearly 80% lower than the rates among third-generation Asian American women, whose rates are similar to those of European American women (Hoover, 2000; Wu et al., 2009). Lifestyle is also intimately connected with the risk of breast cancer—and most other kinds of cancer.

As shown in the nearby Concept Review, biological factors (such as genetics and obesity), psychological factors (such as behaviors and personality), sociocultural factors (such as **socioeconomic status**), environmental factors, and stressors all play roles in health problems such as heart disease and cancer.

Many health problems are affected by psychological factors, such as attitudes and emotions (Frasure-Smith & Lespérance, 2008; Kiecolt-Glaser et al., 2002b). Psychological states such as anxiety and depression can impair the functioning of the immune system, rendering us more vulnerable to physical disorders ranging from viral infections

Socioeconomic status (SES) One’s social and financial level, as indicated by measures such as income, level of education, and occupational status.

CONCEPT REVIEW FACTORS IN HEART DISEASE AND CANCER

HEART DISEASE

Biological:

Family history
Physiological conditions:
Obesity
High serum cholesterol
Hypertension

Psychological (personality and behavior):

Type A behavior
Hostility and holding in feelings of anger
Job strain
Chronic fatigue, stress, anxiety, depression, and emotional strain
Patterns of consumption:
Heavy drinking (but a drink a day may be helpful with heart disease)
Smoking
Overeating
Sudden stressors
Physical inactivity

Sociocultural:

African Americans are more prone to hypertension and heart disease than European Americans
Access to health care
Timing of diagnosis and treatment



CANCER

Biological:

Family history
Physiological conditions:
Obesity

Psychological (personality and behavior):

Patterns of consumption:
Smoking
Drinking alcohol (especially in women)
Eating animal fats?
Sunbathing (skin cancer)
Prolonged depression
Stress? Especially prolonged stress

Sociocultural:

Socioeconomic status
Access to health care
Timing of diagnosis and treatment
Higher death rates are found in nations with higher rates of fat intake



Figure 14.8 ■ Annual Preventable Deaths in the United States

- Elimination of tobacco use could prevent 400,000 deaths each year from cancer, heart and lung diseases, and stroke.
- Improved diet and exercise could prevent 300,000 deaths from conditions like heart disease, stroke, diabetes, and cancer.
- Control of underage and excess drinking of alcohol could prevent 100,000 deaths from motor vehicle accidents, falls, drownings, and other alcohol-related injuries.
- Immunizations for infectious diseases could prevent up to 100,000 deaths.
- Safer sex or sexual abstinence could prevent 20,000 deaths from sexually transmitted infections (STIs).

to cancer (Weinstein et al., 2010). Behavior is another psychological factor that affects physical health. Figure 14.8 ■ reveals that nearly 1 million deaths each year in the United States are preventable. Modifying our behavior—stopping smoking, eating right, exercising, and controlling alcohol use— would prevent nearly 80% of these preventable deaths.

Let’s now discuss some health problems, including headaches, heart disease, and cancer. Each of them involves biological, psychological, and sociocultural factors. Although these are medical problems, we also explore the ways psychologists have contributed to their prevention and treatment.

Headaches: When Stress Presses and Pounds

Headaches are among the most common stress-related physical ailments. Nearly 20% of people in the United States suffer severe headaches. **Question 17: How has psychology contributed to the understanding and treatment of headaches?** To answer this question, let’s consider the common muscle-tension headache and the more severe migraine headache.

MUSCLE-TENSION HEADACHE

The single most frequent kind of headache is the muscle-tension headache. During the first two stages of the GAS, we are likely to contract muscles in the shoulders, neck, forehead, and scalp. Persistent stress can lead to constant contraction of these muscles, causing muscle-tension headaches. **Truth or Fiction Revisited:** Psychological factors, such as the tendency to catastrophize negative events—that is, to blow them out of proportion—can bring on a tension headache (Cathcart, 2009). Tension headaches usually come on gradually. They are most often characterized by dull, steady pain on both sides of the head and feelings of tightness or pressure.

MIGRAINE HEADACHE

A **migraine headache** usually has a sudden onset and is identified by severe throbbing pain on one side of the head. Migraines affect one American in ten. They may last for hours or days. Sensory and motor disturbances often precede the pain; a warning “aura” may include vision problems and the perception of unusual odors. The migraines themselves are often accompanied by sensitivity to light, loss of appetite, nausea, vomiting, sensory and motor disturbances such as loss of balance, and changes in mood. Imaging techniques suggest that when something triggers a migraine, neurons at the back of the brain fire in waves that ripple across the top of the head and then down to the brain stem, the site of many pain centers.

Triggers for migraines include barometric pressure; pollen; certain drugs; monosodium glutamate (MSG), a chemical often used to enhance flavor; chocolate; aged cheese; beer, champagne, and red wine; and the hormonal changes connected with menstruation (Hauge et al., 2010; Levy et al., 2009).

The behaviors connected with migraine headaches serve as a mini-textbook in health psychology. For example, the Type A behavior pattern apparently contributes to migraines. In one study, 53% of people who had migraine headaches showed the Type A behavior pattern compared with 23% of people who had muscle-tension headaches (Rappaport et al., 1988). A study of 232 migraine sufferers found that those who catastrophized their symptoms were more likely to have impaired daily functioning and a lower quality of life (Holroyd et al., 2007).

Regardless of the source of the headache, we can unwittingly propel ourselves into a vicious cycle. Headache pain is a stressor that can lead us to increase, rather than relax, muscle tension in the neck, shoulders, scalp, and face.

Coronary Heart Disease: Taking Stress to Heart

Coronary heart disease (CHD) is the leading cause of death in the United States, most often from heart attacks (Arias et al., 2010). **Question 18: What are the major risk factors for coronary heart disease?**

RISK FACTORS

Let's begin by considering the risk factors for CHD (Glynn, 2010).

BIOLOGICAL RISK FACTORS There are a number of biological risk factors for CHD, including:

- *Family history:* People with a family history of CHD are more likely to develop the disease themselves.
- *Physiological conditions:* Obesity, high **serum cholesterol** levels, and **hypertension** (high blood pressure) are risk factors for CHD. About one American in five has hypertension, which can lead to CHD. When high blood pressure has no identifiable cause, it is referred to as *essential hypertension*. This condition has a genetic component. However, blood pressure is also connected with emotions like depression and anxiety. In addition, it rises when we inhibit the expression of strong feelings or are angry or on guard against threats. When we are under stress, we may believe that we can feel our blood pressure “pounding through the roof,” but most people cannot sense hypertension. Therefore, it is important to check blood pressure regularly.
- *A physically inactive lifestyle.*
- *Patterns of consumption:* Patterns include heavy drinking, smoking, and overeating. On the other hand, a little alcohol seems to be good for the heart.

PSYCHOLOGICAL RISK FACTORS The following are some psychological risk factors for CHD:

- *Type A behavior:* Most studies suggest that there is at least a modest relationship between Type A behavior and CHD. Hostility seems to be the component of the Type A behavior pattern that is most harmful to physical health (Chida & Steptoe,

Organisms keep a vast stock of antibodies around because any gap in coverage would quickly be targeted by an opportunistic germ.

STEVEN PINKER

Migraine headaches Throbbing headaches that are connected with changes in the supply of blood to the head.

Serum cholesterol Cholesterol in the blood.

Hypertension High blood pressure.

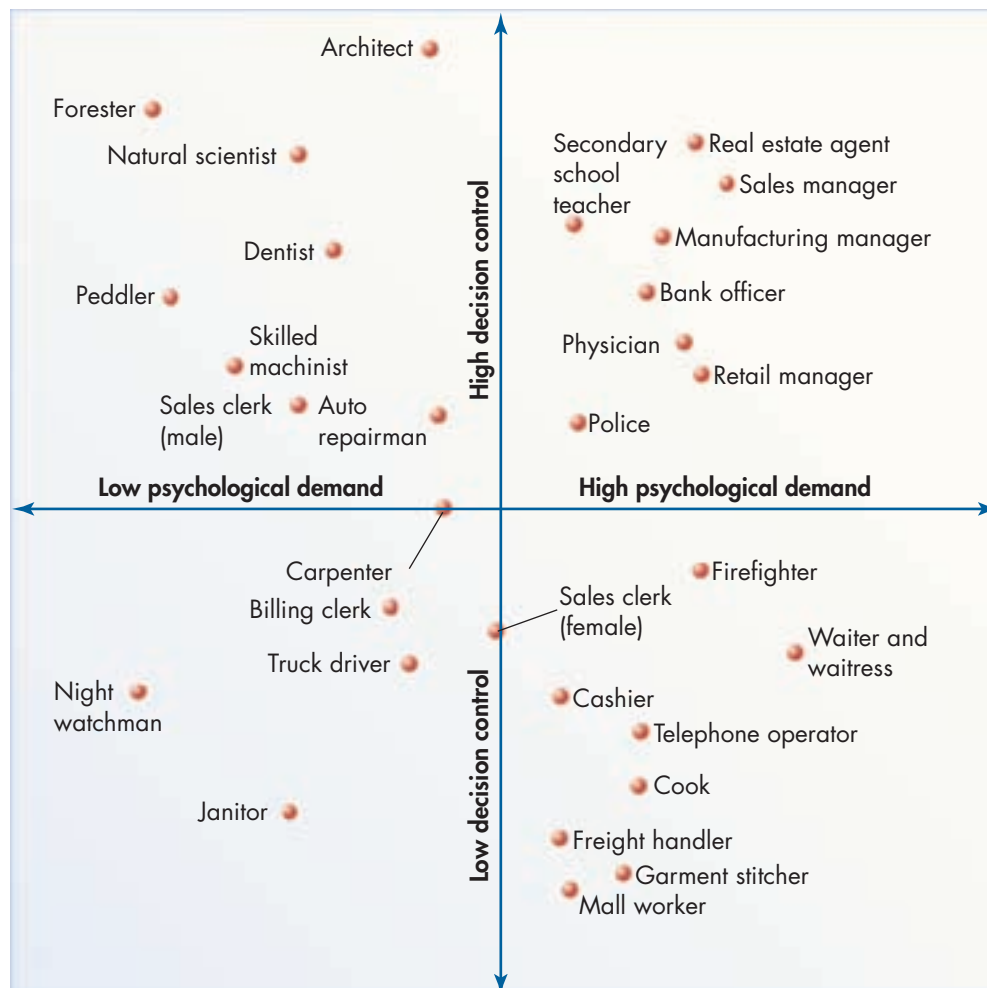


Figure 14.9 ■ The Job-Strain Model

This model highlights the psychological demands made by various occupations and the amount of personal (decision) control they allow. Occupations characterized by high demand and low decision control place workers at greatest risk for heart disease.

2009). One study that controlled for the influences of other risk factors—like high blood pressure and cholesterol levels, smoking, and obesity—found that people who are highly prone to anger are about three times as likely as other people to have heart attacks (J. E. Williams et al., 2000). The stress hormones connected with anger can constrict blood vessels to the heart, which can lead to the attack.

- *Job strain:* Overtime work, assembly line labor, and exposure to conflicting demands can all contribute to CHD. High-strain work, which makes heavy demands on workers but gives them little personal control, puts workers at the highest risk (Aboa-Éboulé et al., 2007; Krantz et al., 1988). As shown in Figure 14.9 ■, the work of waiters and waitresses may best fit this description.
- *Chronic fatigue, stress, anxiety, depression, and emotional strain.* Depression is connected with irregularities in the heart rate and may make blood platelets “sticky,” which may, in turn, cause clots that lead to CHD (Kramer, 2003).
- *Sudden stressors, such as natural disasters.*

SOCIOCULTURAL RISK FACTORS African Americans are more likely than European Americans to have heart attacks and to die from them (Harper et al., 2007; National Center for Health Statistics, 2010). Figure 14.10 ■ compares the death rates from heart disease of American men and women of various ethnic backgrounds. Asian Americans, Native Americans, and Latina and Latino Americans are less likely than European or African Americans to die from heart disease. Early diagnosis and treatment might help decrease the racial gap. However, African Americans with heart disease are less likely than European Americans to obtain complex procedures such as

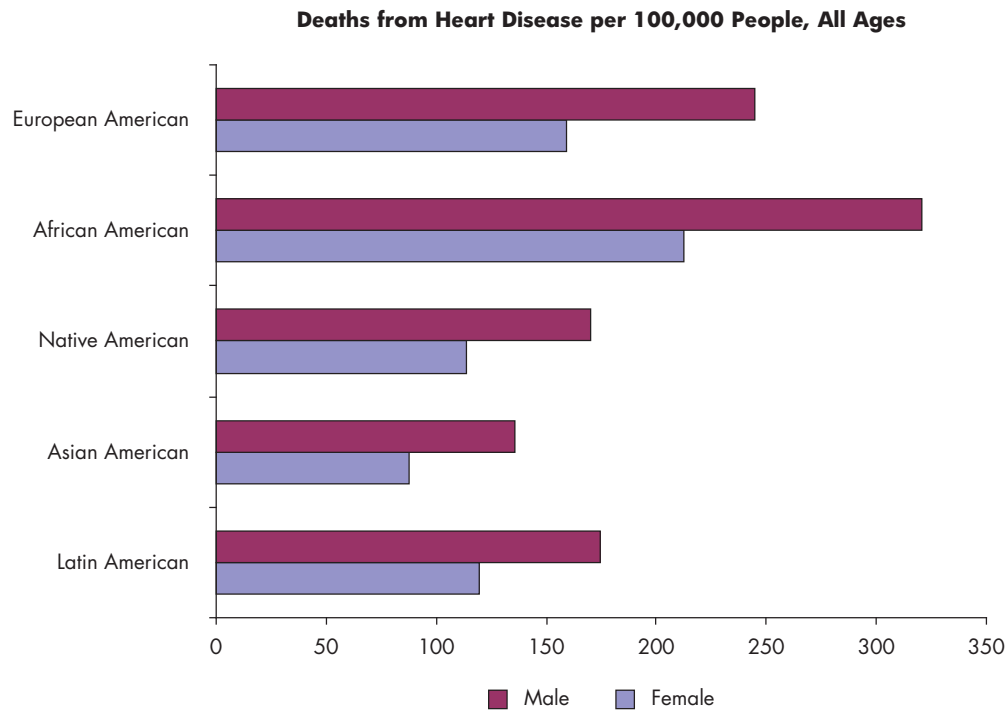


Figure 14.10 ■ Deaths from Heart Disease per 100,000 People, All Ages

Source: National Center for Health Statistics. Health, United States, 2009: With Special Feature on Medical Technology. Hyattsville, MD. 2010. Table 32. (Accessed October 8, 2010.) [http://www.cdc.gov/nchs/data/09.pdf#032](http://www.cdc.gov/nchs/data/hus/09.pdf#032)

bypass surgery and to follow simple measures such as taking a daily aspirin, even when they would benefit equally from them (Mehta et al., 2010).

According to the British Heart Foundation (Reaney, 2000), it turns out that there are also significant differences among Europeans. French, Spanish, and Portuguese people enjoy the lowest death rates from coronary heart disease and also eat diets that are relatively low in fat and high in fruits and vegetables. People in Ireland, Finland, and Britain suffer the most deaths from CHD and also eat high-fat diets and relatively fewer fruits and vegetables.

Cancer: Swerving Off Course

Cancer is characterized by the development of abnormal, or mutant, cells that may take root anywhere in the body: in the blood, bones, digestive tract, lungs, and sex organs. If their spread is not controlled early, the cancerous cells may *metastasize*—that is, establish colonies elsewhere in the body. The good news is that the incidence of cancer has been declining in recent years in the United States due largely to decreases in breast and colorectal cancer in women and in lung, prostate, and colorectal cancer in men (Jemal et al., 2009). The not-so-good news is that cancer remains the second leading cause of death in the United States behind heart disease (Jemal et al., 2009).

It appears that our bodies develop cancerous cells frequently. However, these are normally destroyed by the immune system. People whose immune system is damaged by physical or psychological factors may be more likely to develop tumors or have them progress to more deadly stages (Antoni & Lutgendorf, 2007; Mantovani & Sica, 2010).

Question 19: What are the major risk factors for cancer?

RISK FACTORS

As with CHD, the risk factors for cancer are biological, psychological, and sociocultural.

BIOLOGICAL RISK FACTORS As with many other disorders, people can inherit a disposition toward cancer (Santarius et al., 2010). So-called carcinogenic genes remove the brakes from cell division, allowing cells to multiply wildly. Or they may allow mutations to accumulate unchecked. Behavior patterns that heighten the risk for cancer include smoking, having more than a drink or two a day (especially for women), eating animal fats, and sunbathing (which may cause skin cancer due to exposure to ultraviolet light).



© Collage Photography/Retna

PSYCHOLOGICAL RISK FACTORS Researchers have uncovered possible links between stress and cancer (Antoni & Lutgendorf, 2007; Gross et al., 2010). For example, Rachel Yehuda (2002) suggests that stress sometimes lowers levels of cortisol and impairs the ability of the immune system to destroy cancer cells. Prolonged depression also apparently heightens the risk of some kinds of cancer by depressing the functioning of the immune system (Gross et al., 2010).

Experimental research that could not be conducted with humans has been carried out using rats and other animals. In one type of study, animals are injected with cancerous cells or with viruses that cause cancer and are then exposed to various conditions.

In this way, researchers can determine which conditions influence the likelihood that the animals' immune systems will be able to fend off the disease. Such experiments suggest that once cancer has developed, stress can influence its course. In a classic study, for example, rats were implanted with small numbers of cancer cells so that their own immune systems would have a chance to combat them (Visintainer et al., 1982). Some of the rats were then exposed to inescapable shocks. Others were exposed to escapable shocks or to no shock. The rats that were exposed to the most stressful condition—the inescapable shock—were half as likely as the other rats to reject the cancer and twice as likely to die from it.

SOCIOCULTURAL RISK FACTORS Truth or Fiction Revisited: African Americans are also more likely than European Americans to contract most forms of cancer (National Center for Health Statistics, 2010). Once they contract cancer, African Americans are more likely than European Americans to die from it. The results for African Americans are connected with their lower socioeconomic status and relative lack of access to health care (Orsi et al., 2010).

Also consider cultural differences in health. Death rates from cancer are higher in such nations as the Netherlands, Denmark, England, Canada, and—yes—the United States, where average rates of daily fat intake are high (Bagchi & Preuss, 2007). Death rates from cancer are lower in such nations as Thailand, the Philippines, and Japan, where fat intake is lower. Thailand, the Philippines, and Japan are Asian nations, but do not assume that the difference is racial! The diets of Japanese Americans are similar in fat content to those of other Americans—and so are their rates of death from cancer.

PSYCHOLOGICAL FACTORS IN THE TREATMENT OF CANCER

People with cancer not only must cope with the biological aspects of their illnesses; they may also face a host of psychological problems. These include feelings of anxiety and depression about treatment methods and the eventual outcome, changes in body image after the removal of a breast or testicle, feelings of vulnerability, and family problems (Reich et al., 2008). For example, some families criticize members with cancer for feeling sorry for themselves or not fighting the disease hard enough (Andersen et al., 1994, 2008). Psychological stress due to cancer can weaken the immune system, setting the stage for other health problems, such as respiratory tract infections (Andersen, 2002).

There are also psychological treatments for the nausea that often accompanies chemotherapy. People undergoing chemotherapy who also obtain relaxation training and guided imagery techniques experience significantly less nausea and vomiting than patients who do not use these methods (Richardson et al., 2006). Distraction helps (Cohen, 2002). Studies with children find that playing video games reduces the discomfort of chemotherapy (Windich-Biermeier et al., 2007). Children focus on battling computer-generated enemies rather than on the side effects of drugs.

Of course, cancer is a medical disorder. However, health psychologists have improved the methods used to treat people with cancer. For example, a crisis like cancer can lead people to feel that life has spun out of control (Brooks, 2008). As mentioned earlier, control is a factor in psychological hardiness. A sense of loss of control can heighten stress and impair the immune system. Health psychology therefore emphasizes the value of encouraging people with cancer to remain in charge of their lives (Brooks, 2008). Even measures such as training physicians to listen more attentively,

convey warmth, and provide feedback (as opposed to saying nothing) can help (Andersen, 2002).

Psychologists are teaching coping skills to people with cancer to relieve psychological distress as well as pain. One study of 235 women with metastatic breast cancer found that group therapy aimed at providing support and helping the women express their feelings enhanced the women's moods and decreased the amount of pain they experienced (Goodwin et al., 2001). Unfortunately, the therapy did not affect their survival rate. But psychological methods such as relaxation training, meditation, biofeedback training, and exercise can all help patients cope with their disorders (Andersen, 2002).

Yet another psychological application is helping people undergoing chemotherapy keep up their strength by eating. The problem is that chemotherapy often causes nausea. Nausea then becomes associated with foods eaten during the day, causing taste aversions (Ward, 2007). So people with cancer, who may already be losing weight because of their illness, may find that taste aversions aggravate the problems caused by lack of appetite. To combat these conditions, Bernstein (1996) recommends eating unusual foods prior to chemotherapy. If taste aversions develop, they are associated with the unusual food and not the patient's normal diet.



© Jrgy Kalany/Stone/Getty Images

How Have Health Psychologists Helped This Youngster Cope with Cancer? Cancer is a medical disorder; but psychologists have contributed to the treatment of people with cancer: For example, psychologists help people with cancer remain in charge of their lives, combat feelings of hopelessness, manage stress, and cope with the side effects of chemotherapy.

LearningConnections • PSYCHOLOGY AND HEALTH

ACTIVE REVIEW (14) Psychological states such as anxiety and depression impair the functioning of the _____ system, rendering us more vulnerable to health problems. (15) The most common kind of headache is the _____ headache. (16) The _____ headache has a sudden onset and is identified by throbbing pain on one side of the head. (17) Risk factors for coronary heart disease include family history, obesity, hypertension, high levels of serum _____, heavy drinking, smoking, hostility, Type A behavior, and job strain. (18) African Americans are (more or less?) likely than European Americans to have heart attacks and to contract

most forms of cancer. (19) Genetic factors (play or do not play?) a role in cancer.

REFLECT AND RELATE Does coronary heart disease or cancer run in your family? If so, what can you do about it?

CRITICAL THINKING What are the roles of psychologists in understanding and treating health problems such as headaches, coronary disorders, and cancer?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections PREVENTING AND COPING WITH STRESS, HEADACHES, HEART DISEASE, AND CANCER

If you don't like something, change it. If you can't change it, change your attitude.

—Maya Angelou

Stress is a part of life. Whereas stress is not always to be avoided—Selye noted that some stress is good for you—excesses of stress are discomfiting in themselves and are connected with health problems such as headaches, heart disease, and cancer. There are two major ways of coping with stress: *problem-focused coping* and *emotion-focused coping*:

- Problem-focused coping seeks to manage stress directly by changing either the stressor itself or the ways we respond to the stressor. If you are having difficulty with a college subject, you can study harder or more efficiently, talk to your professor to find ways to perform better, or consult a tutor. If you're involved in arguments with a roommate or a partner, you can hold discussions aimed at getting at the roots of the problems and finding ways to solve them.
- Emotion-focused coping attempts to reduce the effects of a stressor by avoiding it, ignoring it, or managing the emotional needs connected with your reaction to the stressor. Some people, sadly, choose to drink alcohol to lower the reactivity of the nervous system when faced with a stressor. The emotional benefits of drinking are short-lived and do nothing to remove the stressor or respond to it in a more productive way. Some students drop out of college when they encounter academic or social stress. Other students, more usefully, seek out their friends and families to help them manage their emotional needs.

Coping with Stress

Because stress depresses the functioning of the immune system, it may be that alleviating stress has beneficial effects

on the immune system, thus making us less vulnerable to some health problems. Psychologists have devised a number of methods collectively referred to as *stress management*. Stress management is not always the cure-all, but it at least reduces feelings of stress! Moreover, the strategies for preventing and coping with stress, headaches, heart disease, and cancer involve significant improvements in your lifestyle. By following them, there is an excellent chance that you will live longer. It is almost a certainty that you will live *better*.

We will discuss stress management techniques that are examples of problem-focused coping—ways of changing your responses to stressors.

Controlling Irrational Thoughts—How to Change Your Mind for the Better

People often feel stressed because of their own thoughts. Consider the following experiences:

1. You have difficulty with the first item on a test and become convinced that you will flunk.
2. You want to express your genuine feelings but think that if you do so you might make another person angry or upset.
3. You haven't been able to get to sleep for 15 minutes and assume that you will lie awake all night and feel "wrecked" in the morning.
4. You're not sure what decision to make, so you try to put the problem out of your mind by going out, playing cards, or watching TV.
5. You decide not to play tennis because your form isn't perfect and you're in less than perfect condition.

If you have had these or similar experiences, it may be because you harbor some of the irrational beliefs identified by Albert Ellis (see Figure 14.5). These beliefs may make you overly concerned about the approval of others

(item 2 in the preceding list) or perfectionist (item 5). They may lead you to think that you can solve problems by pretending that they do not exist (item 4) or that a minor setback will invariably lead to greater problems (items 1 and 3).

How do we change the irrational thoughts that create and compound stress? The answer is deceptively simple: We just change them. However, this may require work. Moreover, before we can change our thoughts, we must become aware of them. Table 14.2 ■ will help you become aware of irrational beliefs and how to change them.

Cognitive-behavioral psychologists (e.g., Davies, 2008) suggest procedures for controlling the irrational or catastrophizing thoughts that often accompany feelings of anxiety, conflict, or tension:

1. Develop awareness of the thoughts that seem to be making you miserable by careful self-examination. Study the examples at the beginning of this section or in Table 14.2 to see if they apply to you. (Also consider Ellis's list of irrational beliefs in Figure 14.5 and ask yourself whether any of them governs your behavior.) In addition, when you encounter anxiety or frustration, pay close attention to your thoughts.
2. Evaluate the accuracy of your thoughts. Are they guiding you toward a solution, or are they compounding your problems? Do they reflect reality, or do they blow things out of proportion? Do they misplace the blame for failure or shortcomings?
3. Prepare thoughts that are incompatible with the irrational or catastrophizing thoughts, and practice saying them firmly to yourself. (If nobody is nearby, why not say them firmly aloud?)
4. Reward yourself with a mental pat on the back for making effective changes in your beliefs and thought patterns.

Table 14.2 ■ Controlling Irrational Beliefs and Thoughts

Irrational (Upsetting) Thoughts	Rational (Calming) Thoughts
"Oh my God, I'm going to completely lose control!"	"This is painful and upsetting, but I don't have to go to pieces over it."
"This will never end."	"This will end even if it's hard to see the end right now."
"It'll be awful if Mom gives me that look again."	"It's more pleasant when Mom's happy with me, but I can live with it if she isn't."
"How can I go out there? I'll look like a fool!"	"So you're not perfect. That doesn't mean that you're going to look stupid. And so what if someone thinks you look stupid? You can live with that, too. Just stop worrying and have some fun."
"My heart's going to leap out of my chest! How much can I stand?"	"Easy—hearts don't leap out of chests. Stop and think! Distract yourself. Breathe slowly, in and out."
"What can I do? There's nothing I can do!"	"Easy—stop and think. Just because you can't think of a solution right now doesn't mean there's nothing you can do. Take it a minute at a time. Breathe easy."

Do irrational beliefs or catastrophizing thoughts compound your feelings of anxiety and tension? Cognitive psychologists suggest that you can cope with stress by becoming aware of your irrational, upsetting thoughts and replacing them with rational, calming thoughts.

Lowering Arousal: Turning Down the Inner Alarm

Stress tends to trigger intense activity in the sympathetic branch of the autonomic nervous system—that is, overarousal. Overarousal is a sign that something may be wrong. It is a message telling us to solve a problem—to survey the situation and take appropriate action. But once we are aware that a stressor is acting on us and have developed a plan to cope with it, it is no longer helpful to have blood pounding fiercely through our arteries.

Psychologists and other scientists have developed many methods for teaching people to reduce arousal. These include progressive relaxation and meditation. In progressive relaxation, people purposefully tense a particular muscle group before relaxing it. This sequence allows them to develop awareness of their muscle tensions and also to differentiate between feelings of tension and relaxation.

The following instructions will help you try meditation as a means for lowering the arousal connected with stress:

1. Begin by meditating once or twice a day for 10 to 20 minutes.
2. In meditation, what you *don't* do is more important than what you *do*

do. Adopt a passive, “what happens happens” attitude.

3. Create a quiet, nondisruptive environment. For example, don't face a light directly.
4. Do not eat for 1 hour beforehand; avoid caffeine for at least 2 hours.
5. Assume a comfortable position. Change it as needed. It's okay to scratch or yawn.
6. As a device to aid concentrating, you may focus on your breathing or seat yourself before a calming object such as a plant or burning incense. Stress researcher Herbert Benson suggests “perceiving” the word *one* on every outbreath rather than saying it aloud. Others suggest thinking or perceiving the word *in* as you inhale and *out*, or *ah-h-h*, as you exhale.
7. If you are using a mantra (like the syllable “om,” pronounced *oam-mm*), you can prepare for meditation and say the mantra out loud several times. Enjoy it. Then say it more and more softly. Close your eyes and only think the mantra. Allow yourself to perceive, rather than actively think, the mantra. Again, adopt a passive attitude. Continue to perceive the mantra. It may grow

louder or softer, disappear for a while, and then return.

8. If disruptive thoughts enter your mind as you are meditating, you can allow them to “pass through.” Don't get wrapped up in trying to squelch them, or you may raise your level of arousal.
9. Allow yourself to drift. (You won't go too far.) What happens happens.
10. Above all, take what you get. You cannot force the relaxing effects of meditation. You can only set the stage for them and allow them to happen.

Exercising: Run for Your Life?

I like long walks, especially when they are taken by people who annoy me.

—Fred Allen

Exercise, particularly aerobic exercise, enhances the functioning of the immune system, contributes to our psychological well-being, and helps us cope with stress (Paffenbarger et al., 2007; Richardson & Rothstein, 2008). *Aerobic exercise* refers to exercise that requires a sustained increase in the consumption of oxygen. It promotes cardiovascular fitness. Aerobic exercises include, but are not limited to, running and jogging, running in place, walking (at more than a leisurely pace), aerobic dancing, jumping rope, swimming, bicycle riding, basketball, racquetball, and cross-country skiing.

Anaerobic exercises, in contrast, involve short bursts of muscle activity. Examples of anaerobic exercises are weight training, calisthenics (which usually allow rest periods between exercises), and sports such as baseball, in which there are infrequent bursts of strenuous activity. Anaerobic exercises can strengthen muscles and improve flexibility.

Exercise helps people cope by enhancing their physical fitness, or “condition.” Fitness includes muscle strength; muscle endurance; suppleness or flexibility; cardiorespiratory, or aerobic, fitness; and a higher ratio of muscle to fat (usually due to both building muscle and reducing fat). Fitness also enhances our natural immunity and

boosts our levels of endorphins (Jonsdottir et al., 2000). Cardiovascular fitness, or “condition,” means that the body can use more oxygen during vigorous activity and pump more blood with each heartbeat. Because conditioned athletes’ hearts pump more blood with each beat, they usually have a slower pulse rate—that is, fewer heartbeats per minute. However, during aerobic exercise, they may double or triple their resting heart rate for minutes at a time.

Sustained physical activity does more than promote fitness. It reduces hypertension and the risk of heart attacks and strokes (Hu et al., 2000; Kurth et al., 2006; Li et al., 2006). Exercise has been shown to keep the arteries suppler, even among older adults; that is, it counters hardening of the arteries (Van Guilder et al., 2007). Aerobic exercise raises blood levels of high-density lipoproteins (HDL, or “good cholesterol”) (Buyukyazi et al., 2010). HDL lowers the amount of low-density lipoproteins (LDL, or “bad cholesterol”) in the blood. This is another way in which exercise may reduce the risk of heart attacks.

In one research program, Ralph Paffenbarger and his colleagues (2009) have been tracking several thousand Harvard University alumni by means of university records and questionnaires. They have correlated the incidence of heart attacks in this group with their levels of physical activity. As shown in Figure 14.11 ■, the incidence of heart attacks declines as physical activity

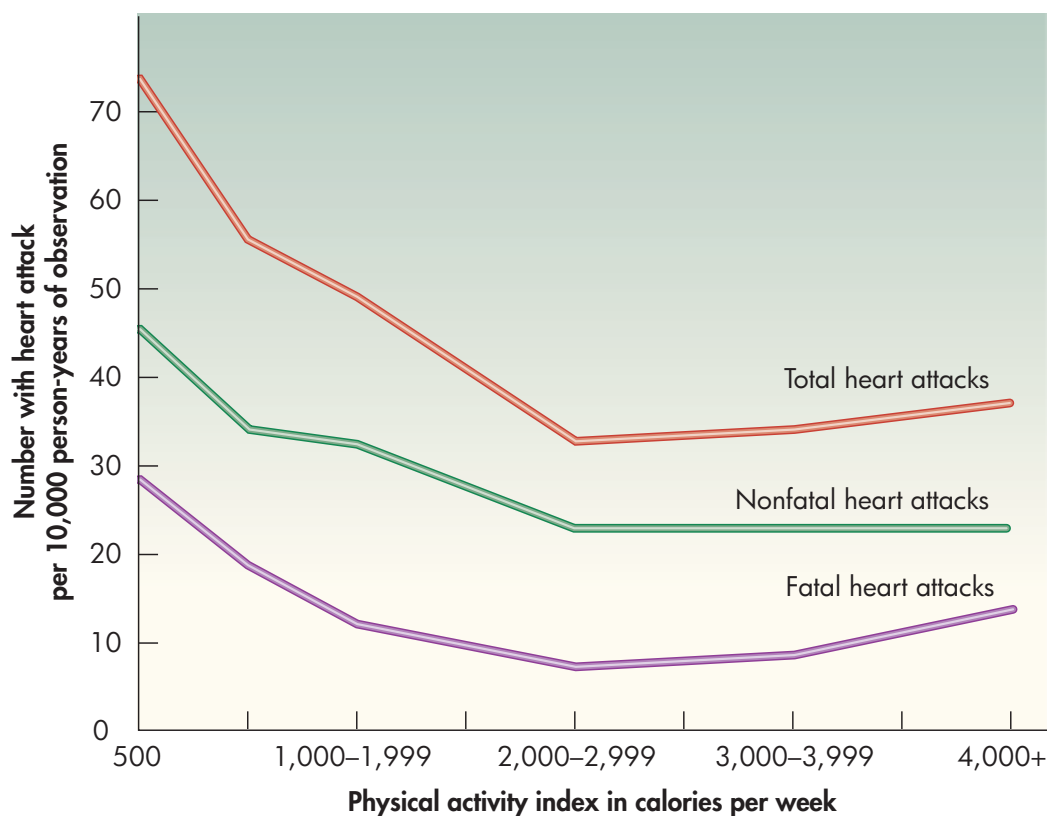


Figure 14.11 ■ Heart Attacks and Physical Activity Paffenbarger and his colleagues have tracked the health of 17,000 Harvard alumni and found that the incidence of heart attacks declines as the level of aerobic exercise rises to burning about 2,000 calories a week. Does aerobic exercise prevent heart attacks, or do healthier people choose to exercise?

rises to a level that consumes about 2,000 calories per week—the equivalent of jogging about 20 miles. Inactive alumni have the highest risk of heart attacks. **Truth or Fiction Revisited:** Alumni who burn at least 2,000 calories a week through exercise live 2 years longer, on average, than their sedentary counterparts.

Of course, Paffenbarger’s research is correlational and not experimental. Therefore, it is possible that people who

are in better health *choose* to engage in higher levels of physical activity. If such is the case, their lower incidence of heart attacks and their lower mortality rates could be due to their initial superior health and not to their physical activity.

Exercise may also have positive psychological effects. People who exercise regularly are less likely to be depressed and to commit suicide (Paffenbarger et al., 2007).

How about you? Are you thinking of climbing onto the exercise bandwagon? If so, consider these suggestions:

1. Unless you have engaged in sustained and vigorous exercise recently, seek the advice of a medical expert.
2. Consider joining a beginner's aerobics class. You'll derive the benefits of social support.
3. Get the proper equipment to facilitate performance and avert injury.
4. Read up on the activity you are considering.
5. Try to select activities that you can sustain for a lifetime. If you do not enjoy what you're doing, you're not likely to stick to it.
6. If you feel severe pain, don't try to exercise "through" it. Some soreness is normal, but sharp pain is abnormal and a sign that something is wrong.
7. Have fun!

Preventing and Coping with Headaches

Because many headaches are related to stress, one way to fight headaches is to reduce the stress in your life. All the methods mentioned earlier—challenging irrational beliefs, lowering the physical alarm, and exercising—may be of help. Biofeedback training has also helped many people with tension-type headaches and with migraine headaches, sometimes by helping sufferers move blood away from their heads and into their hands and feet (Mullally et al., 2009; Nestoriuc et al., 2008).

Aspirin, acetaminophen, ibuprofen, and many prescription drugs are also used to fight headache pain. Some inhibit the production of the prostaglandins

that help initiate transmission of pain messages to the brain. Newer prescription drugs can help prevent many migraines. People who are sensitive to MSG or red wine can request meals without MSG and switch to white wine.

Reducing the Risk of CHD through Behavior Modification

Once CHD has been diagnosed, a number of medical treatments, including surgery and medication, are available. However, people who have not had CHD (as well as those who have) can profit from behavior modification techniques designed to reduce the risk factors. These methods include

- *Stopping smoking.*
- *Dietary change:* See Chapter 9 for strategies for maintaining a healthful body weight. However, most health experts agree on three dietary strategies that are helpful in preventing CHD: Substitute nonhydrogenated unsaturated fats for saturated fats; increase consumption of omega-3 fatty acids, which are found in fish, fish oil supplements, and plant sources; and eat a diet high in fruits, vegetables, nuts (unsalted), and whole grains.
- *Reducing hypertension:* There is medication for reducing hypertension, but behavioral changes are sometimes enough: meditation, aerobic exercise, and dietary changes, including consuming less salt.
- *Lowering low-density lipoprotein (LDL) serum cholesterol:* There is also medication for lowering LDL, but behavioral methods involve exercise, meditation, and cutting down on foods that are high in cholesterol and saturated fats.

- *Modifying Type A behavior.*
- *Managing feelings of anger.*
- *Exercising:* Sustained physical activity helps protect people from CHD as well as helping them cope with stress.

Preventing and Coping with Cancer

Cancer is a frightening disease, and in many cases, there may be little that can be done about its eventual outcome. However, we are not helpless in the face of cancer. We can

- Limit exposure to behavioral risk factors for cancer.
- Modify diet by reducing intake of fats and increasing intake of fruits and vegetables. **Truth or Fiction Revisited:** Tomatoes (especially cooked tomatoes, such as we find in tomato sauce and ketchup—yes, ketchup!), broccoli, cauliflower, and cabbage appear especially helpful (Herr & Büchler, 2010; Seren et al., 2008). (Yes, Grandma was right about veggies.)
- Exercise regularly. (Exercise not only helps us cope with stress; it also lowers the risk of developing CHD and cancer. Just do it.)
- Have regular medical checkups so that cancer will be detected early. Cancer is most treatable in the early stages.
- Regulate exposure to stress.

We conclude this section with good news for readers of this book: *Better-educated* people—that means *you*—are more likely to modify health-impairing behavior and reap the benefits of change (Jemal et al., 2008).

Stress: What It Is, Where It Comes From

1. What is stress?

Stress is the demand made on an organism to adapt, cope, or adjust. Whereas some stress—called eustress—is desirable to keep us alert and occupied, too much stress can tax our capacities to adjust and contribute to physical health problems.

2. What is health psychology?

Health psychology studies the relationships between psychological factors and the prevention and treatment of physical health problems.

3. What are daily hassles?

Daily hassles are regularly occurring experiences that threaten or harm our well-being. There are several kinds of hassles, including household, health, time-pressure, inner concern, environmental, financial responsibility, work, and security hassles.

4. How can too much of a good thing make you ill?

Too many positive life changes can affect one's health because life changes require adjustment, whether they are positive or negative. In contrast to daily hassles, life changes occur irregularly. Research shows that hassles and life changes are connected with health problems such as heart disease and cancer. However, the demonstrated connection between life changes and health is correlational; thus, causality remains clouded.

5. What is conflict?

Conflict is the stressful feeling of being pulled in two or more directions by opposing motives. There are four kinds of conflict: approach–approach, avoidance–avoidance, approach–avoidance (in the case of a single goal), and multiple approach–avoidance, when each alternative has its pluses and minuses.

6. How do irrational beliefs create or compound stress?

Albert Ellis showed that negative activating events (A) can be made more aversive (C) when irrational beliefs (B) compound their effects. People often catastrophize negative events. Two common irrational beliefs are excessive needs for social approval and perfectionism. Both set the stage for disappointment and increased stress.

7. What is Type A behavior?

Type A behavior is connected with hostility, competitiveness, and impatience. Type B people relax more readily.

Psychological Moderators of Stress

8. How do our self-efficacy expectations affect our ability to withstand stress?

Self-efficacy expectations encourage us to persist in difficult tasks and to endure discomfort. They are also connected with lower levels of adrenaline and noradrenaline, thus having a braking effect on bodily arousal.

9. What characteristics are connected with psychological hardiness?

Kobasa and her colleagues found that psychological hardiness among business executives is characterized by commitment, challenge, and control.

10. Is there any evidence that “A merry heart doeth good like a medicine”?

Yes. Research evidence shows that humor can moderate the effects of stress.

11. How do predictability and control help us cope with stress?

Predictability allows us to brace ourselves for the inevitable and, in many cases, plan ways of coping with it. Control—even the illusion of being in control—allows us to feel that we are not at the mercy of the fates.

12. Is there evidence that social support helps people cope with stress?

Social support has been shown to help people resist infectious diseases such as colds. It also helps people cope with the stress of cancer and other health problems. Kinds of social support include expression of emotional concern, instrumental aid, information, appraisal, and simple socializing.

Stress and the Body: The War Within

13. What is the general adaptation syndrome?

The GAS is a cluster of bodily changes triggered by stressors. It consists of three stages: an alarm reaction, a resistance stage, and an exhaustion stage. Corticosteroids help us resist stress by fighting inflammation and allergic reactions. Adrenaline arouses the body by activating the sympathetic nervous system, which is highly active during the alarm and resistance stages of the GAS. Sympathetic activity is characterized by rapid heartbeat and respiration rate, release of stores of sugar, muscle tension, and other responses that deplete the body's supply of energy. The parasympathetic division of the ANS predominates during the exhaustion stage of the GAS and is connected with depression and inactivity. Prolonged stress is dangerous.

14. How does the immune system work?

Leukocytes (white blood cells) engulf and kill pathogens, worn-out body cells, and cancerous cells. The immune system also “remembers” how to battle antigens by maintaining their antibodies in the bloodstream. The immune system also facilitates inflammation, which increases the number of white blood cells that are transported to a damaged area.

15. How does stress affect the functioning of the immune system?

Stress depresses the functioning of the immune system by stimulating the release of corticosteroids. Steroids counter inflammation and interfere with the formation of antibodies.

Psychology and Health

16. What is the multifactorial approach to health?

This view recognizes that many factors, including biological, psychological, sociocultural, and environmental factors, affect our health. Nearly 1 million preventable deaths occur each year in the United States. Measures such as quitting smoking, eating properly, exercising, and controlling alcohol intake would prevent the majority of them.

17. How has psychology contributed to the understanding and treatment of headaches?

Psychologists participate in research concerning the origins of headaches, including stress and tension. Psychologists help people alleviate headaches by reducing tension.

18. What are the major risk factors for coronary heart disease?

The major risk factors for coronary heart disease include family history; physiological conditions such as hypertension and high levels of serum cholesterol; behavior patterns such as heavy drinking, smoking, eating fatty foods, and Type A behavior; job strain; chronic tension and fatigue; sudden stressors (such as natural disasters); and physical inactivity.

19. What are the major risk factors for cancer?

The major risk factors for cancer include family history, smoking, drinking alcohol, eating animal fats, sunbathing, and stress.

KEY TERMS

Alarm reaction (p. 514)

Antibodies (p. 517)

Antigen (p. 517)

Approach–approach conflict (p. 504)

Approach–avoidance conflict (p. 505)

Avoidance–avoidance conflict (p. 504)

Catastrophize (p. 507)

Conflict (p. 503)

Daily hassles (p. 501)

Eustress (p. 500)

Exhaustion stage (p. 517)

Externals (p. 513)

Fight-or-flight reaction

(p. 514)

General adaptation syndrome (GAS)

(p. 514)

Health psychology (p. 501)

Hypertension (p. 521)

Immune system (p. 517)

Inflammation (p. 517)

Internals (p. 513)

Leukocytes (p. 517)

Locus of control (p. 511)

Migraine headaches (p. 521)

Multiple approach–avoidance conflict
(p. 505)

Psychological hardiness (p. 510)

Psychoneuroimmunology (p. 517)

Resistance stage (p. 516)

Self-efficacy expectations (p. 510)

Serum cholesterol (p. 521)

Socioeconomic status (p. 519)

Stress (p. 500)

Stressor (p. 500)

Type A behavior (p. 508)

Uplifts (p. 502)

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15 Psychological Disorders



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MAJOR TOPICS

- What Are Psychological Disorders?
- Anxiety Disorders: Real-Life “Fear Factors”?
- Dissociative Disorders: Splitting Consciousness
- Somatoform Disorders: When the Body Expresses Stress
- Mood Disorders: Up, Down, and Around
- Schizophrenia: When Thinking Runs Astray
- Personality Disorders: Making Oneself or Others Miserable

FEATURES

- In Profile:** Little Hans
- Controversy in Psychology:** Are Somatoform Disorders the Special Province of Women?
- Self-Assessment:** Are You Depressed?
- A Closer Look—Real Life:** When the “Fatty Acid” Places Soda Off Limits
- Controversy in Psychology:** Should We Ban the Insanity Plea?
- Concept Review:** Psychological Disorders
- Life Connections:** Preventing Suicide

TRUTH OR FICTION ?

- T F** A man shot the president of the United States in front of millions of television witnesses, yet he was found not guilty by a court of law.
- T F** It is abnormal to feel anxious.
- T F** In the Middle Ages, innocent people were drowned to prove that they were not possessed by the Devil.
- T F** Some people have more than one identity, and each one may have different allergies and eyeglass prescriptions.
- T F** Feeling “up” is not always a good thing.
- T F** People with schizophrenia may see and hear things that are not really there.
- T F** Some people can kill or maim others with no feelings of guilt at all.
- T F** People who threaten to commit suicide are only seeking attention.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

During one long fall semester, the Ohio State campus lived in terror. Four college women were abducted, forced to cash checks or obtain money from automatic teller machines, and then raped. A mysterious phone call led to the arrest of a 23-year-old drifter—let’s call him “William”—who had been dismissed from the Navy.

William was not the boy next door.

Psychologists and psychiatrists who interviewed William concluded that 10 personalities—8 male and 2 female—resided within him (Scott, 1994). His personality had been “fractured” by an abusive childhood. His several personalities displayed distinct facial expressions, speech patterns, and memories. They even performed differently on psychological tests.

Arthur, the most rational personality, spoke with a British accent. Danny and Christopher were quiet adolescents. Christine was a 3-year-old girl. Tommy, a 16-year-old, had enlisted in the Navy. Allen was 18 and smoked. Adelena, a 19-year-old lesbian personality, had committed the rapes. Who had made the mysterious phone call? Probably David, 9, an anxious child.

The defense claimed that William’s behavior was caused by a psychological disorder termed *dissociative identity disorder* (previously referred to as *multiple personality disorder*). Several distinct identities or personalities dwelled within him. Some of them were aware of the others. Some believed that they were unique. Billy, the core identity, had learned to sleep as a child to avoid his father’s abuse. A psychiatrist asserted that Billy had also been “asleep,” or in a “psychological coma,” during the abductions. Billy should therefore be found not guilty by reason of **insanity**.

William was found not guilty. He was committed to a psychiatric institution and released 6 years later.

Truth or Fiction Revisited: In 1982, John Hinckley was also found not guilty of an assassination attempt on President Reagan’s life, although the shooting was witnessed on television by millions. Expert witnesses testified that he should be diagnosed with *schizophrenia*. Hinckley, too, was committed to a psychiatric institution.

William and Hinckley were diagnosed with psychological disorders. **Question 1: What are psychological disorders?**

WHAT ARE PSYCHOLOGICAL DISORDERS?

Psychology is the study of behavior and mental processes. **Psychological disorders** are behaviors or mental processes—like those of William and John Hinckley—that are connected with various kinds of distress or significant impairment in functioning. However, they are not predictable responses to specific events.

Insanity A legal term descriptive of a person judged to be incapable of recognizing right from wrong or of conforming his or her behavior to the law.

Psychological disorders Patterns of behavior or mental processes that are connected with emotional distress or significant impairment in functioning.



© Sandy Skoglund

Hallucinations Hallucinations are a feature of schizophrenia. They are perceptions that occur in the absence of external stimulation, as in “hearing voices” or “seeing things.” Hallucinations cannot be distinguished from real perceptions. Are the cats in this Sandy Skoglund photograph real or hallucinatory?

Truth or Fiction Revisited: Some psychological disorders are characterized by anxiety, but many people are anxious now and then without being considered disordered. It might seem rather strange if one were not at least a little bit nervous before an important date or on the eve of a midterm exam. When, then, are feelings like anxiety deemed to be abnormal or signs of a psychological disorder? For one thing, anxiety may suggest a disorder when it is not appropriate to the situation. It is inappropriate to be anxious when entering an elevator or looking out a fourth-story window. The magnitude of the problem may also suggest disorder. Some anxiety is usual before a job interview. However, feeling that your heart is pounding so intensely that it might leap out of your chest—and then avoiding the interview—are not usual.

Behavior or mental processes suggest psychological disorders when they meet some combination of the following criteria:

1. *They are unusual.* Rarity or statistical deviance may not be sufficient for behavior or mental processes to be labeled abnormal, but it helps. After all, only a few people obtain a score of 700 or more on the verbal part of the SAT, but that achievement is not considered disordered. Only a few “see things” or “hear things” as Hinckley did, and those behaviors are deemed disordered because of their bizarre quality. We must also consider the situation. Although many of us feel “panicked” when we realize that a term paper or report is due the next day, most of us do not have panic attacks “out of the blue.” Unpredictable panic attacks thus are suggestive of psychological disorder.
2. *They suggest faulty perception or interpretation of reality.* Our society considers it normal to be inspired by religious beliefs but abnormal to believe that God is literally speaking to you. “Hearing voices” and “seeing things” are considered **hallucinations**. Similarly, **ideas of persecution**, such as believing that the Mafia or the FBI is “out to get you,” are considered signs of disorder. (Unless, of course, they *are* out to get you.) Hinckley testified that he believed he would be impressing a popular young actress, Jodie Foster, by killing the president—an idea that was delusional.
3. *They suggest severe personal distress.* Anxiety, exaggerated fears, and other psychological states cause personal distress, and severe personal distress may be considered abnormal. William and Hinckley were in distress—although, of course, they victimized other people.
4. *They are self-defeating.* Behavior or mental processes that cause misery rather than happiness and fulfillment may suggest psychological disorder. Those who have serious anxiety or depressive disorders suffer a great deal. We might also note that chronic drinking and cigarette smoking may be deemed abnormal because they threaten one’s health and, in the case of drinking, one’s social and vocational life.
5. *They are dangerous.* Behavior or mental processes that are hazardous to the self or others may be considered suggestive of psychological disorders. People who threaten or attempt suicide may be considered abnormal, as may people who threaten or attack others, like William and Hinckley.
6. *The individual’s behavior is socially unacceptable.* We must consider the cultural context of a behavior pattern in judging whether it is normal (Lopez & Guarnaccia, 2000). In the United States, it is deemed normal to be aggressive in sports and in combat; in fact, aggression in these situations is applauded. In other situations, warmth and tenderness are valued. Many people in the United States admire women who are self-assertive, yet Latino and Latina American, Asian American, and “traditional” European American groups may see outspoken women as being disrespectful and having personality problems.

Hallucination A perception in the absence of sensory stimulation that is confused with reality.

Ideas of persecution Erroneous beliefs that one is being victimized or persecuted.

Perspectives on Psychological Disorders

Question 2: How have people viewed psychological disorders? If the standards for defining psychological disorders are complex and influenced by one's cultural background, so too are the explanations of their origins.

THE DEMONOLOGICAL MODEL

If William and John Hinckley had lived in Salem, Massachusetts, in 1692, just 200 years after Columbus set foot in the New World, they might have been hanged as witches. At that time, most people assumed that the strange behaviors that were associated with psychological disorders were caused by possession by the Devil. A score of people were executed in Salem that year for allegedly practicing the arts of Satan.

In fact, throughout all of recorded human history, people have attributed unusual behavior and psychological disorders to demons. The ancient Greeks believed that the gods punished humans by causing confusion and madness. An exception was the physician Hippocrates, who made the radical suggestion that psychological disorders are caused by an abnormality of the brain. The notion that biology could affect thoughts, feelings, and behavior was to lie dormant for about 2,000 years.

During the Middle Ages in Europe, as well as during the early period of European colonization of Massachusetts, it was generally believed that psychological disorders were signs of possession by the Devil. Possession could stem from retribution, in which God caused the Devil to possess a person's soul as punishment for committing certain kinds of sins. Agitation and confusion were ascribed to such retribution. Possession was also believed to result from deals with the Devil, in which people traded their souls for earthly gains. Such individuals were called witches. Witches were held responsible for unfortunate events ranging from a neighbor's infertility to a poor harvest. In Europe, as many as 500,000 accused witches were killed during the seventeenth and eighteenth centuries (Hergenhahn, 2009). The goings on at Salem were trivial by comparison.

Truth or Fiction Revisited: A document authorized by Pope Innocent VIII, *The Hammer of Witches*, proposed ingenious "diagnostic" tests to identify those who were possessed. The water-float test was based on the principle that pure metals sink to the bottom during smelting. Impurities float to the surface. Suspects were thus placed in deep water. Those who sank to the bottom and drowned were judged to be pure. Those who managed to keep their heads above water were assumed to be "impure" and in league with the Devil. Then they were in real trouble. This ordeal is the origin of the phrase "damned if you do, and damned if you don't."

Few people in the United States today would argue that unusual or unacceptable behavior is caused by demons. Still, we continue to use "demonic" language. How many times have you heard the expressions "Something got into me" or "The Devil made me do it"?

THE MEDICAL MODEL

The demonological model led to brutal "treatments"—from drilling holes in the skull to permit evil spirits to escape, as in prehistoric times, to burning at the stake and hanging, as practiced during the Middle Ages. In more modern times, as during the Age of Reason, many health professionals, such as Philippe Pinel (1745–1826) in France, began to view psychological disorders as diseases of the mind, and they encouraged humane treatment. During the 1800s, it was discovered that the late stages of the sexually transmitted infection syphilis can distort the workings of the mind as well as destroy the body. Since that time, researchers have assumed that other physical abnormalities can have psychological effects, and the search was on to find the causes of other psychological disorders.

The so-called medical model assumes that illnesses have physical or biological causes that can be identified and that people afflicted by them are to be cured through treatment or therapy. Note the widespread use of medical terminology in the study and treatment of psychological disorders: People without psychological disorders are said to be in good mental *health*.



Exorcism This medieval woodcut represents the practice of exorcism, in which a demon is expelled from a person who has been "possessed."



The disorders themselves are termed mental *illnesses* or *psychopathology*. Disorders are *diagnosed* according to the *symptoms* shown by mental *patients*. Most patients are *outpatients*; that is, they remain out of the hospital and are seen as necessary; some are *admitted* to mental *hospitals*, where they become *inpatients*. Patients may be *prescribed* medication and *psychotherapy*.

The search for biological and physical causes of psychological disorders has borne much fruit. Throughout the chapter, we will see they may be caused, at least in part, by abnormalities in the brain and in the autonomic and endocrine systems. Yet biology is often not destiny in the psychological disorders: Psychological factors such as conditioning and traumatic stress may also make their contributions.

CONTEMPORARY PSYCHOLOGICAL MODELS

Many contemporary psychologists have joined in the search for biological and physical contributors to psychological disorders. However, they tend to subscribe to the *diathesis–stress model* or to the *biopsychosocial model* rather than the medical model in explaining psychological disorders.

The **diathesis–stress model** assumes that there may be biological differences between individuals—diatheses—that explain why some people develop certain psychological disorders under stress, whereas others do not (Belsky & Pluess, 2009; Eberhart & Hammen, 2010). In the case of schizophrenia, as we will see, the diathesis (or biological difference) would appear to be that some people possess a genetic vulnerability to schizophrenia, but others do not.

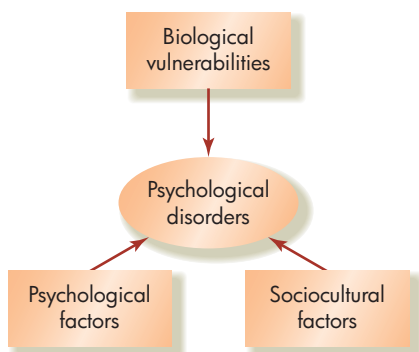
The **biopsychosocial model** (or *interactionist model*) explains psychological disorders in terms of a combination of (a) possible biological vulnerabilities; (b) psychological factors such as conditioning, exposure to stress, and self-defeating thoughts about stressors; and (c) sociocultural factors such as family relationships, unemployment, and cultural beliefs and expectations (Gilbert, 2009; Levine & Schmelkin, 2006).

For example, schizophrenia and depression are found around the world, which appears to support other evidence for biological contributors to these disorders. Yet psychological factors such as family stresses and losses can also play roles in the development of these disorders. Yet there are some disorders which appear to be **culture-bound**, reflecting local customs and traditions.

- Australian Aborigines believe they can communicate with the spirits of their ancestors and that people, especially close relatives, share their dreams (Clarke, 2009). These beliefs are considered normal within aboriginal culture, but in ours, they would likely be deemed delusions, which professionals regard as a common feature of schizophrenia.
- Being reared in the Dominican Republic and some other Caribbean cultures is connected with *susto*, which is characterized by agitation and a fear of voodoo (black magic) (Quinlan, 2010).
- Many traditional Native Americans distinguish between illnesses that are believed to arise from outside influences, called “white man’s sicknesses,” such as alcoholism and drug addiction, and those that emanate from a lack of harmony with traditional tribal life and thought, which are called “Indian sicknesses” (D. R. M. Beck, 2010).
- Japanese and Japanese Americans are prone to developing *taijin-kyofusho*, which is characterized by extreme anxiety over other people’s perceptions of one’s appearance and thus heightens the cultural tendency to avoid direct eye contact (Lim, 2009). In the dominant U.S. culture, eye contact—without glaring!—shows interest and normal self-assurance; among Japanese people, eye contact may be interpreted as a sign of aggression.

Therefore, according to the biopsychosocial model, biological, psychological, and sociocultural factors may all come into play in the development of psychological disorders. But again, different factors take on different importance among different people. We’ll jump a bit ahead to note that if your siblings, parents, grandparents, and cousins have never had a brush with schizophrenia, you are also unlikely to have one regardless of how much stress you experience. Others, whose families are deeply afflicted, are less fortunate. They may develop schizophrenia despite the best of circumstances.

The Biopsychosocial Model



Diathesis–stress model The view that psychological disorders can be explained in terms of an underlying vulnerability (diathesis) and problems that create pressure or tension (stress).

Biopsychosocial perspective The view that psychological disorders can be explained by a combination of (a) possible biological vulnerabilities; (b) psychological factors such as stress and self-defeating thoughts; and (c) sociocultural factors such as family relationships and cultural beliefs and expectations.

Culture-bound Determined by the experiences of being reared within a certain cultural setting.

Many others are in between, with a slight to moderate genetic vulnerability. They may incur intermittent episodes of schizophrenia, especially under stress, but they tend to be readily treated, if not “cured.” As in the case of schizophrenia, psychologists today frequently speak of the interaction between the biological *nature* of the individual and his or her life experiences, or *nurture*.

Classifying Psychological Disorders

Classification is at the heart of science. Without classifying psychological disorders, investigators would not be able to communicate with each other, and scientific progress would come to a halt. The most widely used classification for psychological disorders¹ is the *Diagnostic and Statistical Manual (DSM)* of the American Psychiatric Association (2000). **Question 3: How are psychological disorders grouped or classified?**

The current edition of the *DSM* is the *DSM-IV-TR* (fourth edition, text revision), and it provides information about a person’s overall functioning as well as a diagnosis. People may receive diagnoses for clinical syndromes or personality disorders or both. The *DSM* also includes information about people’s medical conditions and psychosocial and environmental problems, as well as a “global assessment” of functioning. Medical conditions include physical disorders or problems that may affect people’s response to psychotherapy or drug treatment. Psychosocial and environmental problems include difficulties that may affect the diagnosis, treatment, or outcome of a psychological disorder. The global assessment of functioning allows the clinician to compare the client’s current level of functioning with her or his highest previous level of functioning to help set goals for restoring functioning.

Although the *DSM* is widely used, researchers have some concerns about it. Two of them involve the **reliability** and **validity** of the diagnostic standards. The *DSM* might be considered *reliable* if different interviewers or raters would make the same diagnosis when they evaluate the same people. The *DSM* might be considered *valid* if the diagnoses described in the manual correspond to clusters of behaviors observed in the real world. A specific type of validity—**predictive validity**—means that if a diagnosis is valid, then we should be able to predict what will happen to the person over time (that is, the *course* of the disorder) and what type of treatment may be of help.

DSM standards for assessing psychological disorders are strict—so strict that some actual cases of disorders might be left out. On the other hand, the *DSM* has also been accused of “pathologizing” some behavior patterns that may be of concern but are probably not abnormal. For example, perhaps some children, especially boys, who are bored silly by school and normally energetic (have their “motors running”), might be diagnosed with attention-deficit/hyperactivity disorder. The diagnosis of “binge eating disorder” is controversial because it describes people (too many of us!) who have episodes of overeating and then fail to take off the extra pounds through dieting or at least more regular eating patterns (Striegel-Moore & Franco, 2008). Moreover, the reliability and validity of various diagnoses differ (Hilsenroth et al., 2004; S. W. Smith et al., 2009). For example, the diagnosis of schizophrenia might be more reliable and valid than the diagnosis of borderline personality disorder (Johansen et al., 2004). All in all, when evaluating the *DSM*, we should consider whether it improves clinical decision making and whether it enhances the clinical outcome for people with psychological disorders. The *DSM* is entering another new edition in a couple of years.

Prevalence of Psychological Disorders

Question 4: How common are psychological disorders? At first glance, psychological disorders might seem to affect only a few of us. Relatively few people are admitted to psychiatric hospitals. Most people will never seek the help of a psychologist or psychiatrist. And the insanity plea—though well publicized—is a rarity in the criminal justice system. Many of us have “eccentric” relatives or friends, but most of them are not considered “crazy.” But the truth of the matter is that psychological disorders affect us all in one way or another.

Reliability The consistency of a method of assessment, such as a psychological test or (in this case) a manual describing the symptoms of psychological disorders.

Validity The extent to which a method of assessment, such as a psychological test or (in this case) a manual describing the symptoms of psychological disorders, measures the traits or clusters of behavior it is supposed to assess.

Predictive validity The extent to which a diagnosis permits one to predict the course of a disorder and the type of treatment that may be of help.

¹Also known as mental disorders or mental illnesses.

Table 15.1 ■ Past-Year and Lifetime Prevalences of Psychological Disorders

	Anxiety Disorders	Mood Disorders	Substance Use Disorders	Any Disorder
Prevalence during past year	18.1%	9.5%	3.8%	26.2%
Lifetime prevalence	28.8%	20.8%	14.6%	46.4%
Median age of onset	11 years	30 years	20 years	14 years

Sources: Kessler et al., 2005a; Kessler et al., 2005b.

The data in this table are based on a nationally representative sample of 9,282 English-speaking U.S. residents aged 18 and above. Respondents could report symptoms of more than one type of disorder. For example, anxiety and mood disorders are often “comorbid”—that is, occur together. Anxiety and mood disorders are discussed in this chapter. Substance use disorders are discussed in Chapter 5.

About half of us will meet the criteria for a *DSM* disorder at some time or another in our lives, with the disorder most often beginning in childhood or adolescence (Kessler et al., 2005a; see Table 15.1 ■). Slightly more than a fourth of us will experience a psychological disorder in any given year (Kessler et al., 2005b; see Table 15.1). But if we include the problems of family members, friends, and coworkers, add in the number of those who foot the bill in terms of health insurance and taxes, and factor in increased costs due to lost productivity, then perhaps everyone is affected in one way or another.

Let’s now consider the kinds of psychological disorders. Some of them, like anxiety disorders, are common. Others, like dissociative identity disorder (the disorder with which William was diagnosed), are rare.

LearningConnections • WHAT ARE PSYCHOLOGICAL DISORDERS?

ACTIVE REVIEW (1) Since the Middle Ages, Europeans have largely explained psychological disorders in terms of _____ by the Devil. (2) Terms such as *psychopathology* and *mental patient* suggest the influences of the _____ model. (3) Behavior is labeled abnormal when it is unusual, is socially unacceptable, involves faulty _____ of reality (as with hallucinations), and/or is dangerous, self-defeating, or distressing. (4) The _____ perspective explains psychological disorders in terms of biological, psychological, and sociocultural factors.

REFLECT AND RELATE Have you ever heard anyone say, “Something got into me” or, “The Devil made me do it”? What were the circumstances? Was the person trying to evade responsibility for wrongdoing?

CRITICAL THINKING When does a psychological problem become a “psychological disorder”? Is the border clearly defined?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

ANXIETY DISORDERS: REAL-LIFE “FEAR FACTORS”?

I had a great many sex and love cases where people were absolutely devastated when somebody with whom they were compulsively in love didn't love them back. They were killing themselves with anxiety and depression.

ALBERT ELLIS

Imagine allowing spiders to crawl all over your body or clinging to a beam swinging hundreds of feet above the ground. These are the types of experiences to which many people were exposed on the “reality TV” show *Fear Factor*. What made the show so riveting to some viewers? Possibly the fact that many of us, perhaps most of us, could not imagine participating in such activities for nearly any amount of fame or fortune. Discomfort with spiders and extreme heights is common enough; one could even argue that it is sensible. However, there are extreme, irrational fears of objects and situations, such as hypodermic needles and public speaking, that are examples of phobias—a type of anxiety disorder.

Anxiety disorders have psychological and physical symptoms. The psychological symptoms include worrying, fear of the worst things happening, fear of losing control, nervousness, and inability to relax. The physical symptoms reflect arousal—or

“overarousal”—of the sympathetic branch of the autonomic nervous system. They include trembling, sweating, a pounding or racing heart, elevated blood pressure (a flushed face), and faintness. As noted earlier, anxiety is an appropriate response to a real threat, but it can be abnormal when it is excessive, when it comes out of nowhere (that is, when events do not seem to warrant it), and when it prevents us from doing things that are necessary or highly desirable, such as going for medical exams or working with other people. Some anxiety disorders even prevent people from leaving home. **Question 5: What kinds of anxiety disorders are there?** There are different kinds of anxiety disorders, but all of them are characterized by excessive or unwarranted anxiety.

Types of Anxiety Disorders

The anxiety disorders include *phobic disorders*, *panic disorder*, *generalized anxiety*, *obsessive–compulsive disorder*, and *stress disorders*.

PHOBIC DISORDERS

This will sound crazy, but I wouldn’t get married because I couldn’t stand the idea of getting the blood test. [Blood tests for syphilis were required at the time.] [My doctor] said that getting tested for marriage was likely to be one of my small life problems. He told me about minor medical problems that could arise and make it necessary for blood to be drawn, or to have an IV in my arm, so his message was I should try to come to grips with my fear. I nearly fainted while he was talking about these things, so he gave it up.

The story has half a happy ending. We finally got married in [a state] where we found out they no longer insisted on blood tests. But if I ... need a blood test for some other reason, even if it’s life-threatening, I really don’t know what I’ll do.

—Alan, from the author’s files

There are several types of phobic disorders, including *specific phobias*, *social phobia*, and *agoraphobia*. Some of them, such as social phobia, can be highly detrimental to one’s quality of life (Ohayon & Schatzberg, 2010). **Specific phobias** are excessive, irrational fears of specific objects or situations, such as spiders, snakes, or heights. One specific phobia is fear of elevators. Some people will not enter elevators despite the hardships they incur as a result (such as walking up six flights of steps). Yes, the cable *could* break. The ventilation *could* fail. One *could* be stuck in midair waiting for repairs. These problems are uncommon, however, and it does not make sense for most people to walk up and down several flights of stairs to elude them.

Similarly, some people, like Alan, with a specific phobia for hypodermic needles, will not have injections, even to treat profound illness. Injections can be painful, but most people with a phobia for needles would gladly suffer an even more painful pinch if it would help them fight illness. Alan said, “People have me wrong, you know. They think I’m scared of the pain. I don’t like pain—I’m not a masochist—but pain has nothing to do with it. You could pinch my arm till I turned black and blue and I’d tolerate it. I wouldn’t like it, but I wouldn’t start shaking and sweating and faint on you. But even if I didn’t feel the needle at all—just the knowledge that it was in me is what I couldn’t take.”

Other specific phobias include **claustrophobia** (fear of tight or enclosed places), **acrophobia** (fear of heights), and fear of mice, snakes, and other creepy crawlies. (Fear of spiders is technically referred to as *arachnophobia*.) Fears of animals and imaginary creatures are common among children and are generally not considered abnormal.

Social phobias are persistent fears of scrutiny by others or of doing something that will be humiliating or embarrassing. Excessive fear of public speaking is a common social phobia.

Agoraphobia may affect as many as 3% to 4% of adults (Kessler et al., 2005a). Agoraphobia is derived from the Greek words meaning “fear of the marketplace,” or

Now is the age of anxiety.

W. H. AUDEN

Anxiety disorders Disorders characterized by excessive worrying, fear of losing control, nervousness, and inability to relax.

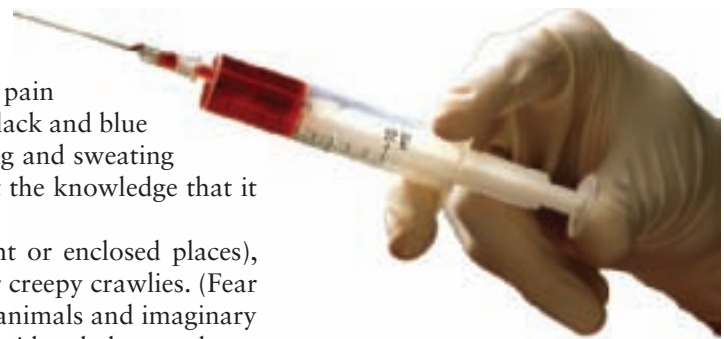
Specific phobia Persistent fear of a specific object or situation.

Claustrophobia Fear of tight, small places.

Acrophobia Fear of high places.

Social phobia An irrational, excessive fear of public scrutiny.

Agoraphobia Fear of open, crowded places.



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A Hypodermic Syringe Phobias are excessive irrational fears that can interfere with a person’s life. A phobia for needles can prevent a person from obtaining needed medical care.

fear of being out in open, busy areas. Persons with agoraphobia fear being in places from which it might be difficult to escape or in which help might not be available if they get upset. In practice, people who receive this diagnosis often refuse to venture out of their homes, especially by themselves. They find it difficult to hold a job or to maintain an ordinary social life.

PANIC DISORDER

It happened while I was sitting in the car at a traffic light. I felt my heart beating furiously fast, like it was just going to explode. It just happened, for no reason. I started breathing really fast but couldn't get enough air. It was like I was suffocating and the car was closing in around me. I felt like I was going to die right then and there. I was trembling and sweating heavily. I thought I was having a heart attack. I felt this incredible urge to escape, to just get out of the car and get away.

—Michael, in Nevid et al., 2012

Panic disorder is an abrupt attack of acute anxiety that is apparently not triggered by a specific object or situation. People with panic disorder have strong physical symptoms such as shortness of breath, heavy sweating, tremors, and pounding of the heart. Like Michael, they are particularly aware of cardiac sensations (Blechert et al., 2010). It is not unusual for them to think they are having a heart attack. Levels of cortisol (a stress hormone) in the saliva are elevated during attacks (Bandelow et al., 2000). Many fear suffocation. People with the disorder may also experience choking sensations, nausea, numbness or tingling, flushes or chills, and fear of going crazy or losing control. Panic attacks may last minutes or hours. Afterward, the person usually feels drained.

Many people panic now and then. The diagnosis of panic disorder is reserved for those who undergo a series of attacks or live in fear of attacks. Panic attacks seem to come from nowhere. Thus, some people who have had them stay home for fear of having an attack in public. These people are diagnosed as having panic disorder with agoraphobia (Schmidt et al., 2010).

People with panic disorder live in fear of fear, a state known more technically as *anxiety sensitivity* (AS) (Naragon-Gainey, 2010). Anxiety sensitivity intensifies fear reactions to cues of bodily arousal. People with high AS fear that their emotions and the discomfort in their bodies will get out of hand, leading to disastrous consequences such as a heart attack. They tend to interpret the physical symptoms of anxiety, such as a racing heart or shortness of breath, as signs of impending doom, which in turn intensifies their physical symptoms and may bring on a full-blown panic attack.

Just as people in panic may fear they are having heart attacks, people with heart problems may sometimes misinterpret their symptoms as anxiety. For this reason, psychologists will typically recommend that people presenting the symptoms of panic disorder have a medical workup to rule out cardiac problems.

GENERALIZED ANXIETY DISORDER

Earl was a 52-year-old supervisor at an automobile plant. His hands trembled as he spoke. His cheeks were pale. He was successful in his work, although he admitted that he was not a “star.” His marriage of nearly three decades was in “reasonably good shape.” The mortgage on the house was not a burden, but “I don’t know what it is—I think about money all the time.” The three children were doing well, but “with everything going on these days, I’m up for hours worrying about them.”

Earl shook his head. “I swear I’ll find myself worrying when there’s nothing in my head. It’s like I’m worrying first and then there’s something in my head to worry about. Then the shakes come, and I’m worrying about worrying.”

Earl had been worked up “for everything. . . . My doctor told me to stay away from coffee and alcohol. Then from tea. Then from chocolate and Coca-Cola, because there’s a little bit of caffeine [in them]. He gave me Valium [a minor tranquilizer] and I thought I was in heaven for a while. Then it stopped working, and

I remember being onstage once when I didn't have fear: I got so scared I didn't have fear that it brought on an anxiety attack.

CARLY SIMON

Panic disorder The recurrent experiencing of attacks of extreme anxiety in the absence of external stimuli that usually elicit anxiety.

he switched me to something else. Then that stopped working, and he switched me back. Then he said he was ‘out of chemical miracles’ and I better see a shrink or something. Maybe it was something from my childhood.”

—From the author’s files

Earl was diagnosed with generalized anxiety disorder. The central symptom of **generalized anxiety disorder** is persistent anxiety. As with panic disorder, the anxiety cannot be attributed to a phobic object, situation, or activity. Rather, it seems to be free floating. The core of the disorder appears to be pervasive worrying about numerous stressors (Behar et al., 2009). Symptoms include motor tension (shakiness, inability to relax, furrowed brow, fidgeting); autonomic overarousal (sweating, dry mouth, racing heart, lightheadedness, frequent urinating, diarrhea); and excessive vigilance, as shown by irritability, insomnia, and a tendency to be easily distracted.

OBSESSIVE–COMPULSIVE DISORDER

Anne had her husband conform to her routines for removing the garbage: She would have him turn on the water and leave it on, because if her husband touched the garbage and then the spigot, she would feel that the spigot had been contaminated. She had him take a garbage bag in one hand, stand several feet from the dumpster so as to be certain not to touch it, and toss the bag in. Then she had him unlock the door to the house, slip off his shoes, enter, and wash his hands with soap from a pump. The pump enabled him to use his clean wrist to pump soap into the palm of his hand without contaminating the dispenser. She had him go through this routine for each bag, perhaps 20 on a given day. If she believed that he had been contaminated during any step, as by some liquid on the outside of a bag wetting his shirt, “I’d have to go over the scene again and again in my mind until I could . . . convince myself that I wasn’t really in danger of getting a disease. . . . If I couldn’t shake the fear, I’d ask my husband to go through [all the bags] to find the contaminated bag and try to identify the liquid. He was usually pretty against this, so I had to beg. It was all I’d talk about for hours, and I guess in an effort to just shut me up he’d relent.”

—Adapted from Colas, 1999, p. 71

Obsessive–compulsive disorder (OCD) is defined by recurrent, anxiety-provoking thoughts or images that seem irrational and beyond control (*obsessions*) and seemingly irresistible urges to engage in thoughts or behaviors that tend to reduce the anxiety (*compulsions*). Obsessions are so compelling and recurrent that they disrupt daily life. They may include doubts about whether one has locked the doors and shut the windows or images such as one mother’s repeated fantasy that her children had been run over on the way home from school. One woman became obsessed with the idea that she had contaminated her hands with Sani-Flush and that the chemicals were spreading to everything she touched. A 16-year-old boy found “numbers in his head” when he was about to study or take a test.

Compulsions are urges to engage in specific acts, often repeatedly, such as Anne’s compulsion to have her husband “decontaminate” himself after handling the garbage or elaborate washing after using the bathroom. The impulse is recurrent and forceful, interfering with daily life. The woman who felt contaminated by Sani-Flush spent 3 to 4 hours at the sink each day and complained, “My hands look like lobster claws.”

STRESS DISORDERS

Darla, who lives in Oregon, dreamed that she was trapped in a World Trade Center tower when it was hit by an airplane on September 11, 2001. Kelly, a Californian, dreamed of a beautiful bald eagle that was suddenly transformed into a snarling bird with glowing red eyes.

—“Sleepers Suffer WTC Nightmares,” 2001



© Stuart Paton/Stone/Getty Images

Generalized anxiety disorder Feelings of dread and foreboding and sympathetic arousal of at least 6 months’ duration.

Obsessive–compulsive disorder (OCD) An anxiety disorder defined by recurrent, anxiety-provoking thoughts or images that seem irrational and beyond control (*obsessions*) and seemingly irresistible urges to engage in thoughts or behaviors that tend to reduce the anxiety (*compulsions*).



© Paula Bronstein/Getty Images

The all-too-real nightmare of the events of September 11 has caused many people to have bad dreams. Such dreams are part of the experience of *posttraumatic stress disorder*.

POSTTRAUMATIC STRESS DISORDER (PTSD)

Posttraumatic stress disorder is characterized by a rapid heart rate and feelings of anxiety and helplessness that are caused by a traumatic experience. Such experiences may include a natural or human-made disaster, a threat or assault, or witnessing a death. PTSD may occur months or years after the event. It frequently occurs among firefighters, combat veterans, and people whose homes and communities have been swept away by natural disasters or who have been victims of accidents or interpersonal violence (Chard et al., 2010; McCauley et al., 2010).

The traumatic event is revisited in the form of intrusive memories, recurrent dreams, and flashbacks—the sudden feeling that the event is recurring (McDevitt-Murphy et al., 2010). People with PTSD typically try to avoid thoughts and activities connected to the traumatic event. They may also find it more difficult to enjoy life and have sleep problems, irritable outbursts, difficulty concentrating, extreme vigilance, and an intensified “startle” response. The terrorist attacks of September 11, 2001, took their toll on sleep. According to a poll taken by the National Sleep Foundation (2001) 2 months after the attacks, nearly half of Americans had difficulty falling asleep compared with about one-quarter of Americans before the attacks (see Figure 15.1 ■). Women, who are more likely than men to ruminate about stressors (Nolen-Hoeksema et al., 2008), were also more likely than men to report sleep problems, such as difficulty falling asleep (50% versus 37%).

ACUTE STRESS DISORDER **Acute stress disorder**, like PTSD, is characterized by feelings of anxiety and helplessness that are caused by a traumatic event. However, PTSD can occur 6 months or more after the traumatic event and tends to persist. Acute stress disorder occurs within a month of the event and lasts from 2 days to 4 weeks. Women who have been raped, for example, experience acute distress that tends to peak in severity about 3 weeks after the assault (Bryant, 2006). Yet the same women frequently go on to experience PTSD (Kilpatrick et al., 2007; Koss et al., 2002).

Mark Schuster and his colleagues (2001) conducted a telephone survey of a nationally representative sample of 560 American adults—not just those who lived near the attacks—3 to 5 days following the terrorist attacks on September 11, 2001. They found that 90% of respondents reported at least one stress-related symptom, and 44% reported more severe symptoms of stress. Respondents coped by seeking social support, as in talking in group activities (60%), by turning to religion (90%), and by making donations (36%). The great majority of parents of children aged 5 to 18 (84%) reported that they had talked with their children about the attacks for at least an hour, and about one-third (34%) restricted their children’s exposure to television coverage of the attacks.

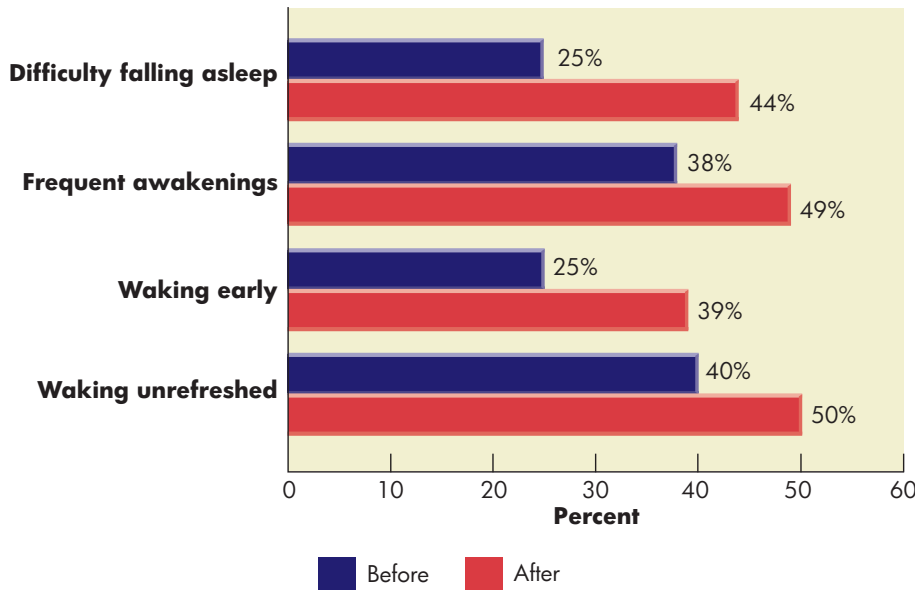


Figure 15.1 ■ Sleep Problems among Americans before and 2 Months after September 11, 2001 Insomnia is one of the symptoms of stress disorders. A poll by the National Sleep Foundation found that Americans had a greater frequency of sleep problems after the terrorist attacks of September 11.

Origins of Anxiety Disorders

There are thus several kinds of anxiety disorders. **Question 6: What is known about the origins of anxiety disorders?**

ANXIETY DISORDERS:
REAL-LIFE “FEAR
FACTORS”?

PSYCHOLOGICAL VIEWS

According to the psychodynamic perspective, phobias symbolize conflicts originating in childhood. Psychodynamic theory explains generalized anxiety as persistent difficulty in repressing primitive impulses. Obsessions are explained as leakage of unconscious impulses, and compulsions are seen as acts that allow people to keep such impulses partly repressed. For example, fixation in the anal stage is theorized to be connected with development of traits such as excessive neatness of the sort that could explain some cases of obsessive–compulsive disorder.

Some learning theorists—particularly behaviorists—consider phobias to be conditioned fears that were acquired in early childhood. Therefore, their origins are beyond memory. Avoidance of feared stimuli is reinforced by the reduction of anxiety. Observational learning may also play a role in the acquisition of fears (Mineka & Oehlberg, 2008). If parents squirm, grimace, and shudder at the sight of mice, blood, or dirt on the kitchen floor, children might assume that these stimuli are awful and imitate their parents’ behavior.

Cognitive theorists suggest that anxiety is maintained—if not initially caused—by thinking that one is in a terrible situation and helpless to change it. People with anxiety disorders may be cognitively biased toward paying a good deal of attention to threats (Koster et al., 2009).

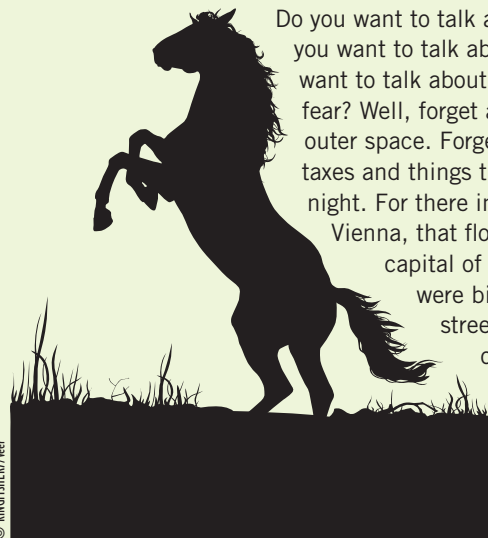
Cognitive theorists note that people’s appraisals of the magnitude of threats help determine whether they are traumatic and can lead to PTSD (Koster et al., 2009). People with panic attacks tend to misinterpret bodily cues and to view them as threats. Obsessions and compulsions may serve to divert attention from more frightening issues, such as “What am I going to do with my life?” When anxieties are acquired at a young age, we may later interpret them as enduring traits and label ourselves as “someone who fears _____” (you fill it in). We then live up to the labels. We also entertain thoughts that heighten and perpetuate anxiety, such as “I’ve got to get out of here” or “My heart is going to leap out of my chest.” Such ideas intensify physical signs of anxiety, disrupt planning, make stimuli seem worse than they really are, motivate

Posttraumatic stress disorder

(PTSD) A disorder that follows a distressing event outside the range of normal human experience and that is characterized by features such as intense fear, avoidance of stimuli associated with the event, and reliving of the event.

Acute stress disorder A disorder, like PTSD, that is characterized by feelings of anxiety and helplessness and caused by a traumatic event. Acute stress disorder occurs within a month of the event and lasts from 2 days to 4 weeks.

In Profile— Little Hans



© KINGSHERY/WER

Phobias Little Hans feared that horses were biting people in the streets. Why?

Do you want to talk about conflict? Do you want to talk about drama? Do you want to talk about raw, unnerving fear? Well, forget about aliens from outer space. Forget about income taxes and things that go bump in the night. For there in turn-of-the-century Vienna, that flourishing European capital of the arts, horses were biting people in the streets. Or so thought one petrified 5-year-old boy by the name of Hans.

In 1908, Hans’s distraught father sought Sigmund Freud’s advice. Freud (1909/1955) went

on to write one of his most famous case studies, “Analysis of a Phobia in a 5-Year-Old Boy.” Freud concluded that the horses were symbols that represented Hans’s father. Being bitten symbolized being castrated. In other words, Hans unconsciously feared that his father would castrate him. Why? Because Hans was his father’s rival in a contest for the affection of his mother. Hans, that is, was in the throes of the Oedipus complex.

Freud’s analysis has been criticized on many grounds. For one thing, Freud carried out Hans’s psychoanalysis from a distance—by mail with the boy’s father! For another, other interpretations of the boy’s fear of horses are possible. Historically speaking, however, the case of Little Hans laid much of the groundwork for the psychoanalytic belief that phobic objects symbolize unconscious conflicts that date from early childhood.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Little Hans.

avoidance, and decrease self-efficacy expectations. The belief that we will not be able to handle a threat heightens anxiety. The belief that we are in control reduces anxiety (Bandura et al., 1985).

BIOLOGICAL VIEWS

Biological factors play key roles in anxiety disorders. They involve genetic factors, evolution, the autonomic nervous system, and the endocrine system.

GENETIC FACTORS Genetic factors are implicated in most psychological disorders, including anxiety disorders (Bienvenu et al., 2007; Hettema et al., 2005). For one thing, anxiety disorders tend to run in families, both in monkeys and in people. Twin studies find much higher **concordance** rates for anxiety disorders among identical (MZ) twins than among fraternal (DZ) twins (Kendler et al., 2001). Studies of adoptees who are anxious similarly show that the biological parent places the child at greater risk for anxiety and related traits than does the adoptive parent.

Some researchers suggest that the actions of specific genes affect chemical balances that lead to an overarousal of brain circuitry, dubbed the “worry circuit,” contributing to the development of obsessive–compulsive disorder (Fineberg & Craig, 2009). The worry circuit consists of a network of neurons in the brain that help signal danger. In obsessive–compulsive disorder, the brain may be sending continual but bogus messages through the circuit, signaling erroneously that something is wrong and requires immediate attention. This leads to obsessive, worrisome thoughts and repetitive, compulsive behaviors. The worry circuit incorporates structures in the limbic system, including the amygdala, which is involved in processing threatening stimuli.

NATURAL SELECTION Evolutionary psychologists suggest that anxiety may reflect natural selection. Humans (and nonhuman primates) are genetically predisposed (“biologically prepared”) to fear stimuli that may have posed a threat to their ancestors (Gerdes et al., 2009; Mineka & Oehlberg, 2008; see Chapter 6). Evolutionary forces would have favored the survival of individuals who were predisposed toward acquiring fears of large animals, spiders, snakes, heights, entrapment, sharp objects, and strangers. Thus, the individuals who fearlessly encounter potentially harmful stimuli, such as we see on shows like *Fear Factor*, may be at a disadvantage, evolutionarily speaking, rather than at an advantage.



© Michael Blann/Syrene/Getty Images

Evolutionary Forces at Work? Why do so many people fear spiders?

THE AUTONOMIC NERVOUS SYSTEM AND THE ENDOCRINE SYSTEM

Perhaps a predisposition toward anxiety—in the form of a highly reactive autonomic nervous system—can be inherited (Beesdo et al., 2010; Binder & Nemeroff, 2009). What might make a nervous system “highly reactive”? The hypothalamus of people with anxiety disorders may secrete excessive amounts of corticotrophin-releasing hormone (CRH), which in turn causes the adrenal glands to secrete high levels of stress hormones. The autonomic nervous system may stimulate the production of excessive quantities of adrenaline (epinephrine) and noradrenaline (norepinephrine). These chemicals normally pump up the body in preparation for the fight-or-flight response—both sides of which can make up self-preserving responses to threats. But when their production is so intense that they flood the body, we can feel drenched with sweat and shakiness and incapable of doing anything useful.

Anxiety disorders may also involve the excitatory neurotransmitter glutamate, and receptor sites in the brain may not be sensitive enough to gamma-aminobutyric acid (GABA), an inhibitory neurotransmitter that may counterbalance glutamate (Martin et al., 2009). The benzodiazepines, a class of drugs that reduce anxiety, may work by increasing the sensitivity of receptor sites to GABA.

According to the biopsychosocial perspective, biological imbalances may initially trigger attacks in panic disorder. But subsequent fear of attacks—and of the

Concordance Agreement.

bodily cues that signal their onset—may heighten discomfort and give one the idea there is nothing one can do about them (Olatunji & Wolitzky-Taylor, 2009). Feelings of helplessness increase fear. People with panic disorder therefore can be helped by psychological methods that provide ways of reducing physical discomfort—including regular breathing—and show them that there are, after all, things they can do to cope with attacks (Olatunji & Wolitzky-Taylor, 2009).

LearningConnections • ANXIETY DISORDERS: REAL-LIFE “FEAR FACTORS”?

ACTIVE REVIEW (5) A(n) _____ is an irrational, excessive fear. (6) _____ disorder is characterized by sudden attacks in which people typically fear that they may be losing control or going crazy. (7) In obsessive-_____ disorder, people are troubled by intrusive thoughts or impulses to repeat some activity. (8) Anxiety disorders (do or do not?) tend to run in families.

REFLECT AND RELATE Have you ever felt anxious? Did your anxiety strike you as being normal under the circumstances? Why or why not?

CRITICAL THINKING Critical thinkers attend to the definitions of terms. For example, is anxiety abnormal? What is the difference between run-of-the-mill anxiety and an *anxiety disorder*?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

DISSOCIATIVE DISORDERS: SPLITTING CONSCIOUSNESS

William’s disorder, described at the beginning of the chapter, was a dissociative disorder. In the **dissociative disorders**, mental processes such as thoughts, emotions, memory, consciousness, even knowledge of one’s own identity—the processes that make a person feel whole—may seem to be split off from one another. **Question 7: What kinds of dissociative disorders are there?**

— ■ —
*Nothing is so difficult as not
deceiving oneself.*

LUDWIG WITTGENSTEIN
— ■ —

Types of Dissociative Disorders

The *DSM* lists several dissociative disorders. Among them are *dissociative amnesia*, *dissociative fugue*, and *dissociative identity disorder* (previously termed *multiple personality disorder*).

DISSOCIATIVE AMNESIA

A person with **dissociative amnesia** is suddenly unable to recall important personal information (that is, explicit episodic memories). The loss of memory cannot be attributed to organic problems such as a blow to the head or alcoholic intoxication. It is thus a psychological dissociative disorder and not an organic one. In the most common example, the person cannot recall events for a number of hours after a stressful incident, as in warfare or in the case of an uninjured survivor of an accident. In *generalized* dissociative amnesia, people forget their entire lives. Amnesia may last for hours or years.

DISSOCIATIVE FUGUE

A person with **dissociative fugue** abruptly leaves his or her home or place of work and travels to another place, having lost all memory of his or her past life. While at the new location, the person either does not think about the past or reports a past filled with invented memories. The new personality is often more outgoing and less inhibited than the “real” identity. Following recovery, the events that occurred during the fugue are not recalled.

Dissociative disorders Disorders in which there are sudden, temporary changes in consciousness or self-identity.

Dissociative amnesia A dissociative disorder marked by loss of memory or self-identity; skills and general knowledge are usually retained.

Dissociative fugue A dissociative disorder in which one experiences amnesia and then flees to a new location.

Showtime for DID In the Showtime series *United States of Tara*, Toni Collette plays Tara Gregson, a homemaker with two children and several other personalities. Tara has dissociative identity disorder, and within her “reside” the flirty “T,” a suburban housewife plucked from the 1950s, and a beer-guzzling Vietnam veteran named “Buck.”



DISSOCIATIVE IDENTITY DISORDER

Dissociative identity disorder (DID) (formerly termed **multiple personality disorder**) is the name given to William’s disorder. In dissociative identity disorder, two or more identities or personalities, each with distinct traits and memories, “occupy” the same person. Each identity may or may not be aware of the others or of events experienced by the others (Huntjens et al., 2003).

Truth or Fiction Revisited: The identities of an individual with dissociative identity disorder can be very different from one another. They might even have different eyeglass prescriptions (Braun, 1988). Braun reports cases in which assorted identities showed different allergic responses. In one person, an identity named Timmy was not sensitive to orange juice. But when other identities gained control over him and drank orange juice, he would break out with hives. Hives would also erupt if another identity emerged while the juice was being digested. If Timmy reappeared when the allergic reaction was present, the itching of the hives would cease, and the blisters would start to subside. In other cases reported by Braun, different identities within a person might show various responses to the same medicine. Or one identity might exhibit color blindness while others had normal color vision.

A few celebrated cases of this disorder have been portrayed in the popular media. One of them became the subject of the film *The Three Faces of Eve*. A timid housewife named Eve White harbored two other identities. One was Eve Black, a sexually aggressive, antisocial personality. The third was Jane, an emerging identity who was able to accept the existence of her primitive impulses yet engage in socially appropriate behavior. Ironically, later on, Jane (a woman named Chris Sizemore in real life) reportedly split into 22 identities. Another well-publicized case is that of *Sybil*, a woman with 16 identities who was portrayed by Sally Field in the film *Sybil*.

Dissociative identity disorder A disorder in which a person appears to have two or more distinct identities or personalities that may alternately emerge.

Multiple personality disorder The previous term for *dissociative identity disorder*.

Origins of Dissociative Disorders

The dissociative disorders are some of the odder psychological disorders. **Question 8: What is known about the origins of dissociative disorders?**

Psychologists of different theoretical persuasions have offered hypotheses about the origins of dissociative identity disorder and other dissociative disorders. According

to psychodynamic theory, for example, people with dissociative disorders use massive repression to prevent them from recognizing improper impulses or remembering ugly events (Berlin & Koch, 2009). In dissociative amnesia and fugue, the person forgets a profoundly disturbing event or impulse. In dissociative identity disorder, the person expresses unacceptable impulses through alternative identities.

According to learning theorists, people with dissociative disorders have learned not to think about bad memories or disturbing impulses to avoid feelings of anxiety, guilt, and shame. Both psychodynamic and learning theories suggest that dissociative disorders help people keep disturbing memories or ideas out of mind. Of what could such memories be? Research suggests that many—perhaps most—cases involve memories of sexual or physical abuse during childhood, usually by a relative or caregiver (Foote et al., 2006; Ross, 2006; Simeon et al., 2007).

Whereas some disorders—major depressive disorder and schizophrenia among them—are found around the world, most cases of dissociative disorders have been limited to the United States and Canada (Ross, 2006). Perhaps dissociative disorders, especially DID, are culture-bound. It might also be the case, as suggested by skeptics, that many or most individuals who claim to have multiple personalities are misrepresenting (Kong et al., 2008). On the other hand, as noted, different personalities in people with DID may have different eyeglass prescriptions, or one person may be allergic to some substance, as shown by hives, whereas another personality is not (Ross, 2006).

As further evidence for the validity of the diagnosis, people diagnosed with DID show enhanced functioning of working memory compared to normal controls. Bernet Elzinga and his colleagues (2007) gave DID patients and control participants a verbal memory task and used fMRI to measure how active their brains were during the task. DID patients showed comparatively greater activity in parts of the prefrontal cortex, which is involved in executive functioning. Perhaps people diagnosed with DID exercise greater control over which memories they will access—a possibility consistent with the view that different personalities have different sets of memories. A PET scan study found that DID patients and normal controls apparently process trauma-related memories in different areas of the brain (Reinders et al., 2006). Possibly, more studies into DID are carried out each year than there are people with DID. As time goes on, we look forward to more knowledge of biological factors in DID.

LearningConnections • DISSOCIATIVE DISORDERS: SPLITTING CONSCIOUSNESS

ACTIVE REVIEW (9) People with generalized dissociative _____ forget their own identities. (10) In dissociative _____ disorder, the person behaves as if distinct personalities occupy the body. (11) Many people with dissociative disorders have a history of physical or sexual _____.

REFLECT AND RELATE Have you seen a film or a TV show in which a character was supposed to have dissociative identity disorder (perhaps it was called “multiple personality”)?

Did the character’s behavior seem consistent with the description of the disorder in the text?

CRITICAL THINKING Can you think of a way to determine whether someone who claims to have a dissociative disorder is telling the truth?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

SOMATOFORM DISORDERS: WHEN THE BODY EXPRESSES STRESS

People with **somatoform disorders** complain of physical problems such as paralysis, pain, or a persistent belief that they have a serious disease. Yet no evidence of a physical abnormality can be found.

Somatoform disorders Disorders in which people complain of physical (somatic) problems even though no physical abnormality can be found.

— ■ —

*The trouble with being a
hypochondriac these days is
that antibiotics have cured all
the good diseases.*

CASKIE STINNETT

— ■ —



Hypochondriasis People with hypochondriasis are irrationally concerned that they have contracted illnesses. Such people appear to be unusually sensitive to physical sensations. Do they also focus on their physical symptoms as an alternative to dealing with the social and other problems in their lives?

Types of Somatoform Disorders

Question 9: What kinds of somatoform disorders are there? In this section, we discuss two somatoform disorders: *conversion disorder* and *hypochondriasis*.

CONVERSION DISORDER

Conversion disorder is characterized by a major change in, or loss of, physical functioning, although there are no medical findings to explain the loss of functioning. The behaviors are not intentionally produced. That is, the person is not faking. Conversion disorder is so named because it appears to “convert” a source of stress into a physical difficulty.

If you lost the ability to see at night or if your legs became paralyzed, you would understandably show concern. But some people with conversion disorder show indifference to their symptoms, a symptom termed *la belle indifférence*. The lack of concern suggests awareness, on some level, that the physical problems have their benefits.

During World War II, some bomber pilots developed night blindness. They could not carry out their nighttime missions, although no damage to the optic nerves was found. In rare cases, women with large families have been reported to become paralyzed in the legs, again with no medical findings. More recently, a Cambodian woman who had witnessed atrocities became blind as a result.

HYPOCHONDRIASIS

Another more common type of somatoform disorder is **hypochondriasis** (also called *hypochondria*). People with this disorder insist that they are suffering from a serious physical illness, even though no medical evidence of illness can be found. They become preoccupied with minor physical sensations and continue to believe that they are ill despite the reassurance of physicians that they are healthy. They may run from doctor to doctor, seeking the one who will find the causes of the sensations. Fear of illness may disrupt their work or home life. **Question 10: What is known about the origins of somatoform disorders?**

Origins of Somatoform Disorders

There is evidence that people with conversion disorder are susceptible to being hypnotized (R. J. Brown et al., 2007). In fact, some investigators consider conversion disorder to be a form of self-hypnosis in which people focus so intently on an imaginary physical problem that they exclude conflicting information.

Research evidence suggests that people who develop hypochondriasis are particularly sensitive to bodily sensations and tend to ruminate about them (Marcus et al., 2008). However, an earlier name for the somatoform disorders affords us insight into a former sexist explanation of them, as we see in the nearby Controversy in Psychology. Consistent with psychodynamic theory, early versions of the *DSM* labeled them “hysterical neuroses.”

LearningConnections • SOMATOFORM DISORDERS: WHEN THE BODY EXPRESSES STRESS

ACTIVE REVIEW (12) In _____ disorders, people complain of physical problems or persist in believing they have a serious disease, even though no medical problem can be found. (13) In a(n) _____ disorder, there is a major change in or loss of physical functioning with no organic basis.

REFLECT AND RELATE Have you heard anyone referred to as “hysterical”? What was the usage of the word intended

to mean? Now that you know the origin of the term, do you feel it was used appropriately?

CRITICAL THINKING Why have somatoform disorders been considered “hysterical”? What are the social problems in labeling them as hysterical?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Controversy in Psychology ARE SOMATOFORM DISORDERS THE SPECIAL PROVINCE OF WOMEN?

Somatofarm disorders were once called *hysterical neuroses*. “Hysterical” derives from the word *hystera*, the Greek word for “uterus or womb.” Like many other Greeks, Hippocrates believed that hysteria was a female problem caused by a wandering uterus. It was erroneously thought that the uterus was not anchored in place and could roam through the body! As the uterus meandered, it could cause pains and odd sensations nearly anywhere. The Greeks also believed

that pregnancy anchored the uterus and ended hysterical complaints. What do you think Greek physicians prescribed to end monthly aches and pains? Good guess. Even in the earlier years of the 20th century, it was suggested that strange sensations and medically unfounded complaints were largely the province of women. Moreover, viewing the problem as a neurosis suggested that it stemmed from unconscious childhood conflicts. The psychodynamic view of conversion disorders is that the symp-

toms protect the individual from feelings of guilt or shame or from another source of stress. Conversion disorders, like dissociative disorders, often seem to serve a purpose. For example, the “blindness” of the World War II pilots may have enabled them to avoid feelings of fear of being literally shot down or of guilt for killing civilians. The night blindness of the pilots shows that conversion disorders are not the special province of women—whether they were once labeled hysterical or not.

MOOD DISORDERS: UP, DOWN, AND AROUND

Mood disorders are characterized by disturbance in expressed emotions. The disruption generally involves sadness or elation. Most instances of sadness are normal, or “run-of-the-mill.” If you have failed an important test, if you have lost money in a business venture, or if your closest friend becomes ill, it is understandable and fitting for you to be sad about it. It would be odd, in fact, if you were *not* affected by adversity.

Types of Mood Disorders

Question 11: What kinds of mood disorders are there? In this section, we discuss two mood disorders: *major depressive disorder* and *bipolar disorder*.

MAJOR DEPRESSIVE DISORDER

Depression is the common cold of psychological problems. People with run-of-the-mill depression may feel sad, blue, or “down in the dumps.” They may complain of lack of energy, loss of self-esteem, difficulty concentrating, loss of interest in activities and other people, pessimism, crying, and thoughts of suicide.

These feelings are more intense in people with **major depressive disorder**. According to a nationally representative sample of more than 9,000 adults in the United States, major depressive disorder affects 5% to 7% of us within any given year and one person in six or seven over the course of our lives (Hasin et al., 2005; Kessler et al., 2003). About half of those with major depressive disorder experience severe symptoms such as poor appetite, serious weight loss, and agitation or **psychomotor retardation**. They may be unable to concentrate and make decisions. They may say that they “don’t care” anymore and in some cases attempt suicide. A minority may display faulty perception of reality—so-called psychotic behaviors. These include delusions of unworthiness, guilt for imagined wrongdoings, even the notion that one is rotting from disease. There may also be delusions, as of the Devil administering deserved punishment, or hallucinations, as of strange bodily sensations. The nearby self-assessment will afford you insight as to whether you are experiencing feelings of depression.

BIPOLAR DISORDER

[Bipolar disorder] is about buying a dozen bottles of Heinz ketchup and all eight bottles of Windex in stock at the Food Emporium on Broadway at 4 a.m., flying from Zurich to the Bahamas and back to Zurich in three days to balance the hot and cold weather . . . , carrying \$20,000 in \$100 bills in your shoes into the country on your way back to Tokyo, and picking out the person sitting six seats away at the

Concern should drive us into action, not into a depression.

KAREN HORNEY

Conversion disorder A disorder in which anxiety or unconscious conflicts are “converted” into physical symptoms that often have the effect of helping the person cope with anxiety or conflict.

La belle indifférence A French term descriptive of the lack of concern sometimes shown by people with conversion disorders.

Hypochondriasis Persistent belief that one is ill despite lack of medical findings.

Mood disorder A disturbance in expressed emotions, generally involving excessive or inappropriate sadness or elation.

Major depressive disorder A serious to severe depressive disorder in which the person may show loss of appetite, psychomotor retardation, and in extreme cases, delusions of worthlessness.

Psychomotor retardation Slowness in motor activity and (apparently) in thought.

SELF ASSESSMENT

Are You Depressed?

This self-assessment, offered by the organizers of the National Depression Screening Day, can help you assess whether you are suffering from depression. It is not intended for you to diagnose yourself but rather to raise your awareness of concerns you may want to discuss with a professional.

	YES	NO		YES	NO
1. I feel downhearted, blue, and sad.	_____	_____	6. I have trouble sleeping through the night.	_____	_____
2. I don't enjoy the things that I used to.	_____	_____	7. I am restless and can't keep still.	_____	_____
3. I feel that others would be better off if I were dead.	_____	_____	8. My mind isn't as clear as it used to be.	_____	_____
4. I feel that I am not useful or needed.	_____	_____	9. I get tired for no reason.	_____	_____
5. I notice that I am losing weight.	_____	_____	10. I feel hopeless about the future.	_____	_____

Check Appendix A to rate your responses.

Source: Adapted from J. E. Brody, "Myriad masks hide an epidemic of depression," *The New York Times*, September 30, 1992, p. C12.

bar to have sex with only because he or she happens to be sitting there. It's about blips and burps of madness, moments of absolute delusion, bliss, and irrational and dangerous choices made in order to heighten pleasure and excitement and to ensure a sense of control. . . .

—From *Electroboy* by Andy Behrman

But then you crash—hard. You not only return to normal; you fall well beneath it and hope—unless you're too hopeless to hope—that you will rise back to normal again.

Truth or Fiction Revisited: It is true that feeling "up" is not always a good thing. People with **bipolar disorder**, formerly known as *manic-depressive disorder*, have mood swings from ecstatic elation to deep depression. The cycles seem to be unrelated to external events. In the elated, or **manic** phase, the person may show excessive excitement or silliness, carrying jokes too far. The manic person may be argumentative. Like "Electroboy," he or she may show poor judgment, making foolish purchases, shoplifting, destroying property, making huge contributions to charity, or giving away expensive possessions. People often find manic individuals abrasive and avoid them. They are often oversexed and too restless to sit still or sleep restfully. They often speak rapidly (showing *pressured speech*) and jump from topic to topic (showing **rapid flight of ideas**). It can be hard to get a word in edgewise.

Depression is the other side of the coin. People with bipolar depression often sleep more than usual and are lethargic. People with major (or unipolar) depression are more likely to have insomnia and agitation. Those with bipolar depression also exhibit social withdrawal and irritability. Some people with bipolar disorder attempt suicide when the mood shifts from the elated phase toward depression (Jamison, 2000). They will do almost anything to escape the depths of depression that lie ahead.

THE CASE OF WOMEN AND DEPRESSION

Women are about twice as likely as men to be diagnosed with depression (Kessler, 2003; Kramer et al., 2008). This gender difference begins to emerge during adolescence (Conley & Rudolph, 2009). Colleen Conley and Karen Rudolph (2009) found that girls who reached puberty early were more likely to be depressed, but the picture was reversed for boys, who were more likely to be depressed if they entered puberty late. Stress affects girls and boys differently, with greater social stress placed on early-maturing girls and on late-maturing boys. Early-maturing girls may have to combat social pressure to engage in sexual activity, and late-maturing boys do not have the size and strength to compete in athletics—or in the high school hallways.

Bipolar disorder A disorder in which the mood alternates between two extreme poles (elation and depression); also referred to as *manic-depression*.

Manic Elated; showing excessive excitement.

Rapid flight of ideas Rapid speech and topic changes, characteristic of manic behavior.

Many people assume that biological gender differences largely explain why women are more likely to become depressed. Low levels of estrogen are widely seen as the culprit. Estrogen levels plummet prior to menstruation. How often do we hear degrading remarks such as “It must be that time of the month” when a woman expresses feelings of anger or irritation? But part of the gender difference may be due to the fact that men are less likely than women to admit to depression or seek treatment for it. “I’m the John Wayne generation,” admitted one man, a physician. “It’s only a flesh wound”; that’s how you deal with it. I thought depression was a weakness—there was something disgraceful about it. A real man would just get over it” (cited in Wartik, 2000).

It was once assumed that depression was most likely to accompany menopause in women because women could no longer carry out their “natural” function of child-bearing. However, women are more likely to encounter severe depression during the childbearing years (Depression Research, 2000).

Yes, hormonal changes during adolescence, the menstrual cycle, and childbirth may contribute to depression in women (Soares & Zitek, 2008). The bodies and brains of males, on the other hand, are stoked by testosterone during adolescence. High testosterone levels are connected with feelings of self-confidence, high activity levels, and aggression—a cluster of traits and behaviors that are more connected with elation (even if sometimes misplaced) than with depression (Mehta & Beer, 2009).

INTERNALIZING AND EXTERNALIZING RESPONSES TO FEELINGS OF DEPRESSION: GENDER DIFFERENCES Cognitive psychologists also note that people who ruminate about feelings of depression—a response termed *internalizing*—are more likely to prolong them (Hughes et al., 2008; Wisco & Nolen-Hoeksema, 2009). Women are more likely than men to ruminate about such feelings (Grabe et al., 2007; Wisco & Nolen-Hoeksema, 2009). Men seem more likely to try to fend off negative feelings by distracting themselves. Men are also more likely to turn to alcohol and aggression—responses termed *externalizing*—when they don’t feel right (Nolen-Hoeksema, 2001). They thus expose themselves and their families to additional problems.

Women may be more likely than men to encounter depression, but men also become depressed. Let’s consider theoretical views of depression that apply to both men and women.

Origins of Mood Disorders

Question 12: What is known about the origins of mood disorders? Depression may be a reaction to losses and stress (Cowen, 2002; Mazure et al., 2000). Sources of chronic strain such as marital discord, physical discomfort, incompetence, and failure or pressure at work all contribute to feelings of depression. We tend to be more depressed by things we bring on ourselves, such as academic problems, financial problems, unwanted pregnancy, conflict with the law, arguments, and fights (Greenberger et al., 2000). However, some people recover from depression less readily than others. People who remain depressed have lower self-esteem (Andrews, 1998; Sherrington et al., 2001), are less likely to solve social problems (Reinecke et al., 2001), and have less social support.

What are the origins of depression and bipolar disorder?



I didn't know my mother had it. I think a lot of women don't know their mothers had it; that's the sad thing about depression. You know, you don't function anymore. You shut down. You feel like you are in a void.

MARIE OSMOND

Women and Depression Women are much more likely than men to be diagnosed with depression. Does the gender difference reflect biases among the mental-health professionals who make the diagnoses, women’s (frequent) status as second-class citizens, the fact that women are often expected to take care of the family as well as earn a living, hormonal and other biological differences between women and men, other factors—or all of the above or some of the above?

Learned helplessness A model for the acquisition of depressive behavior based on findings that organisms in unchangeable aversive situations may learn to do nothing.

Attributional style The tendency to attribute one's behavior to internal or external factors, stable or unstable factors, and global or specific factors.

PSYCHOLOGICAL VIEWS

Psychoanalysts suggest various explanations for mood disorders. For example, from the psychodynamic perspective, people who are at risk for depression are overly concerned about hurting other people's feelings or losing their approval. As a result, they hold in feelings of anger rather than express them. Anger is turned inward and experienced as misery and self-hatred. From the psychodynamic perspective, bipolar disorder may be seen as alternating states in which the personality is dominated first by the ego and then by the superego. It is a classic case of excess followed by self-recrimination: The ascendant ego produces elation and irrational seeking of gratification. Then the superego passes judgment, producing exaggerated ideas of wrongdoing and associated feelings of guilt and worthlessness.

Many learning theorists suggest that depressed people behave as though they cannot obtain reinforcement. For example, they appear to be inactive and apathetic. Many people with depressive disorders have an external locus of control. That is, they do not believe they can control events so as to achieve reinforcements (Tong, 2001; Weinmann et al., 2001).

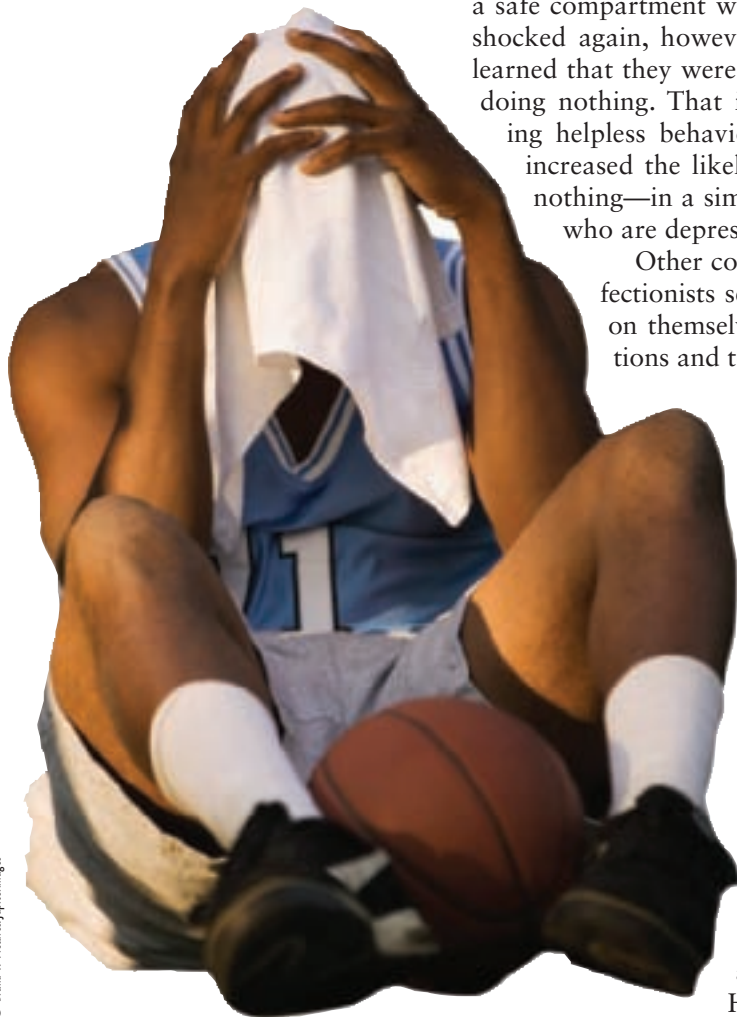
Research conducted by learning theorists has also found links between depression and **learned helplessness**. In classic research, psychologist Martin Seligman (1975) taught dogs that they were helpless to escape an electric shock. The dogs were prevented from leaving a cage in which they received repeated shocks. Later, a barrier to a safe compartment was removed, offering the animals a way out. When they were shocked again, however, the dogs made no effort to escape. They had apparently learned that they were helpless. Seligman's dogs were also, in a sense, reinforced for doing nothing. That is, the shock *eventually* stopped when the dogs were showing helpless behavior—inactivity and withdrawal. “Reinforcement” might have increased the likelihood of repeating the “successful behavior”—that is, doing nothing—in a similar situation. This helpless behavior resembles that of people who are depressed.

Other cognitive factors also contribute to depression. For example, perfectionists set themselves up for depression by making irrational demands on themselves. They are likely to fall short of their (unrealistic) expectations and to feel depressed as a result (Flett et al., 2007).

ATTRIBUTIONS FOR FAILURE AND DEPRESSION Still other cognitions involve the ways people explain their failures and shortcomings to themselves. Seligman (1996) suggests that when things go wrong, we may think of the causes of failure as either *internal* or *external*, *stable* or *unstable*, *global* or *specific*. These various **attributional styles** can be illustrated using the example of having a date that does not work out. An internal attribution involves self-blame (as in “I really loused it up”). An external attribution places the blame elsewhere (as in “Some couples just don't take to each other,” or “She was the wrong sign for me”). A stable attribution (“It's my personality”) suggests a problem that cannot be changed. An unstable attribution (“It was because I had a head cold”) suggests a temporary condition. A global attribution of failure (“I have no idea what to do when I'm with other people”) suggests that the problem is quite large. A specific attribution (“I have problems making small talk at the beginning of a relationship”) chops the problem down to a manageable size. How does this connect to depression? Research has shown that

people who are depressed are more likely to attribute their failures to internal, stable, and global factors—factors that they are relatively powerless to change (Safford et al., 2007).

Let's add one remarkable note about attributional styles and the mind–body connection. Shelley Taylor and her colleagues (2000a) found that self-blame for negative events is connected with poorer functioning of the immune system. That is, excessive self-blame is not only depressing, but it might also make us physically ill.



Why Did He Miss That Basket? This basketball player is compounding his feelings of depression by attributing his shortcomings on the court to factors he cannot change. For example, he tells himself that he missed the basket out of stupidity and lack of athletic ability. He ignores the facts that his coaching was poor and his teammates failed to support him.

BIOLOGICAL FACTORS

Researchers are also searching for biological factors in mood disorders. Depression, for example, is often associated with the trait of **neuroticism**, which is heritable (Dunkley et al., 2009). Anxiety is also connected with neuroticism, and mood and anxiety disorders are frequently found in the same person (Spinhoven et al., 2010).

Genetic factors appear to be involved in major depression and bipolar disorder (McGuffin, 2008). Twin and adoption studies support a role for genetic factors in bipolar disorder (Willcutt & McQueen, 2010). In the case of bipolar disorder, genetic factors may heighten the activity of the neurotransmitter dopamine during the manic phase, which is characterized by high activity levels, restlessness, and greater than normal sexual activity (Boora et al., 2009; Einat, 2007). Dopamine is produced in several places in the brain and is believed to play key roles in cognition, motivation, punishment and reward, sexual gratification, sleep, mood, and learning and memory. The release of dopamine normally has the effects of rewarding sexual activity, eating, and substance use and abuse.

Research into depression focuses on underutilization of the neurotransmitter serotonin in the brain (Artigas, 2008; Leach, 2008). It has been shown, for example, that learned helplessness is connected with lower serotonin levels in rats' brains (Wu et al., 1999). Moreover, people with severe depression often respond to drugs (selective serotonin reuptake inhibitors, or SSRIs) that heighten the action of serotonin (Leonard, 2008).

Relationships between mood disorders and biological factors are complex and under intense study. Even if people are biologically predisposed toward depression, self-efficacy expectations and attitudes—particularly attitudes about whether one can change things for the better—may also play a role.

Neuroticism A personality trait characterized largely by persistent anxiety.

LearningConnections • MOOD DISORDERS: UP, DOWN, AND AROUND

ACTIVE REVIEW (14) _____ depressive disorder can reach psychotic proportions, with delusional ideas of worthlessness. (15) In bipolar disorder, there are mood swings between _____ and depression. (16) Manicky people may have grand delusional schemes and show rapid _____ of ideas. (17) Seligman and his colleagues have explored links between depression and learned _____. (18) Depressed people are more likely than other people to make (internal or external?) attributions for failures. (19) Mood disorders (do or do not?) tend to run in families. (20) Depression is connected with underutilization of the neurotransmitter _____.

REFLECT AND RELATE When you fall short of your goals, do you tend to be merciless in your self-criticism or to blame other people or “circumstances”?

CRITICAL THINKING Under what circumstances is depression considered a psychological disorder?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

SCHIZOPHRENIA: WHEN THINKING RUNS ASTRAY

Jennifer was 19. Her husband, David, brought her into the emergency room because she had cut her wrists. When she was interviewed, her attention wandered. She seemed distracted by things in the air or something she might be hearing. It was as if she had an invisible earphone.

She explained that she had cut her wrists because the “hellsmen” had told her to. Then she seemed frightened. Later she said that the hellsmen had warned her not to reveal their existence. She had been afraid that they would punish her for talking about them.

David and Jennifer had been married for about 1 year. At first, they had been together in a small apartment in town. But Jennifer did not want to be near other

—■—

*If you talk to God, you are
praying. If God talks to you,
you have schizophrenia.*

THOMAS SZASZ

—■—

people and had convinced Dave to rent a bungalow in the country. There she would make fantastic drawings of goblins and monsters during the day. Now and then, she would become agitated and act as if invisible things were giving her instructions.

“I’m bad,” Jennifer would mutter. “I’m bad.” She would begin to jumble her words. David would then try to convince her to go to the hospital, but she would refuse. Then the wrist-cutting would begin. David thought he had made the cottage safe by removing knives and blades. But Jennifer would always find something.

Then Jennifer would be brought to the hospital, have stitches put in, be kept under observation for a while, and be medicated. She would explain that she cut herself because the hellsmen had told her that she was bad and must die. After a few days, she would deny hearing the hellsmen, and she would insist on leaving the hospital.

David would take her home. The pattern continued.

—From the author’s files

When the emergency room staff examined Jennifer’s wrists and heard that she believed she had been following the orders of “hellsmen,” they suspected that she could be diagnosed with **schizophrenia**. **Question 13: What is schizophrenia?** **Schizophrenia** is a severe psychological disorder that touches every aspect of a person’s life. It is characterized by disturbances in thought and language, perception and attention, motor activity, and mood, as well as withdrawal and absorption in daydreams or fantasy.

Schizophrenia has been referred to as the worst psychological disorder affecting human beings. It afflicts nearly 1% of the population worldwide. Its onset occurs relatively early in life, and its adverse effects tend to endure.

Symptoms of Schizophrenia

In schizophrenia, whatever can go wrong, psychologically, seems to go wrong. There are disturbances in thinking, language, perception, motor behavior, and social interaction. People with schizophrenia may have *positive symptoms*, *negative symptoms*, or both. **Positive symptoms** are the inappropriate kinds of behavior we find in afflicted people, including, for example, agitated behavior, vivid hallucinations, unshakable delusions, disorganized thinking, and nonsensical speech. **Negative symptoms** are those that reflect the absence of appropriate behavior. We see them in flat, emotionless voices, blank faces, rigid, motionless bodies, and **mutism**.

PROBLEMS IN THINKING AND LANGUAGE

Schizophrenia has been called a “thought disorder” because people with schizophrenia have problems in thinking, language, memory, and attention (Cellard et al., 2010). Their thinking and communication abilities become unraveled. Unless we are allowing our thoughts to wander, our thinking is normally tightly knit. We start at a certain point, and associated thoughts tend to be logically connected. But people with schizophrenia often think illogically. Their speech may be jumbled. They may combine parts of words into new words or make meaningless rhymes. They may jump from topic to topic, conveying little useful information. They usually do not recognize that their thoughts and behavior are abnormal.

Many people with schizophrenia have **delusions** of grandeur, persecution, or reference (Freeman et al., 2010). In the case of *delusions of grandeur*, a person may believe that he is a famous historical figure such as Jesus or a person on a special mission. He may have grand, illogical plans for saving the world. Such delusions tend to be unshakable even in the face of evidence that they are not true. People with *delusions of persecution* may believe that they are sought by the Mafia, CIA, FBI, or some other group. There is a tendency for paranoid individuals to jump to conclusions that people intend to do them harm based on very little evidence (Lincoln et al., 2010). People with *delusions of reference* erroneously believe that other people are talking about them or referring to them. For example, a woman with delusions of reference said that news stories contained coded information about her. A man with such delusions complained that neighbors had “bugged” his walls with “radios.” Other people with schizophrenia have had delusions that they have committed unpardonable sins, that they were rotting away from disease, or that they or the world did not exist.

Schizophrenia A psychotic disorder characterized by loss of control of thought processes and inappropriate emotional responses.

Positive symptoms Those symptoms of schizophrenia that indicate the presence of inappropriate behavior, such as hallucinations, delusions, agitation, and inappropriate giggling.

Negative symptoms Those symptoms of schizophrenia that reflect the absence of appropriate behavior, such as blank faces, monotonic voices, and motionless bodies.

Mutism Refusal to talk.

Delusions False, persistent beliefs that are unsubstantiated by sensory or objective evidence.

A CLOSER LOOK • REAL LIFE

WHEN “FATTY ACID” PLACES SODA OFF LIMITS

The *Schizophrenia Bulletin* invited people to print their own first-person accounts of psychological disorders. This is what Thomas (Campbell, 2000), who was diagnosed with both schizophrenia and major depression, wrote:

I finally had an episode . . . that I couldn't get out of and one that was making me too miserable. This was several months after a front-page automatic weapons robbery in North Hollywood, near my residence, and during a change in my supervisors. My paranoia made me think I was somehow tied to the first, and real stress came from the change of supervisors. The voices, human

sounding, and sounding from a short distance outside my apartment, were slowly turning nearly all bad. I could hear them jeering me, plotting against me, singing songs sometimes that would only make sense later in the day when I would do something wrong at work or at home. I began sleeping on the floor of my living room because I was afraid a presence in the bedroom was torturing good forces around me. If I slept in the bedroom, the nightly torture would cause me to make mistakes during the day. A voice, calling himself Fatty Acid, stopped me from drinking soda. Another voice allowed me only one piece of bread with my meals. These two voices called themselves “professionals.” I was forced to stop smoking, too. If I smoked, I would hit a pedestrian with my car.

PROBLEMS IN PERCEPTION: “DAGGERS OF THE MIND”?

Truth or Fiction Revisited: It is true that people with schizophrenia may see and hear things that are not really there. Their perceptual problems often include hallucinations—imagery in the absence of external stimulation that the person cannot distinguish from reality. In Shakespeare's *Macbeth*, for example, after killing King Duncan, Macbeth apparently experiences a hallucination:

Is this a dagger which I see before me,
The handle toward my hand? Come, let me clutch thee:
I have thee not, and yet I see thee still.
Art thou not, fatal vision, sensible
To feeling as to sight? or art thou but
A dagger of the mind, a false creation,
Proceeding from the heat-oppressed brain?

Jennifer apparently hallucinated the voices of “hellmen.” Other people who experience hallucinations may see colors or even obscene words spelled out in midair. Auditory hallucinations are the most common type.

PROBLEMS IN ACTIONS, EMOTIONS, AND SOCIAL INTERACTION

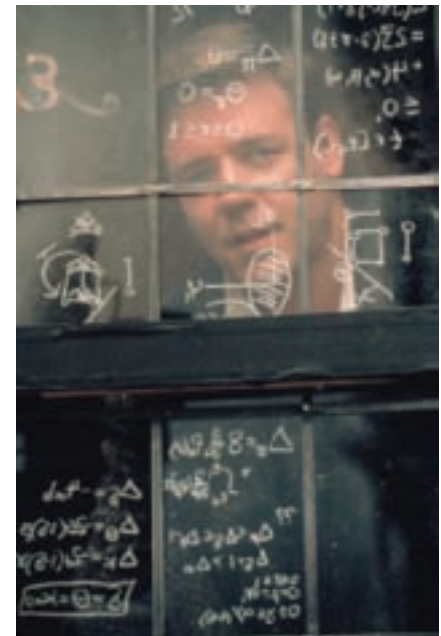
For individuals with schizophrenia, motor activity may become wild or so slowed that the person is said to be in a **stupor**—that is, a condition in which the senses, thought, and movement are inhibited. There may be strange gestures and facial expressions. The person's emotional responses may be flat or blunted or completely inappropriate—as in giggling upon hearing bad news. People with schizophrenia tend to withdraw from social contacts and become wrapped up in their own thoughts and fantasies (Horan et al., 2010; Mathews & Barch, 2010). **Question 14: What kinds of schizophrenia are there?**

Types of Schizophrenia

All types of schizophrenia involve a thought disorder. However, the three major types of schizophrenia—*paranoid*, *disorganized*, and *catatonic schizophrenia*—have distinct features.

PARANOID TYPE

People with **paranoid schizophrenia** can have complex delusions and, frequently, related auditory hallucinations. They usually have delusions of grandeur and persecution, but they may also have delusions of jealousy, in which they believe that a spouse or lover has been unfaithful—again, jumping to conclusions with very little evidence (Lincoln et al., 2010). They may show agitation, confusion, and fear and may experience vivid hallucinations



© Mary Evans/Imagine Entertainment/Ronald Grant/Everett Collection

Schizophrenia in *A Beautiful Mind* In the film *A Beautiful Mind*, Russell Crowe played the role of mathematician John Forbes Nash Jr. Nash struggled with schizophrenia for more than three decades and was eventually awarded a Nobel Prize for work he had done as a graduate student decades earlier.

Stupor A condition in which the senses, thought, and movement are dulled.

Paranoid schizophrenia A type of schizophrenia characterized primarily by delusions—commonly of persecution—and by vivid hallucinations.



Catatonic Schizophrenia People with catatonic schizophrenia show striking motor impairment and may hold unusual positions for hours.

— ■ —
*Schizophrenia cannot
 be understood without
 understanding despair.*

R. D. LAING
 — ■ —

Disorganized schizophrenia A type of schizophrenia characterized by disorganized delusions and vivid hallucinations.

Catatonic schizophrenia A type of schizophrenia characterized by striking motor impairment.

Waxy flexibility A feature of catatonic schizophrenia in which people can be molded into postures that they maintain for quite some time.

that are consistent with their delusions. People with paranoid schizophrenia often construct complex or systematized delusions involving themes of wrongdoing or persecution. John Nash, the character in the true story *A Beautiful Mind*, believed that the government was recruiting him to decipher coded messages sent by our Cold War enemies.

DISORGANIZED TYPE

People with **disorganized schizophrenia** show incoherence, disorganized behavior, disorganized delusions, hallucinations, and flat or inappropriate emotional responses. Extreme social impairment is common. People with this type of schizophrenia may also exhibit silliness and giddiness of mood, giggling, and nonsensical speech. They may neglect their appearance and personal hygiene and lose control of their bladder and bowels.

CATATONIC TYPE

Catatonic schizophrenia is one of the most unusual psychological disorders. People with **catatonic schizophrenia** show striking impairment in motor activity. It is characterized by a slowing of activity into a stupor that may suddenly change into an agitated phase. Catatonic individuals may maintain unusual, sometimes difficult postures for hours, even as their limbs grow swollen or stiff. A striking feature of this condition is **waxy flexibility**, in which the person maintains positions into which he or she has been manipulated by others. Catatonic individuals may also show mutism, but afterward, they usually report that they heard what others were saying at the time.

OTHER TYPES OF SCHIZOPHRENIA

Two other types of schizophrenia are the undifferentiated type and the residual type. People with the *undifferentiated type* show abundant and varied symptoms that may be drawn from the major types. People with the *residual type* predominantly show social withdrawal after delusions and hallucinations have faded.

Origins of Schizophrenia

Question 15: What is known about the origins of schizophrenia? Psychologists have investigated various factors that may contribute to schizophrenia. They include psychological, sociocultural, and biological factors.

PSYCHOLOGICAL VIEWS

According to the psychodynamic perspective, schizophrenia occurs because the ego is overwhelmed by sexual or aggressive impulses from the id. Under this barrage, the person regresses to an early phase of the oral stage in which the infant has not yet learned that it and the world are separate. Fantasies become confused with reality, giving rise to hallucinations and delusions. Yet critics point out that schizophrenic behavior is not the same as infantile behavior.

Most learning theorists have explained schizophrenia in terms of conditioning and observational learning. They have suggested that people engage in schizophrenic behavior when it is more likely to be reinforced than normal behavior. This may occur when a person is reared in a socially unrewarding or punitive situation. Inner fantasies then become more reinforcing than social realities. Patients in a psychiatric hospital may learn what is “expected” by observing others. Hospital staff may reinforce schizophrenic behavior by paying more attention to patients who behave bizarrely. This view is consistent with folklore that the child who disrupts the class attracts more attention from the teacher than the “good” child.

SOCIOCULTURAL VIEWS

Many investigators have considered whether and how social and cultural factors such as poverty, poor parenting, discrimination, and overcrowding contribute to schizophrenia—especially among people who are genetically vulnerable to the disorder. Although quality of parenting is connected with the development of schizophrenia (Buckley et al., 2000), critics note that many people who are reared in socially punitive settings are apparently

immune to the extinction of socially appropriate behavior. Classic research in New Haven, Connecticut, showed that the rate of schizophrenia was twice as high in the lowest socioeconomic class as in the next higher class on the socioeconomic ladder (Hollingshead & Redlich, 1958). It appears that poor-quality housing contributes to psychological disorders (Dunn, 2008). Some sociocultural theorists therefore suggest that treatment of schizophrenia requires alleviation of poverty and other social ills rather than changing people whose behavior is deviant.

Critics of this view suggest that low socioeconomic status may be a result, rather than a cause, of schizophrenia. People with schizophrenia may drift downward in social status because they lack the social skills and cognitive abilities to function at higher levels. Thus, they wind up in poor neighborhoods in disproportionately high numbers.

Although many researchers continue to seek psychological and social risk factors for the development of schizophrenia, it must be admitted that research to date has not discovered any environmental causes that will lead to the development of schizophrenia in people who are not related to people with schizophrenia. Because of this lack of evidence, much focus today is on the biological aspects of schizophrenia—on its nature as a brain disease and on its likely biological origins. Once we have outlined the nature of the biological differences between schizophrenic people and normal people, we will turn to genetic and other biological factors that may produce schizophrenia.

BIOLOGICAL VIEWS

Many studies have shown that the brains of schizophrenic people differ from those of normal people. Studies have focused on the amount of gray matter in the brain (see Figure 15.2 ■), the size of ventricles (hollow spaces), activity levels in the brain, and brain chemistry (for example, neurotransmitters).

BRAIN DEFICITS ASSOCIATED WITH SCHIZOPHRENIA One avenue of brain research connects the major deficits we find in schizophrenia—problems in attention, working memory, abstract thinking, and language—with dysfunction in the prefrontal cortex of the brain. Imaging of the brain has shown that people with schizophrenia generally have less gray matter than other people, which suggests deficiencies in associative processes (Takahashi et al., 2009). “Loose associations” is a key feature of schizophrenia; that is, people with schizophrenia are less likely than normal people to think

Video Connections—Schizophrenia



Schizophrenia is considered the most severe of the psychological disorders and afflicts about 1% of the population. Etta suffers from schizophrenia. See the video to view a conversation between Etta and a therapist. Through Etta's plight you will realize how devastating this disorder is.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

Image not available due to copyright restrictions

Figure 15.2 ■ Average Rates of Loss of Gray Matter among Normal Adolescents and Adolescents Diagnosed with Schizophrenia

High-resolution MRI scans show rates of gray matter loss in normal 13- to 18-year-olds and among adolescents of the same age diagnosed with schizophrenia. Maps of brain changes reveal profound, progressive loss in schizophrenia (right). Loss also occurs in normal adolescents (left) but at a slower rate.

Source: P. M. Thompson, et al. (2001). Mapping adolescent brain change reveals dynamic wave of accelerated gray matter loss in very early-onset schizophrenia. *Proceedings of the National Academy of Sciences of the USA*, 98(20), 11650–11655.

logically and arrive at sensible conclusions. People with schizophrenia have smaller brains than normal people and, in particular, a smaller prefrontal region of the cortex (Shirayama et al., 2010). PET scans reveal that people with schizophrenia also tend to have a lower level of activity in the prefrontal cortex—the region responsible for executive functions such as planning and decision making (Farzan et al., 2010; Meyer-Lindenberg et al., 2001).

Still other research connects the lower activity levels with a loss in synapses (the structures that permit communication between neurons) in the region (Glantz et al., 2010), further decreasing the likelihood that people with schizophrenia will transmit neural messages efficiently. People with schizophrenia also tend to have larger ventricles than other people, suggestive of a process of deterioration (Keller et al., 2003; Puri, 2010). Enlarged ventricles are not only associated with schizophrenia; they are also predictive of development of the disorder.

What might account for differences in brain structure and functioning? Research evidence suggests that there are a number of biological risk factors for schizophrenia, such as heredity, complications during pregnancy and birth, and birth during winter.

THE GENETICS OF SCHIZOPHRENIA Schizophrenia, like many other psychological disorders, runs in families (Bolinsky & Gottesman, 2010; Chan & Gottesman, 2008; Pogue-Geile & Gottesman, 2007). As noted earlier, people with schizophrenia make up about 1% of the global population. Yet studies show that children with one parent who has been diagnosed with schizophrenia have about a 6% chance of being diagnosed with schizophrenia themselves (see Figure 15.3 ■). There is about a 48% concordance rate for the diagnosis among pairs of identical (MZ) twins, whose genetic codes are the same, compared with a 17% rate among pairs of fraternal (DZ) twins (Gottesman, 1991). Moreover, adoptee studies find that the biological parent typically places the child at greater risk for schizophrenia than the adoptive parent—even though the child has been reared by the adoptive parent (Gottesman, 1991). Sharing genes with relatives who have schizophrenia apparently places a person at risk of developing the disorder. Many studies have been carried out to try to isolate the gene or genes involved in schizophrenia. Some studies find locations for multiple genes on several chromosomes.

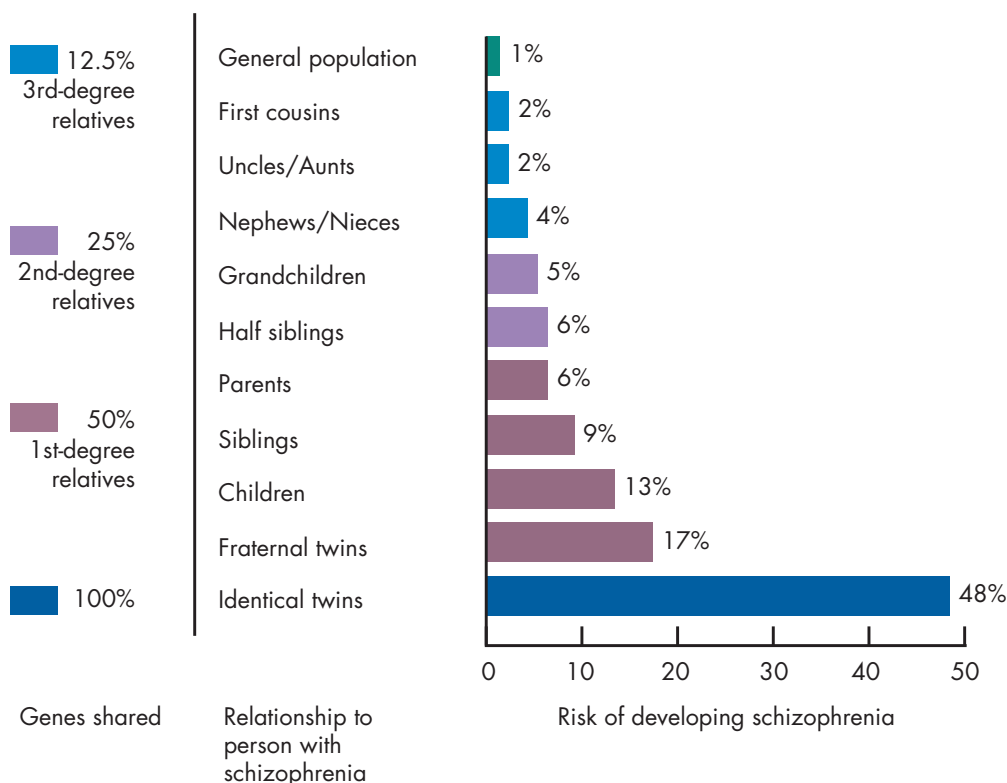


Figure 15.3 ■ Relationship to a Person Diagnosed with Schizophrenia and Likelihood of Being Diagnosed with Schizophrenia Oneself

Source: Gottesman, I. I. (1991). *Schizophrenia genesis: The origins of madness*. New York: W. H. Freeman.

The importance of heredity is underscored by research findings that suggest individuals unrelated to people with schizophrenia will not develop schizophrenia despite the worst of environments. Moreover, other people appear to be so genetically vulnerable to schizophrenia that they will probably not be able to avoid it despite the best of environments. For some who are vulnerable, it appears that other biological factors may interact with heredity to produce the disorder.

OTHER BIOLOGICAL RISK FACTORS IN SCHIZOPHRENIA In many cases of schizophrenia, a genetic vulnerability may be a necessary factor—but not the only factor—in the development of the disorder. The mothers of many people who develop schizophrenia have undergone complications during pregnancy and birth (Spencer et al., 2008). For example, many mothers had the flu during the 6th or 7th month of pregnancy (A. S. Brown & Derkits, 2010; Short et al., 2010). Complications during childbirth, especially prolonged labor, seem to be connected with the larger ventricles we find among people with schizophrenia (Spencer et al., 2008). Poor maternal nutrition has also been implicated (Stein et al., 2009; Susser et al., 2009).

People with schizophrenia are also somewhat more likely to have been born during winter than would be predicted by chance, which might heighten the risk of viral and other infections in the mother during the late stages of pregnancy and in the child's early infancy (Polanczyk et al., 2010). Alcohol abuse may also lead to differences in brain structures among people with schizophrenia (Welch et al., 2010). Considering genetics and these other biological risk factors, it seems implausible to avoid the conclusion that schizophrenia involves atypical development of the central nervous system. Problems in the nervous system may involve brain chemistry as well as brain structures, and research along these lines has led to the dopamine theory of schizophrenia.

THE DOPAMINE THEORY OF SCHIZOPHRENIA Numerous chemical substances have been suspected of playing a role in schizophrenia, and much research has focused on the neurotransmitter dopamine. According to the dopamine theory of schizophrenia, people with schizophrenia overutilize dopamine (use more of it than other people do), although they may not produce more of it (Fatemi & Folsom, 2009; Tost et al., 2009). Why? Research suggests that they have increased concentrations of dopamine at the synapses in the brain and also larger numbers of dopamine receptors (Kegeles et al., 2010). It's a sort of “double hit” of neural transmission that may be connected with the confusion that characterizes schizophrenia.

Figure 15.4 ■ outlines the biopsychosocial model of schizophrenia. According to this model, genetic factors create a predisposition toward—or vulnerability to—schizophrenia. Genetic vulnerability to the disorder interacts with other factors, such as complications of pregnancy and birth, and perhaps psychological factors, such as stress and the quality of parenting, to give rise to the disorder (Bishop, 2009).

Because the perceptions and judgment of people with schizophrenia are impaired, the diagnosis is sometimes associated with the insanity plea in the criminal courts. The nearby Controversy in Psychology offers insight into the insanity plea.

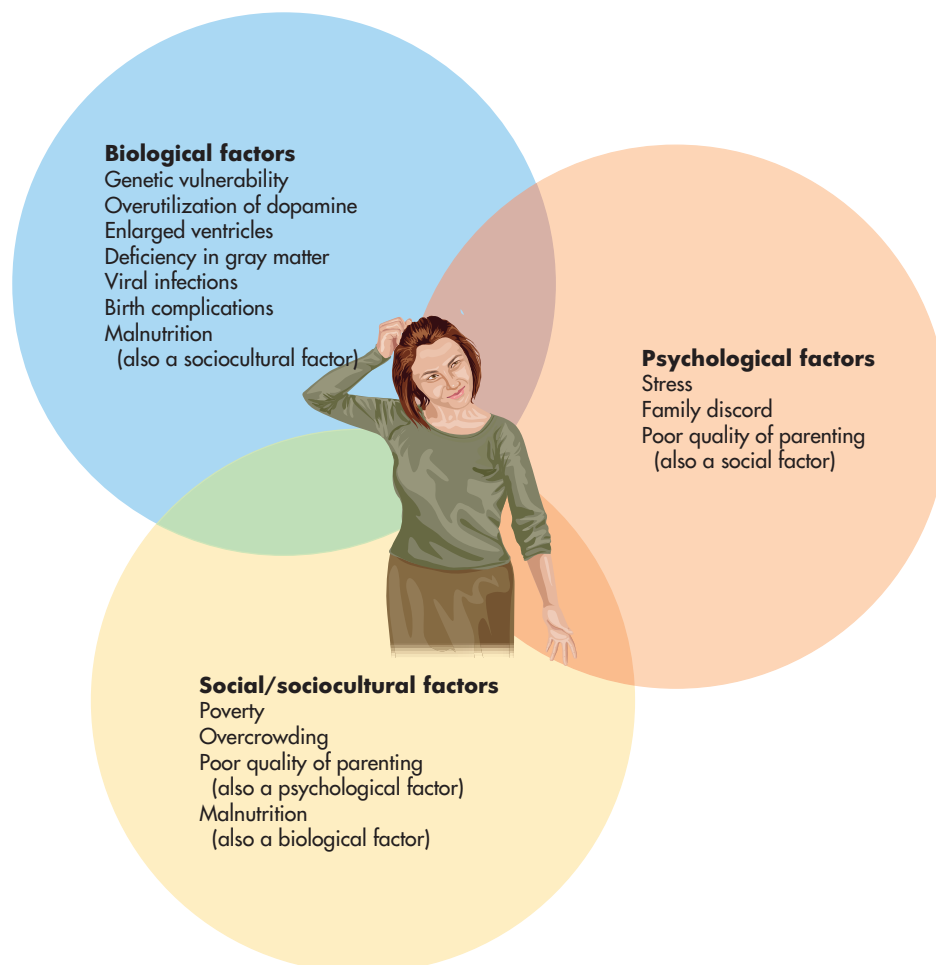


Figure 15.4 ■ A Multifactorial Model of Schizophrenia According to the multifactorial model of schizophrenia, people with a genetic vulnerability to the disorder experience increased risk for schizophrenia when they encounter problems such as viral infections, birth complications, stress, and poor parenting. People without the genetic vulnerability would not develop schizophrenia despite such problems.

LearningConnections • SCHIZOPHRENIA: WHEN THINKING RUNS ASTRAY

ACTIVE REVIEW (21) Paranoid schizophrenia is characterized by paranoid _____. (22) _____ schizophrenia is characterized by impaired motor activity and waxy flexibility. (23) Schizophrenia (does or does not?) tend to run in families. (24) The prefrontal region of the brain of people with schizophrenia has (more or fewer?) synapses than those of other people. (25) People with schizophrenia utilize more of the neurotransmitter _____ than other people do.

REFLECT AND RELATE There is evidence for genetic factors in schizophrenia. What would you tell the son or daughter

of a person with schizophrenia about the likelihood of his or her developing the disorder? Explain.

CRITICAL THINKING Agree or disagree with the following statement and support your answer: Schizophrenia is a disease of the brain.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

PERSONALITY DISORDERS: MAKING ONESELF OR OTHERS MISERABLE

Personality disorders, like personality traits, are characterized by enduring patterns of behavior. Personality disorders, however, are inflexible and maladaptive. They impair personal or social functioning and are a source of distress to the individual or to other people. **Question 16: What kinds of personality disorders are there?**

Personality disorders Enduring patterns of maladaptive behavior that are sources of distress to the individual or others.

Paranoid personality disorder A personality disorder characterized by persistent suspiciousness but not involving the disorganization of paranoid schizophrenia.

Types of Personality Disorders

There are a number of personality disorders. They include the paranoid, schizotypal, schizoid, borderline, antisocial, and avoidant personality disorders.

PARANOID PERSONALITY DISORDER

The defining trait of the **paranoid personality disorder** is a tendency to interpret other people's behavior as threatening or demeaning. People with the disorder do not show the

Controversy in Psychology SHOULD WE BAN THE INSANITY PLEA?



© AP Photo/Judy Linenberg

During his trial, John Hinckley Jr. looks on while his father cries and claims responsibility for “John’s tragedy” because he prevented his son from coming home when he desperately needed help.

John Hinckley was found not guilty of a 1981 assassination attempt on President Ronald Reagan by reason of insanity.

Hinckley was diagnosed with schizophrenia and was committed to a psychiatric institution rather than given a prison term. In pleading insanity, lawyers use the M’Naghten rule, named after Daniel M’Naghten, who tried to assassinate British Prime Minister Robert Peel in 1843. M’Naghten had delusions that Peel was persecuting him, and he killed the minister’s secretary in the attempt. The court found M’Naghten not guilty by reason of insanity. That is, the defendant did not understand what he was doing at the time of the act or did not realize it was wrong. The insanity plea is still used in much the same way (Zapf et al., 2009). Many people would like to ban the insanity plea. They worry that “people are literally getting away with murder.” Yet surveys show that people tend to exaggerate the extent to which the insanity plea is used and how successful it is in obtaining acquittals (see Table 15.2 ■). Moreover,

people found not guilty by reason of insanity are institutionalized for indefinite terms—supposedly until they are no longer insane. Hinckley remains institutionalized more than two decades after he tried to kill President Reagan, although he has had family visits on the outside. If he had been convicted of attempted murder, he might already have served his time in jail.

Table 15.2 ■ Use of the Insanity Defense

	Public Belief	Reality
Percent of felony indictments involving the insanity plea	37%	0.9%
Percent of pleas resulting in acquittal	44%	26%

Source: Cirincione, C., Steadman, H. J., & McGreevy, M.A. (1995).

grossly disorganized thinking of paranoid schizophrenia. However, they are mistrustful of others, and their relationships suffer for it. They may be suspicious of coworkers and supervisors, but they can generally hold a job.

SCHIZOTYPAL PERSONALITY DISORDER

Schizotypal personality disorder is characterized by peculiarities of thought, perception, or behavior, such as excessive fantasy and suspiciousness, feelings of being unreal, or the odd use of words. There are no complex delusions, no hallucinations, and no unusual motor activities, so this disorder is *schizotypal*, not schizophrenic.

THE SCHIZOID PERSONALITY

Schizoid personality disorder is characterized by indifference to relationships and flat emotional response. People with this disorder are “loners.” They do not develop warm, tender feelings for others. They have few friends and rarely maintain long-term relationships. Some people with schizoid personality disorder do very well on the job provided that continuous social interaction is not required. They do not have hallucinations or delusions.

BORDERLINE PERSONALITY DISORDER

People with **borderline personality disorder** show instability in their relationships, self-image, and mood and a lack of control over impulses (Stanley & Siever, 2010). They tend to be uncertain of their values, goals, loyalties, careers, choices of friends, and sometimes even their sexual orientations (Roepke et al., 2010). Instability in self-image or identity may leave them with feelings of emptiness and boredom. Many cannot tolerate being alone and make desperate attempts to avoid feelings of abandonment. They may be clinging and demanding in social relationships, but clinging often pushes away the people on whom they depend. They alternate between extremes of adulation in their relationships (when their needs are met) and loathing (when they feel scorned). They tend to view other people as all good or all bad, shifting abruptly from one extreme to the other. As a result, they may flit from partner to partner in brief and stormy relationships. People they had idealized are treated with contempt when they feel the other person has failed them.

Instability of moods is a central characteristic of borderline personality disorder. Moods run the gamut from anger and irritability to depression and anxiety, with each lasting from a few hours to a few days. People with the disorder have difficulty controlling anger and are prone to fights or smashing things. They often act on impulse, like eloping with someone they have just met. This impulsive and unpredictable behavior is often self-destructive and linked to a risk of suicidal attempts and gestures. It may involve spending sprees, gambling, drug abuse, engaging in unsafe sexual activity, reckless driving, binge eating, or shoplifting. People with the disorder may also engage in self-mutilation, such as scratching their wrists or burning cigarettes on their arms (Zanarini et al., 2010). Self-mutilation is sometimes a means of manipulating others, particularly in times of stress. Frequent self-mutilation is also associated with suicide attempts.

The label of borderline personality has been applied to people as diverse as Marilyn Monroe and Lawrence of Arabia. Some theorists believe we live in fragmented and alienating times that tend to create the problems in forming a stable identity and stable relationships. “Living on the edge,” or border, can be seen as a metaphor for an unstable society.

ANTISOCIAL PERSONALITY DISORDER

Truth or Fiction Revisited: It is true that some people can kill or maim others with no feelings of guilt at all. When these people also persistently violate the rights of others and are in repeated conflict with the law, they may be diagnosed with

Schizotypal personality disorder A personality disorder characterized by oddities of thought and behavior but not involving bizarre psychotic behaviors.

Schizoid personality disorder A personality disorder characterized by social withdrawal.

Borderline personality disorder A personality disorder characterized by instability in relationships, self-image, mood, and lack of impulse control.



© Bettmann/COBIS

A Person with Borderline Personality Disorder? Many well-known individuals such as Marilyn Monroe (seen here with her husband, playwright Arthur Miller) and Lawrence of Arabia may have had borderline personality disorder. The disorder is characterized by instability in relationships, self-image, and mood and by problems in impulse control.

Table 15.3 ■ Characteristics of People Diagnosed with Antisocial Personality Disorder

Key Characteristics	Other Common Characteristics
History of delinquency and truancy	Lack of loyalty or of formation of enduring relationships
Persistent violation of the rights of others	Failure to maintain good job performance over the years
Impulsiveness	Failure to develop or adhere to a life plan
Poor self-control	Sexual promiscuity
Lack of remorse for misdeeds	Substance abuse
Lack of empathy	Inability to tolerate boredom
Deceitfulness and manipulativeness	Low tolerance for frustration
Irresponsibility	Irritability
Glibness; superficial charm	
Exaggerated sense of self-worth	

antisocial personality disorder (see Table 15.3 ■). People with antisocial personality disorder often show a superficial charm and are at least average in intelligence. They do not form meaningful bonds with other people and fail to learn to improve their behavior from punishment (Kumari et al., 2009; Romero et al., 2001). Though they are often heavily punished by their parents and rejected by peers, they continue in their impulsive, careless styles of life. Women are more likely than men to have anxiety and depressive disorders. However, antisocial personality disorder is more common among men than women (McCormick et al., 2007).

AVOIDANT PERSONALITY DISORDER

People with **avoidant personality disorder** are generally unwilling to enter a relationship without some assurance of acceptance because they fear rejection and criticism. As a result, they may have few close relationships outside their immediate families. Unlike people with schizoid personality disorder, however, they have some interest in, and feelings of warmth toward, other people. **Question 17: What is known about the origins of personality disorders?**

Origins of Personality Disorders

Many theoretical explanations of personality disorders are derived from the psychodynamic model. Traditional Freudian theory focuses on Oedipal problems as the source of many psychological disorders, including personality disorders. Faulty resolution of the Oedipus complex might lead to lack of guilt because conscience, or superego, is thought to depend on proper resolution of the complex. Although lack of guilt may occur more often among children who are rejected and punished by parents rather than given affection (Fowles & Dindo, 2009), the view that such treatment causes Oedipal problems remains speculative.

Cognitive psychologists find that antisocial adolescents encode social information in ways that bolster their misdeeds. For example, they tend to interpret other people's behavior as threatening, even when it is not (Dodge & McCourt, 2010). Aggressive individuals often find it difficult to solve social problems in useful ways (Fontaine et al., 2010). Cognitive therapists have encouraged some antisocial adolescents to view social provocations as problems to solve rather than as threats to their "manhood" with some favorable results (Fontaine et al., 2010).

Antisocial personality disorder The diagnosis given a person who is in frequent conflict with society, yet who is undeterred by punishment and experiences little or no guilt and anxiety.

Avoidant personality disorder A personality disorder in which the person is unwilling to enter relationships without assurance of acceptance because of fears of rejection and criticism.

BIOLOGICAL VIEWS OF ANTISOCIAL PERSONALITY DISORDER

Genetic factors are apparently involved in some personality disorders (Jang et al., 2007; Livesley & Jang, 2008). Personality traits are to some degree heritable, and many personality disorders seem to be extreme variations of normal personality traits. An analysis of 51 twin and adoption studies estimated that genetic factors were the greatest influences on antisocial behavior (Rhee & Waldman, 2002). Referring to the five-factor model of personality, people with schizoid personalities tend to be highly introverted (Widiger & Simonsen, 2005). People with avoidant personalities tend to be both introverted and emotionally unstable (neurotic) (Widiger & Simonsen, 2005).

Table 15.4 ■ Areas of the Brain Frequently Impaired in People with Antisocial Personality Disorder and Possible Consequences

Processes/Risk Factors	Possible Outcome
Ventral Prefrontal Cortex	
Regulation of emotion	Poor control over anger
Mediation of emotional responses guiding behavior	Poor control over behavior
Empathy/concern for others	Callous regard for the feelings or situation of others
Amygdala	
Fear conditioning	Lack of affect and poor development of conscience
Social-emotion judgments	Misinterpreting other people's motives and feelings
Moral emotion	Noncompliance with societal rules
Judging trustworthiness	Hypersociability and victimization of others

Source: Raine, A. (2008). From genes to brain to antisocial behavior. *Current Directions in Psychological Science*, 17(5), 323–328. Adapted from Table 1., page 326.

Perhaps the genetics of antisocial personality involve the prefrontal cortex of the brain, which is connected with emotional responses. There is some evidence that people with antisocial personality, as a group, have less gray matter (associative neurons) in the prefrontal cortex—especially on the underside, or ventral part, of the prefrontal cortex—than other people do (Narayan et al., 2007; Raine et al., 2009). Adrian Raine (2008) suggests that specific genes lead to this impairment and also predispose people to antisocial behavior. He notes that a common change in one gene has been connected with antisocial behavior, on the one hand, and with reductions in the volume of the ventral prefrontal cortex and also the amygdala, on the other hand. Table 15.4 outlines findings concerning the impairments that have been found in these parts of the brain and the possible emotional and behavioral consequences.

Joshua Isen and his colleagues (2010) used skin conductance—the amount of sweat in the palms of the hands—as a measure of arousal of the autonomic nervous system of 9- and 10-year-old boys and girls. They found that lower skin conductance was associated with antisocial tendencies in boys, including manipulateness and deceitfulness. Boys with lower levels of arousal would be less likely to show guilt for their misdeeds and would be less afraid of punishment. But a lower than normal level of arousal might not in itself give rise to the development of an antisocial personality because there was no correlation between skin conductance and antisocial tendencies in girls (Isen et al., 2010). Perhaps testosterone and stereotypical masculine gender-role expectations also play roles.

Although the causes of many psychological disorders remain in dispute, various methods of therapy have been devised to deal with them. Those methods are the focus of Chapter 16.

LearningConnections • PERSONALITY DISORDERS: MAKING ONESELF OR OTHERS MISERABLE

ACTIVE REVIEW (26) _____ disorders are inflexible, maladaptive behavior patterns that impair personal or social functioning and are a source of distress to the individual or to others. (27) Research suggests that people with antisocial personalities have (higher or lower?) than normal levels of arousal than most people.

REFLECT AND RELATE Do you know anyone whom you consider to have a personality disorder? What characteristics lead you to describe him or her in this way?

CRITICAL THINKING Within the medical model, sick people are often excused from school or work. If some criminals are “sick” in the sense of being diagnosed with antisocial personality disorder, does the disorder relieve them of responsibility for their behavior? Explain.

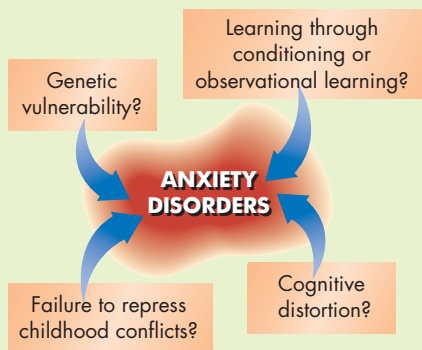


Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Anxiety Disorders

Dissociative Disorders

Somatoform Disorders



Major Subtypes

- Phobic disorders
- Panic disorder
- Generalized anxiety disorder
- Obsessive–compulsive disorder
- Stress disorders

- Dissociative amnesia
- Dissociative fugue
- Dissociative identity disorder (multiple personality disorder)

- Conversion disorder
- Hypochondriasis

Symptoms

- Worrying
- Fear of the worst happening
- Fear of losing control
- Nervousness
- Inability to relax

- Separation of mental processes such as thoughts, emotions, identity, memory, or consciousness

- Complaints of physical problems such as paralysis or pain
- Persistent belief that one has a serious disease in the absence of medical findings

Possible Origins

- Phobias symbolize conflicts originating in childhood (psychodynamic theory)
- Phobias may have been acquired in early childhood by conditioning or observational learning (learning theory)
- People with anxiety disorders may be biased toward attending too much to threats (cognitive theory)
- Genetic factors are implicated
- Phobias may have contributed to survival of human species (evolutionary perspective)
- Receptor sites in the brain may not be sensitive enough to the neurotransmitter GABA, which quiets anxiety reactions (neurological perspective)

- People with dissociative disorders use massive repression to prevent recognition of improper impulses or ugly memories (psychodynamic theory)
- People learn not to think about improper impulses or ugly memories, such as childhood sexual abuse (learning theory)

- Capacity to focus on imagined physical problems, a form of self-hypnosis
- Special sensitivity to bodily symptoms

Mood Disorders



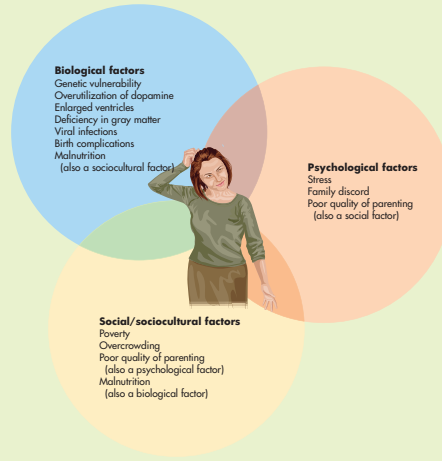
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- Major depression
- Bipolar disorder

- Disturbance in expressed emotions

- Depression may be anger turned inward due to holding in rather than expressing feelings of anger; bipolar disorder may be due to alternating domination by the ego and superego (psychodynamic theory)
- People with depression learn that they are helpless to change their situations (learning theory)
- Perfectionism, rumination, and attributional style—internal, stable, and global attributions for failures and shortcomings—lead to depression (cognitive theory)
- Depression is connected with neuroticism, which is believed to be heritable (genetic)
- Depression is connected with underutilization of the neurotransmitter serotonin (neurological)

Schizophrenia

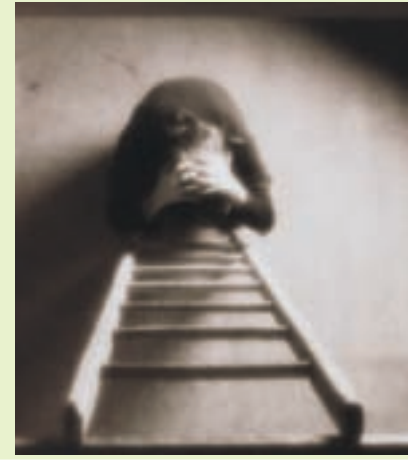


- Paranoid schizophrenia
- Disorganized schizophrenia
- Catatonic schizophrenia

- Disturbances in language and thought (e.g., delusions, loose associations), attention and perception (e.g., hallucinations)
- Disturbances in motor activity
- Disturbances in mood
- Withdrawal and absorption in daydreams or fantasy

- Ego may be overwhelmed by the id (psychodynamic theory)
- Schizophrenic behavior can be imitated in the hospital setting and reinforced by staff attention (learning theory)
- Poor parenting and poverty may contribute to schizophrenia (sociocultural)
- Schizophrenia runs in families, with a high concordance rate among monozygotic twins (genetic)
- People with schizophrenia may have larger ventricles, smaller prefrontal cortexes, and fewer synapses than others; complications during pregnancy and childbirth and overutilization of the neurotransmitter dopamine are also connected with schizophrenia (neurological)

Personality Disorders



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- Paranoid personality disorder
- Schizotypal personality disorder
- Schizoid personality disorder
- Borderline personality disorder
- Antisocial personality disorder
- Avoidant personality disorder

- Inflexible and maladaptive patterns of behavior
- Impairment in personal or social functioning
- Providing a source of distress to oneself or others

- Faulty resolution of Oedipus complex (psychodynamic theory)
- Children learn maladaptive ways of relating to other people (learning theory)
- Antisocial individuals misinterpret other people's behavior as threatening (cognitive theory)
- Exaggerated personality traits, which are partly heritable (genetic)
- Antisocial individuals may have less gray matter, which might lower arousal and thus feelings of guilt and the effects of punishment (neurological)



Go to Psychology CourseMate at www.cengagebrain.com to access an interactive version of this Concept Review designed to help you test yourself on the topics presented here.

Life Connections PREVENTING SUICIDE

About 33,000 people each year take their lives in the United States (Centers for Disease Control and Prevention, 2009). Suicide is the third leading cause of death among 15- to 24-year-olds, behind accidents and assaults (Heron & Tejada-Vera, 2009). What prompts people to take their own lives? Who is most at risk of attempting or committing suicide?

Risk Factors in Suicide

Most suicides are linked to feelings of depression and hopelessness (Dwivedi, 2010; Zaitsoff & Grilo, 2010). My daughter Jill Rathus and her colleagues (A. L. Miller et al., 2007) have found that suicidal adolescents experience four areas of psychological problems: (a) confusion about the self, (b) impulsiveness, (c) emotional instability, and (d) interpersonal problems. Some suicidal teenagers, like suicidal adults, are highly achieving, rigid perfectionists who have set impossibly high expectations for themselves (A. L. Miller et al., 2007). Many people throw themselves into feelings of depression and hopelessness by comparing themselves negatively with others, even when the comparisons are inappropriate (Barber, 2001). Contributors to suicidal behavior among adolescents include concerns over sexuality, sexual abuse, grades in school, problems at home, and substance abuse (Duke et al., 2010; A. L. Miller et al., 2007; Zayas et al., 2010). It is not always a stressful event itself that precipitates suicide but the individual's anxiety or fear of being "found out" about something, such as failing a course or getting arrested (Marttunen et al., 1998). People who consider suicide are apparently less capable of solving problems, especially social problems, than others (A. L. Miller et al., 2007). They are thus less likely to find productive ways of changing the stressful situation. They want a magical solution to problems

that require work or else a quick way out (Shneidman, 2001).

There is a tendency for suicide to run in families (Goldston & Compton, 2010). Many suicide attempters have family members with serious psychological problems, and about 25% have family members who have taken their own lives (Sorensen & Rutter, 1991). The causal connections are unclear, however. Do people who attempt suicide inherit disorders that can lead to suicide? Does the family environment subject family members to feelings of hopelessness? Does the suicide of a family member give a person the idea of committing suicide or create the impression that he or she is "fated" to commit suicide?

Sociocultural Factors in Suicide

Suicide is connected not only with feelings of depression and stressful events but also with age, educational status, ethnicity, and gender. Consider some facts about suicide:

- More teenagers and young adults die from suicide than from cancer, heart disease, AIDS, birth defects, stroke, pneumonia and influenza, and chronic lung disease combined (Centers for Disease Prevention and Control, 2009).
- Suicide is more common among college students than among people of the same age who are not in college. Each year, about 10,000 college students attempt suicide.
- Although teenage suicides loom large in the media spotlight, older people are more likely to commit suicide (Centers for Disease Control and Prevention, 2009). The suicide rate among older people who are unmarried or divorced is double that of older people who are married.

Rates of suicide and suicide attempts also vary among different ethnic groups and according to gender. For example, about one in every six Native Americans (17%) has attempted suicide—a rate higher than that of other Americans (Centers for Disease Control and Prevention, 2009). About one in eight Latino and Latina Americans has attempted suicide, and three in ten have considered it. European Americans are next, with 8% attempting and 28% contemplating suicide. African Americans are least likely to attempt suicide (6.5%) or to think about it (20%). The actual suicide rates for African Americans are about two-thirds of those for European Americans, despite the fact that African Americans are more likely to live in poverty and suffer from discrimination (Centers for Disease Control and Prevention, 2009). How can we explain this "disconnect" between hope for the future and suicide rates? One possibility is that when African Americans are feeling low, they tend to blame social circumstances, including discrimination. Many European Americans, on the other hand, may feel that there is no one to blame but themselves.

About three times as many females as males attempt suicide, but about five times as many males succeed (Centers for Disease Control and Prevention, 2009). Males are more likely to "succeed" because they use deadlier and quicker-acting methods: Males are more likely to shoot or hang themselves; females more often use drugs, such as overdoses of tranquilizers or sleeping pills, or poisons. It takes a while for drugs to work, giving people the opportunity to find them and intervene.

Warning Signs of Suicide

The majority of people who commit suicide send out signals about their

impending act (Rudd, 2008). But these signals often are overlooked, sometimes because other people do not recognize them and sometimes because other people don't know whom to call (Rudd, 2008). Here are clues that a person may be at risk of committing suicide (Bongar, 2002; Hendin et al., 2001):

- Changes in eating and sleeping patterns.
- Difficulty concentrating on school or the job.
- A sharp decline in performance and attendance at school or on the job.
- Loss of interest in previously enjoyed activities.
- Giving away prized possessions.
- Complaints about physical problems when no medical basis can be found.
- Withdrawal from social relationships.
- Personality or mood changes.
- Talking or writing about death or dying.
- Abuse of drugs or alcohol.
- A previously attempted suicide.
- Availability of a handgun.
- A precipitating event such as an argument, a broken romantic relationship, academic difficulties, problems on the job, loss of a friend, or trouble with the law.
- In the case of adolescents, knowing or hearing about another teenager who has committed suicide (which can lead to so-called cluster suicides).
- Threatening to commit suicide.

Myths about Suicide

You may have heard that individuals who threaten suicide are only seeking attention. Those who are serious just do it. **Truth or Fiction Revisited:** It is not true that people who threaten suicide are only seeking attention. Most people who commit suicide give warn-

ings about their intentions (Jackson & Nuttall, 2001; Waters, 2000).

Some believe that those who fail at suicide attempts are only seeking attention. But many people who commit suicide have made prior attempts (Bakst et al., 2009). Contrary to widespread belief, discussing suicide with a person who is depressed does not prompt the person to attempt suicide (Centers for Disease Control and Prevention, 1995). Extracting a promise not to commit suicide before calling or visiting a helping professional seems to prevent some suicides.

Some believe that only “insane” people (meaning people who are out of touch with reality) would take their own lives. However, suicidal thinking is not necessarily a sign of psychosis, neurosis, or personality disorder. Instead, people may consider suicide when they think they have run out of options (Nock & Kazdin, 2002; Townsend et al., 2001)

What Can You Do?

If someone tells you that he or she is considering suicide, you may become frightened and flustered or feel that an enormous burden has been placed on you. You are right: It has. In such a case, your objective should be to encourage the person to consult a health-care provider, or to consult one yourself, as soon as possible. But if the person refuses to talk to anyone else and you feel that you can't break free for a consultation, there are a number of things you can do (Joffe, 2008; Shneidman, 2001):

1. Keep talking. Encourage the person to talk to you or to some other trusted person. Draw the person out with questions like “What’s happening?” “Where do you hurt?” “What do you want to happen?” Questions like these may encourage the person to express frustrated needs and provide some relief. They also give you time to think.
2. Be a good listener. Be supportive with people who express suicidal

thoughts or feel depressed, hopeless, or worthless. They may believe their condition is hopeless and will never improve, but let them know that you are there for them and willing to help them get help. Show that you understand how upset the person is. Do *not* say, “Don’t be silly.”

3. Suggest that something other than suicide might solve the problem, even if it is not evident at the time. Many suicidal people see only two solutions—death or a magical resolution of their problems. Therapists try to “remove the mental blinders” from suicidal people.
4. Emphasize as concretely as possible how the person’s suicide would be devastating to you and to other people who care.
5. Ask how the person intends to commit suicide. People with concrete plans and a weapon are at greater risk. Ask if you might hold on to the weapon for a while. Sometimes, the answer is yes.
6. Suggest that the person go *with you* to obtain professional help *now*. The emergency room of a general hospital, the campus counseling center or infirmary, or the campus or local police station will do. Some campuses have hotlines you can call. Some cities have suicide prevention centers with hotlines that people can use anonymously.
7. Extract a promise that the person will not commit suicide before seeing you again. Arrange a specific time and place to meet. Get professional help as soon as you are apart.
8. Do *not* tell people threatening suicide that they’re silly or crazy. Do *not* insist on contact with specific people, such as parents or a spouse. Conflict with these people may have led to the suicidal thinking in the first place.

What Are Psychological Disorders?

1. What are psychological disorders?

Psychological disorders are characterized by unusual behavior, socially unacceptable behavior, faulty perception of reality, personal distress, dangerous behavior, or self-defeating behavior.

2. How have people viewed psychological disorders?

Psychological disorders were once viewed from a demonological perspective. In modern times, the medical model grew into prominence. Today, many psychologists view psychological disorders from the diathesis–stress perspective or from the biopsychosocial perspective.

3. How are psychological disorders grouped or classified?

The most widely used classification is found in the *Diagnostic and Statistical Manual (DSM)* of the American Psychiatric Association.

4. How common are psychological disorders?

Nearly half (46%) of us will have some psychological disorder during our lifetime. We are most likely to develop depression and anxiety disorders; schizophrenia will affect about 1% of us.

Anxiety Disorders: Real-Life “Fear Factors”?

5. What kinds of anxiety disorders are there?

Anxiety disorders are characterized by motor tension, feelings of dread, and overarousal of the sympathetic branch of the autonomic nervous system. These disorders include irrational, excessive fears, or phobias; panic disorder, characterized by sudden attacks in which people typically fear that they may be losing control or going crazy; generalized or pervasive anxiety; obsessive–compulsive disorder, in which people are troubled by intrusive thoughts or impulses to repeat some activity; and stress disorders, in which a stressful event is followed by persistent fears and intrusive thoughts about the event.

6. What is known about the origins of anxiety disorders?

Many learning theorists view phobias as conditioned fears. Cognitive theorists focus on ways people interpret threats. We may be “biologically prepared” to acquire certain kinds of fears. Anxiety disorders tend to run in families. Faulty regulation of neurotransmitters such as GABA may be involved in anxiety disorders.

Dissociative Disorders: Splitting Consciousness

7. What kinds of dissociative disorders are there?

Dissociative disorders are characterized by sudden, temporary changes in consciousness or self-identity. They include dissociative amnesia; dissociative fugue, which involves forgetting plus fleeing and adopting a new identity; and dissociative identity disorder (multiple personality disorder), in which a person behaves as if more than one personality occupies his or her body.

8. What is known about the origins of dissociative disorders?

Many psychologists suggest that dissociative disorders help people keep disturbing memories or ideas out of their mind.

These memories may involve episodes of childhood sexual or physical abuse. It may be that people with dissociative identity disorder have greater than normal capacity to recall some memories and put others out of mind.

Somatoform Disorders: When the Body Expresses Stress

9. What kinds of somatoform disorders are there?

People with somatoform disorders complain of physical problems, although no medical evidence can be found. Somatoform disorders include conversion disorder and hypochondriasis. In conversion disorder, stress is converted into a physical symptom, and the individual may show indifference to it. People diagnosed with hypochondriasis believe they have serious health problems that nobody can detect or explain.

10. What is known about the origins of somatoform disorders?

These disorders may reflect the relative benefits of focusing on physical symptoms rather than fears and conflicts.

Mood Disorders: Up, Down, and Around

11. What kinds of mood disorders are there?

Mood disorders involve disturbances in expressed emotions. Major depression is characterized by persistent feelings of sadness, loss of interest, feelings of worthlessness or guilt, inability to concentrate, and physical symptoms that may include disturbances in the regulation of eating and sleeping. Bipolar disorder is characterized by dramatic swings in mood between elation and depression; manic episodes include pressured speech and rapid flight of ideas.

12. What is known about the origins of mood disorders?

Research emphasizes possible roles for learned helplessness, attributional styles, and underutilization of serotonin in depression. People who are depressed are more likely than other people to make internal, stable, and global attributions for failures. Genetic factors involving regulation of neurotransmitters, such as serotonin, may also be involved in mood disorders.

Schizophrenia: When Thinking Runs Astray

13. What is schizophrenia?

Schizophrenia is a severe psychological disorder that is characterized by disturbances in thought and language, such as loosening of associations and delusions; in perception and attention, as in hallucinations; in motor activity, as shown by a stupor or by excited behavior; in mood, as in flat or inappropriate emotional responses; and in social interaction, as in social withdrawal and absorption in daydreams or fantasy.

14. What kinds of schizophrenia are there?

The major types of schizophrenia are paranoid, disorganized, and catatonic. Paranoid schizophrenia is characterized largely by delusions; disorganized schizophrenia by incoherence; and catatonic schizophrenia by motor impairment.

15. What is known about the origins of schizophrenia?

Schizophrenia is connected with smaller brains, especially fewer synapses in the prefrontal region, and larger ventricles. Genetic vulnerability to schizophrenia may interact with other factors, such as stress, complications during pregnancy and childbirth, and quality of parenting, to cause the disorder to develop. According to the dopamine theory of schizophrenia, people with schizophrenia *utilize* more dopamine than other people do.

Personality Disorders: Making Oneself or Others Miserable

16. What kinds of personality disorders are there?

Personality disorders are inflexible, maladaptive behavior patterns that impair personal or social functioning and cause distress for the individual or others. The defining trait of paranoid personality disorder is suspiciousness. People with

schizotypal personality disorders show oddities of thought, perception, and behavior. Social withdrawal is the major characteristic of schizoid personality disorder. People diagnosed with borderline personality disorder show instability in relationships, self-image, mood, and impulse control. People with antisocial personality disorders persistently violate the rights of others and are in conflict with the law. They show little or no guilt or shame over their misdeeds and are largely undeterred by punishment. People with avoidant personality disorder tend to avoid relationships for fear of rejection.

17. What is known about the origins of personality disorders?

Genetic factors may be involved in some personality disorders. People diagnosed with antisocial personality disorder apparently have less gray matter in the prefrontal cortex of the brain, which may provide lower than normal levels of arousal.

KEY TERMS

Acrophobia (p. 539)	Dissociative fugue (p. 545)	Paranoid schizophrenia (p. 555)
Acute stress disorder (p. 542)	Dissociative identity disorder (p. 546)	Personality disorders (p. 560)
Agoraphobia (p. 539)	Generalized anxiety disorder (p. 541)	Positive symptoms (p. 554)
Antisocial personality disorder (p. 562)	Hallucination (p. 534)	Posttraumatic stress disorder (PTSD) (p. 542)
Anxiety disorders (p. 538)	Hypochondriasis (p. 548)	Predictive validity (p. 537)
Attributional style (p. 552)	Ideas of persecution (p. 534)	Psychological disorders (p. 533)
Avoidant personality disorder (p. 562)	Insanity (p. 533)	Psychomotor retardation (p. 549)
Biopsychosocial perspective (p. 536)	<i>La belle indifférence</i> (p. 548)	Rapid flight of ideas (p. 550)
Bipolar disorder (p. 550)	Learned helplessness (p. 552)	Reliability (p. 537)
Borderline personality disorder (p. 561)	Major depressive disorder (p. 549)	Schizoid personality disorder (p. 561)
Catatonic schizophrenia (p. 556)	Manic (p. 550)	Schizophrenia (p. 554)
Claustrophobia (p. 539)	Mood disorder (p. 549)	Schizotypal personality disorder (p. 561)
Concordance (p. 544)	Multiple personality disorder (p. 546)	Social phobia (p. 539)
Conversion disorder (p. 548)	Mutism (p. 554)	Somatoform disorders (p. 547)
Culture-bound (p. 536)	Negative symptoms (p. 554)	Specific phobia (p. 539)
Delusions (p. 554)	Neuroticism (p. 553)	Stupor (p. 555)
Diathesis–stress model (p. 536)	Obsessive–compulsive disorder (OCD) (p. 541)	Validity (p. 537)
Disorganized schizophrenia (p. 556)	Panic disorder (p. 540)	Waxy flexibility (p. 556)
Dissociative amnesia (p. 545)	Paranoid personality disorder (p. 560)	

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16 | Methods of Therapy



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MAJOR TOPICS

What Is Psychotherapy?
Psychodynamic Therapies:
Digging Deep Within
Humanistic Therapies:
Strengthening the Self
Behavior Therapy: Adjustment
Is What You Do
Cognitive Therapies:
Adjustment Is What You
Think (and Do)
Group Therapies: On Being in
It Together
Does Psychotherapy Work?
Biological Therapies

FEATURES

In Profile: Carl Rogers
A Closer Look—Real Life: Psychotherapy Online: On the Electronic Nearness of You
In Profile: Aaron Beck and Albert Ellis
Controversy in Psychology: Should Health Professionals Use
Electroconvulsive Therapy?
A Closer Look—Research: Contemporary Psychosurgery for Treatment-Resistant
Obsessive–Compulsive Disorder and Depression
A Closer Look—Research: Eye-Movement Desensitization and Reprocessing
Concept Review: Methods of Therapy
Life Connections: Alleviating Depression: Getting Out of the Dumps
Self-Assessment: Do You Speak Your Mind or Do You Wimp Out?
The Assertiveness Schedule

TRUTH OR FICTION ?

- T F** Residents of London used to visit the local insane asylum for a fun night out on the town.
- T F** Some psychotherapists interpret clients' dreams.
- T F** Some psychotherapists let their clients take the lead in psychotherapy.
- T F** Other psychotherapists challenge their clients to make the tough choices in life.
- T F** Still other psychotherapists tell their clients exactly what to do.
- T F** Lying in a reclining chair and fantasizing can be an effective way of confronting fears.
- T F** Smoking cigarettes can be an effective method for helping people ... stop smoking cigarettes.
- T F** You might be able to put an end to bad habits merely by keeping a record of where and when you practice them.
- T F** The same kind of drug is used to treat depression, panic disorder, obsessive-compulsive disorder, even eating disorders.
- T F** The originator of a surgical technique intended to reduce violence learned that it was not always successful ... when one of his patients shot him.
- T F** People with psychological disorders should always say no to drugs.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

Some things are too painful to bear. One of them, for New York Fire Chief Stephen King, was 9/11. His experiences at the World Trade Center that day led him to retire from the department, avoid bridges and tunnels, and stay out of Manhattan.

“I was in the north tower, the one that got hit first,” King (2005) explains. “Where I was and what I saw that day—the many people that jumped, the magnitude of it—was just overwhelming.” Many who witnessed the events of that day developed stress disorders.

But a new tool in the treatment of anxiety disorders, *virtual therapy*, has helped King face the past—and his future. Using the technology we find in video games, programs mimic traumatic settings and events, whether they be public speaking in an auditorium, flying in an airplane, spiders, or in King’s case, images of the World Trade Center.

JoAnn Difede, director of the Anxiety and Traumatic Stress Studies Program at Weill Cornell Medical College, is using virtual therapy to help World Trade Center survivors cope with their memories (Difede et al., 2007). “The idea,” Difede (2005) explains, “behind the treatment is to systematically expose the patient to aspects of their experience in a graded fashion so they can confront their fear of the trauma.”

University of Southern California psychologist Albert Rizzo has developed scenes from classrooms and parties to help people overcome social anxieties. “To help people deal with their problems, you must get them exposed to what they fear most,” Rizzo argues (Rizzo & Schultheis, 2002).

Drs. Difede and Rizzo use programs like 3D Studio MAX and DeepPaint to create the necessary software. Atlanta-based company Virtually Better has developed scenes of a bridge and a glass elevator to desensitize patients to fear of heights, a virtual airplane cabin for people who fear flying, and a virtual thunderstorm to help people reduce their fear of tempestuous weather. The U.S. Army has asked Virtually Better to use its 3D imaging software to create programs that will help soldiers returning from Iraq and Afghanistan, and the researchers are currently working with Virtual Iraq (Rizzo et al., 2009).

Virtually Better is working on programs to help treat addictions. Psychologists are studying whether virtual exposure to alcohol, drugs, and cigarettes can evoke cravings that patients can learn to resist. Virtually Better’s contributions include scenes of a virtual crack house and a virtual bar.



Firefighter Stephen King and Dr. JoAnn Difede, Who Treated Him with Virtual Therapy King was at the World Trade Center on September 11, 2001, and he developed posttraumatic stress disorder.

© Christian Wirtlin

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Virtual therapy was also used to help desensitize Joanne Cartwright, who had a fear of spiders that impaired the quality of her life. “I washed my truck every night before I went to work in case there were webs,” says Cartwright (cited in Robbins, 2000). “I put all my clothes in plastic bags and taped duct tape around my doors so spiders couldn’t get in. I thought I was going to have a mental breakdown. I wasn’t living.” Twelve virtual therapy desensitization sessions changed her life. “I’m amazed,” notes Cartwright, “because I am doing all this stuff I could never do,” such as camping and hiking.

Writing in *Scientific American*, psychologist Hunter Hoffman (2004) describes an elaborate virtual environment called *SpiderWorld* that helps people with spider phobias overcome their aversion by gradually approaching virtual spiders and reaching out to touch them. A toy spider and a device that tracks the patient’s hand movements provide tactile sensations akin to touching a real spider. Virtual immersion in *SpiderWorld* and similar virtual environments has also helped people cope with pain by distracting them from it.

Chief Stephen King received virtual therapy to learn to cope with his traumatic experience at the World Trade Center. If he had chosen a different kind of therapist, he might have been:

- Lying on a couch, talking about anything that popped into awareness, and exploring the possible meaning of his recurrent dreams.
- Sitting face to face with a warm, gentle therapist who expressed faith in King’s ability to manage his problems.
- Listening to a frank, straightforward therapist assert that King was compounding his emotional problems and demanding that he be “man enough” to face the trauma of 9/11 and just move on.
- Taking medication.
- Participating in some combination of these approaches.

These methods, although different, all represent methods of therapy. In this chapter, we explore various methods of psychotherapy and biological therapy. **Question 1: What is psychotherapy?**

Psychologist Hunter Hoffman Uses Virtual Therapy to Treat “Miss Muffet” *Miss Muffet* is the name playfully given by Hoffman to a woman with a phobia for spiders. She is wearing virtual reality headgear and sees the scene displayed on the monitor, which shows a large and hairy—but

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WHAT IS PSYCHOTHERAPY?

There are many kinds of psychotherapy, but they all have certain common characteristics. **Psychotherapy** is a systematic interaction between a therapist and a client that applies psychological principles to affect the client's thoughts, feelings, and/or behavior to help the client overcome psychological disorders, adjust to problems in living, or develop as an individual.

Quite a mouthful? True. But note the essentials:

1. *Systematic interaction.* Psychotherapy is a systematic interaction between a client and a therapist. The therapist's theoretical point of view interacts with the client's to determine how the therapist and client relate to each other.
2. *Psychological principles.* Psychotherapy is based on psychological theory and research in areas such as personality, learning, motivation, and emotion.
3. *Thoughts, feelings, and behavior.* Psychotherapy influences clients' thoughts, feelings, and behavior. It can be aimed at any or all of these aspects of human psychology.
4. *Psychological disorders, adjustment problems, and personal growth.* Psychotherapy is often used with people who have psychological disorders. Other people seek help in adjusting to problems such as shyness, weight problems, or loss of a life partner. Still other clients want to learn more about themselves and to reach their full potential as individuals, parents, or creative artists.

Video Connections—Virtual Reality Therapy



Virtual reality therapy helps people overcome fears like that of the subway and other enclosed spaces. View the video to learn more about how psychologists use virtual reality and why they might use different treatment methods for people with the same kind of problems.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

The History of Therapies

Historically speaking, “treatments” of psychological disorders often reflected the assumption that people who behaved in strange ways were possessed by demons. **Question 2: How, then, have people with psychological problems and disorders been treated throughout the ages?** Because of this belief, treatment tended to involve cruel practices such as exorcism and execution. Some people who could not meet the demands of everyday life were tossed into prisons. Others begged in the streets, stole food, or became prostitutes. A few found their way to monasteries or other retreats that offered a kind word and some support. Generally speaking, they died early.

ASYLUMS

Asylums originated in European monasteries. They were the first institutions meant primarily for people with psychological disorders. But their function was warehousing, not treatment. Their inmate populations mushroomed until the stresses created by noise, overcrowding, and disease aggravated the problems they were meant to ease. Inmates were frequently chained and beaten.

The word *bedlam* derives from St. Mary's of *Bethlehem*, the London asylum that opened its gates in 1547. Here unfortunate people with psychological disorders were chained, whipped, and allowed to lie in their own waste. **Truth or Fiction Revisited:** And here the ladies and gentlemen of the British upper class might stroll on a lazy afternoon to be amused by inmates' antics. The price of admission was one penny.

Psychotherapy A systematic interaction between a therapist and a client that brings psychological principles to bear on influencing the client's thoughts, feelings, and/or behavior to help that client overcome psychological disorders, adjust to problems in living, or develop as an individual.

Asylum An institution for the care of the mentally ill.


Humanitarian reform movements began in the 18th century. In Paris, the physician Philippe Pinel unchained the patients at La Salpêtrière. Rather than run amok as had been feared, most patients profited from kindness and freedom. Many eventually reentered society. Later, movements to reform institutions were led by William Tuke in England and Dorothea Dix in America.

MENTAL HOSPITALS

In the United States, mental hospitals gradually replaced asylums. In the mid-1950s, more than a million people resided in state, county, Veterans Administration, or private facilities. (The number has dropped to about 200,000 today.) The mental hospital's function is treatment, not warehousing. Still, because of high patient populations and understaffing, many patients received little attention. Even today, with somewhat improved conditions, one psychiatrist may be responsible for the welfare of several hundred residents on a weekend when other staff members are absent.

THE COMMUNITY MENTAL HEALTH MOVEMENT

Since the 1960s, efforts have been made to maintain people with serious psychological disorders in their communities. Community mental health centers attempt to maintain new patients as outpatients and to serve patients who have been released from mental hospitals. Today, most people with chronic psychological disorders live in the community, not the hospital. Social critics note that many people who had resided in hospitals for decades were suddenly discharged to “home” communities that seemed foreign and forbidding to them. Many do not receive adequate follow-up care. Many join the ranks of the homeless (Drury, 2003).



The Unchaining of the Patients at La Salpêtrière Philippe Pinel sparked the humanitarian reform movement by unchaining the patients at this asylum in Paris.

© Robert Fleury, 1837–1912, (after) Bibliothèque des Arts Décoratifs, Paris, France, Archives Chancelier/The Bridgeman Art Library

LearningConnections • WHAT IS PSYCHOTHERAPY?

ACTIVE REVIEW (1) Psychotherapy is a systematic interaction between a therapist and a client that applies _____ principles to influence clients' thoughts, feelings, and/or behavior. (2) Since the 1950s, the population of mental hospitals in the United States has (increased or decreased?).

REFLECT AND RELATE Before you get deeper into the chapter, consider what you think happens in psychotherapy. Then ask yourself whether your ideas align

with one or more of the kinds of therapy you will be reading about.

CRITICAL THINKING Are there advantages to people in using virtual therapy rather than imagining troubling stimuli? If so, what might they be?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

PSYCHODYNAMIC THERAPIES: DIGGING DEEP WITHIN

Psychodynamic therapies are based on the thinking of Sigmund Freud, the founder of psychodynamic theory. Such therapies assume that psychological problems reflect early childhood experiences and internal conflicts. According to Freud, these conflicts involve the shifting of psychic, or libidinal, energy among the three psychic structures—the id, ego, and superego. These shifts of psychic energy determine our behavior. When primitive urges threaten to break through from the id or when the superego floods us with excessive guilt, defenses are established and distress is created. Freud's psychodynamic therapy method—*psychoanalysis*—aims to modify the flow of energy among these structures, largely to bulwark the ego against the torrents of energy let loose by the id and the superego. With impulses and feelings of guilt and shame placed under greater control, clients are freer to develop adaptive behavior. **Question 3: How, then, do psychoanalysts conduct a traditional Freudian psychoanalysis?**

—*Freud is the father of psychoanalysis. It has no mother.*
GERMAINE GREER

Traditional Psychoanalysis: “Where Id Was, There Shall Ego Be”

Canst thou not minister to a mind diseas'd,
Pluck out from the memory a rooted sorrow,
Raze out the written troubles of the brain,
And with some sweet oblivious antidote
Cleanse the stuff'd bosom of that perilous stuff
Which weighs upon the heart?

—Shakespeare, *Macbeth*

In this passage, Macbeth asks a physician to help Lady Macbeth after she has gone mad. In the play, her madness is caused partly by events—namely, her role in murders designed to seat her husband on the throne of Scotland. There are also hints of mysterious, deeply rooted problems, such as conflicts about infertility.

If Lady Macbeth's physician had been a traditional psychoanalyst, he might have asked her to lie on a couch in a slightly darkened room. He would have sat behind her and encouraged her to talk about anything that came to mind, no matter how trivial, no matter how personal. To avoid interfering with her self-exploration, he might have said little or nothing for session after session. That would have been par for the course. A traditional **psychoanalysis** can extend for months, even years.

Psychoanalysis is the clinical method devised by Freud for plucking “from the memory a rooted sorrow,” for razing “out the written troubles of the brain.” It aims to provide *insight* into the conflicts that are presumed to lie at the roots of a person's problems. Insight means many things, including knowledge of the experiences that lead

Psychodynamic therapy A type of psychotherapy that is based on Freud's thinking and that assumes that psychological problems reflect early childhood experiences and internal conflicts.

Psychoanalysis Freud's method of psychotherapy.



© Freud Museum, London

A View of Freud's Consulting Room Freud would sit in a chair by the head of the couch while a client free-associated. The basic rule of free association is that no thought is censored. Freud did not believe that free association was really “free”; he assumed that significant feelings would rise to the surface and demand expression.

Catharsis In psychoanalysis, the expression of repressed feelings and impulses to allow the release of the psychic energy associated with them.

Free association In psychoanalysis, the uncensored uttering of all thoughts that come to mind.

Resistance The tendency to block the free expression of impulses and primitive ideas—a reflection of the defense mechanism of repression.

Interpretation In psychoanalysis, an explanation of a client's utterance according to psychoanalytic theory.

Transference Responding to one person (such as a spouse or the psychoanalyst) in a way that is similar to the way one responded to another person (such as a parent) in childhood.

to conflicts and maladaptive behavior, recognition of unconscious feelings and conflicts, and conscious evaluation of one's thoughts, feelings, and behavior.

Psychoanalysis also aims to help the client express feelings and urges that have been repressed. By so doing, Freud believed that the client spilled forth the psychic energy that had been repressed by conflicts and guilt. He called this spilling forth **catharsis**. Catharsis would provide relief by alleviating some of the forces assaulting the ego.

Freud was also fond of saying, “Where id was, there shall ego be.” In part, he meant that psychoanalysis could shed light on the inner workings of the mind. He also sought to replace impulsive and defensive behavior with coping behavior. In this way, for exam-

ple, a man with a phobia for knives might discover that he had been repressing the urge to harm someone who had taken advantage of him. He might also find ways to confront the person verbally.

FREE ASSOCIATION

Early in his career as a therapist, Freud found that hypnosis allowed his clients to focus on repressed conflicts and talk about them. The relaxed “trance state” provided by hypnosis seemed to allow clients to “break through” to topics of which they would otherwise be unaware. Freud also found, however, that many clients denied the accuracy of this material once they were out of the trance. Other clients found them to be premature and painful. Freud therefore turned to **free association**, a more gradual method of breaking through the walls of defense that block a client's insight into unconscious processes.

In free association, the client is made comfortable—for example, lying on a couch—and asked to talk about any topic that comes to mind. No thought is to be censored—that is the basic rule. Psychoanalysts ask their clients to wander “freely” from topic to topic, but they do not believe that the process occurring *within* the client is fully free. Repressed impulses clamor for release.

The ego persists in trying to repress unacceptable impulses and threatening conflicts. As a result, clients might show **resistance** to recalling and discussing threatening ideas. A client about to entertain such thoughts might claim, “My mind is blank.” The client might accuse the analyst of being demanding or inconsiderate. He or she might “forget” the next appointment when threatening material is about to surface.

The therapist observes the dynamic struggle between the compulsion to utter certain thoughts and the client's resistance to uttering them. Through discreet remarks, the analyst subtly tips the balance in favor of utterance. A gradual process of self-discovery and self-insight ensues. Now and then, the analyst offers an **interpretation** of an utterance, showing how it suggests resistance or deep-seated feelings and conflicts.

TRANSFERENCE

Freud believed that clients responded to him not only as an individual but also in ways that reflected their attitudes and feelings toward other people in their lives. He labeled this process **transference**. For example, a young woman client might respond to Freud as a father figure and displace her feelings toward her father onto Freud, perhaps seeking affection and wisdom. A young man could also see Freud as a father figure, but rather than wanting affection from Freud, he might view Freud as a rival, responding to Freud in terms of his own unresolved Oedipal complex.

Analyzing and working through transference have been considered key aspects of psychoanalysis. Freud believed that clients reenact their childhood conflicts with their

parents when they are in therapy. Clients might thus transfer the feelings of anger, love, or jealousy they felt toward their own parents onto the analyst. Childhood conflicts often involve unresolved feelings of love, anger, or rejection. A client may interpret a suggestion by the therapist as a criticism and see it as a devastating blow, transferring feelings of self-hatred that he had repressed because his parents had rejected him in childhood. Transference can also distort clients' relationships with other people here and now, such as relationships with spouses or employers. The following therapeutic dialogue illustrates the way an analyst may interpret a client's inability to communicate his needs to his wife as a function of transference. The purpose is to provide his client, a Mr. Arianes, with insight into how his relationship with his wife has been colored by his childhood relationship with his mother:

- Arianes: I think you've got it there, Doc. We weren't communicating. I wouldn't tell [my wife] what was wrong or what I wanted from her. Maybe I expected her to understand me without saying anything.
- Therapist: Like the expectations a child has of its mother.
- Arianes: Not my mother!
- Therapist: Oh?
- Arianes: No, I always thought she had too many troubles of her own to pay attention to mine. I remember once I got hurt on my bike and came to her all bloodied up. When she saw me she got mad and yelled at me for making more trouble for her when she already had her hands full with my father.
- Therapist: Do you remember how you felt then?
- Arianes: I can't remember, but I know that after that I never brought my troubles to her again.
- Therapist: How old were you?
- Arianes: Nine, I know that because I got that bike for my ninth birthday. It was a little too big for me still, that's why I got hurt on it.
- Therapist: Perhaps you carried this attitude into your marriage.
- Arianes: What attitude?
- Therapist: The feeling that your wife, like your mother, would be unsympathetic to your difficulties. That there was no point in telling her about your experiences because she was too preoccupied or too busy to care.
- Arianes: But she's so different from my mother. I come first with her.
- Therapist: On one level you know that. On another, deeper level there may well be the fear that people—or maybe only women, or maybe only women you're close to—are all the same, and you can't take a chance at being rejected again in your need.
- Arianes: Maybe you're right, Doc, but all that was so long ago, and I should be over that by now.
- Therapist: That's not the way the mind works. If a shock or a disappointment is strong enough it can permanently freeze our picture of ourselves and our expectations of the world. The rest of us grows up—that is, we let ourselves learn about life from experience and from what we see, hear, or read of the experiences of others, but that one area where we really got hurt stays unchanged. So what I mean when I say you might be carrying that attitude into your relationship with your wife is that when it comes to your hopes of being understood and catered to when you feel hurt or abused by life, you still feel very much like that nine-year-old boy who was rebuffed in his need and gave up hope that anyone would or could respond to him. (Basch, 1980, pp. 29–30)

*Dreams are often most profound
when they seem the most crazy.*

SIGMUND FREUD

*The interpretation of dreams is
the royal road to a knowledge
of the unconscious activities of
the mind.*

SIGMUND FREUD

DREAM ANALYSIS

Truth or Fiction Revisited: It is true that some therapists interpret clients' dreams. Freud often asked clients to jot down their dreams upon waking so that they could

— ■ —
Sometimes a cigar is just a cigar.

SIGMUND FREUD
— ■ —

discuss them in therapy. Freud considered dreams the “royal road” to the unconscious. He believed that the content of dreams is determined by unconscious processes as well as by the events of the day. Unconscious impulses tend to be expressed in dreams as a form of **wish fulfillment**.

In dreams, unacceptable sexual and aggressive impulses are likely to be displaced onto objects and situations that reflect the client’s era and culture. These objects become symbols of unconscious wishes. For example, long, narrow dream objects might be **phallic symbols**, but whether the symbol takes the form of a spear, rifle, stick shift, or spacecraft partially reflects the dreamer’s cultural background.

In Freud’s theory, the perceived content of a dream is called its visible or **manifest content**. Its presumed hidden or symbolic content is its **latent content**. If a man dreams he is flying, flying is the manifest content of the dream. Freud usually interpreted flying as symbolic of erection, so concerns about sexual potency might make up the latent content of the dream.

Modern Psychodynamic Approaches

Some psychoanalysts adhere faithfully to Freud’s techniques. They engage in protracted therapy that continues to rely heavily on free association, interpretation of dreams, and other traditional methods. In recent years, however, more modern forms of psychodynamic therapy have been devised. **Question 4: How do modern psychodynamic approaches differ from traditional psychoanalysis?** Modern psychodynamic therapy is briefer and less intense and makes treatment available to clients who do not have the time or money for long-term therapy. Many modern psychodynamic therapists do not believe that prolonged therapy is needed or justifiable in terms of the ratio of cost to benefits.

Some modern psychodynamic therapies continue to focus on revealing unconscious material and breaking through psychological defenses. Nevertheless, they differ from traditional psychoanalysis in several ways (Prochaska & Norcross, 2010). One is that the client and therapist usually sit face to face (the client does not lie on a couch). The therapist is usually directive. That is, modern therapists often suggest helpful behavior instead of focusing on insight alone. Finally, there is usually more focus on the ego as the “executive” of personality and less emphasis on the id. For this reason, many modern psychodynamic therapists are considered **ego analysts**.

Many of Freud’s followers, “neoanalysts”—from Jung and Adler to Horney and Erikson—believed that Freud had placed too much emphasis on sexual and aggressive impulses and underestimated the role of the ego. For example, Freud aimed to establish conditions under which clients could spill forth psychic energy and eventually shore up the ego. Erikson, in contrast, spoke to clients directly about their values and concerns, encouraging them to develop desired traits and behavior patterns. Even Freud’s daughter, the psychoanalyst Anna Freud (1895–1982), was more concerned with the ego than with unconscious forces and conflicts.

Wish fulfillment In dreams, the acting out of ideas and impulses that are repressed when one is conscious.

Phallic symbol A sign that represents the penis.

Latent content In psychodynamic theory, the symbolized or underlying content of dreams.

Manifest content In psychodynamic theory, the reported content of dreams.

Ego analyst A psychodynamically oriented therapist who focuses on the conscious, coping behavior of the ego instead of the hypothesized, unconscious functioning of the id.

LearningConnections • PSYCHODYNAMIC THERAPIES: DIGGING DEEP WITHIN

ACTIVE REVIEW (3) Freud’s method of psychoanalysis attempts to shed light on _____ conflicts that are presumed to lie at the roots of clients’ problems. (4) Freud believed that psychoanalysis would promote _____, that is, the spilling forth of repressed psychic energy. (5) The chief psychoanalytic method is _____ association. (6) Freud considered _____ to be the “royal road” to the unconscious.

REFLECT AND RELATE Does it make you or other people you know feel good to talk with someone about your

problems? Are there some “deep secrets” you are unwilling to talk about or share with others? How do you think a psychoanalyst would respond if you brought them up? Why?

CRITICAL THINKING Can you think of a way to demonstrate scientifically whether an unacceptable idea has been repressed?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

HUMANISTIC THERAPIES: STRENGTHENING THE SELF

Psychodynamic therapies focus on internal conflicts and unconscious processes. **Humanistic therapies** focus on the quality of the client's subjective, conscious experience. Traditional psychoanalysis focuses on early childhood experiences. Humanistic therapies usually focus on what clients are experiencing “here and now.”

These differences, however, are mainly a matter of emphasis. The past has a way of influencing current thoughts, feelings, and behavior. Carl Rogers, the originator of *client-centered therapy*, believed that childhood experiences gave rise to the conditions of worth that troubled his clients here and now. He and Fritz Perls, the originator of *Gestalt therapy*, recognized that early incorporation of other people's values often leads clients to “disown” parts of their own personalities.

Client-Centered Therapy: Removing Roadblocks to Self-Actualization

Question 5: What is Carl Rogers's method of client-centered therapy? Rogers believed that we are free to make choices and control our destinies despite the burdens of the past. He also believed that we have natural tendencies toward health, growth, and fulfillment. Psychological problems arise from roadblocks placed in the path of self-actualization—that is, what Rogers believed was an inborn tendency to strive to realize one's potential. If, when we are young, other people approve of us only when we are doing what they want us to do, we may learn to disown the parts of ourselves to which they object. We may learn to be seen but not heard—not even by ourselves. As a result, we may experience stress and discomfort and the feeling that we—or the world—are not real.

Client-centered therapy aims to provide insight into the parts of us that we have disowned so that we can feel whole. It creates a warm, therapeutic atmosphere that encourages self-exploration and self-expression. The therapist's acceptance of the client is thought to foster self-acceptance and self-esteem. Self-acceptance frees the client to make choices that develop his or her unique potential.

Client-centered therapy is nondirective. **Truth or Fiction Revisited:** It is true that in this type of therapy, the client takes the lead by stating and exploring problems. An effective client-centered therapist has several qualities:

Humanistic therapy A form of psychotherapy that focuses on the client's subjective, conscious experience in the “here and now.”

Client-centered therapy Carl Rogers's method of psychotherapy, which emphasizes the creation of a warm, therapeutic atmosphere that frees clients to engage in self-exploration and self-expression.

In my early professional years I was asking the question: How can I treat, or cure, or change this person? Now I would phrase the question in this way: How can I provide a relationship which this person may use for his own personal growth?

CARL ROGERS

In Profile

He spent his early years in a wealthy Chicago suburb, where he attended school with Ernest Hemingway and Frank Lloyd Wright's children. His family, with its six children, was religious and close-knit. His father viewed such activities as smoking, drinking, playing cards, and going to the movies as questionable. It was all right to be tolerant of them, but relationships with those who engaged in them were discouraged. When Carl Rogers was 12, his family moved to a farm farther from the city to protect the children from such unwholesome influences.

Rogers (1902–1987) took refuge in books and developed an interest in science. His first college major was agriculture. During a student visit to Peking in 1922, he was exposed for the first time to people from different ethnic backgrounds. He wrote his parents to proclaim his independence from their conservative



CARL ROGERS

© Michael Reigler/Time & Life Pictures/Getty Images

views. Shortly thereafter, he developed an ulcer and had to be hospitalized.

Rogers then attended New York's Union Theological Seminary with the goal of becoming a minister. At the same time, he took courses in psychology and education across the street at Columbia University. After a couple of years, he came to believe that psychology might be a better way of helping people, so he transferred to Columbia. Perhaps in response to his parents' efforts to “protect” him

from other ways of thinking, Rogers developed a form of therapy—client-centered therapy—intended to help people get in touch with their genuine feelings and pursue their own interests regardless of other people's wishes.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Carl Rogers.

Unconditional positive regard In client-centered therapy, the acceptance of the value of another person, although not necessarily acceptance of everything the person does.

Empathic understanding In client-centered therapy, the ability to perceive a client's feelings from the client's frame of reference. A quality of the good client-centered therapist.

Frame of reference In client-centered therapy, one's unique patterning of perceptions and attitudes, according to which one evaluates events.

Genuineness In client-centered therapy, openness and honesty in responding to the client.

Gestalt therapy Fritz Perls's form of psychotherapy, which attempts to integrate conflicting parts of the personality through directive methods designed to help clients perceive their whole selves.



© Courtesy, The Gestalt Journal Press

Fritz Perls Known to friends, clients, and peers alike as "Fritz," Perls put clients through structured experiences to help them understand how their feelings might be in conflict. He believed that people had to accept responsibility for making choices in their lives.

- **Unconditional positive regard:** Respect for clients as human beings with unique values and goals.
- **Empathic understanding:** Recognition of the client's experiences and feelings. Therapists view the world through the client's **frame of reference** by setting aside their own values and listening closely.
- **Genuineness:** Openness and honesty in responding to the client. Client-centered therapists must be able to tolerate differentness because they believe that every client is different in important ways.

The following excerpt from a therapy session shows how Carl Rogers uses empathic understanding and paraphrases a client's (Jill's) feelings. His goal is to help her recognize feelings that she has partially disowned:

- Jill: I'm having a lot of problems dealing with my daughter. She's 20 years old; she's in college; I'm having a lot of trouble letting her go. ... And I have a lot of guilt feelings about her; I have a real need to hang on to her.
- C. R.: A need to hang on so you can kind of make up for the things you feel guilty about. Is that part of it?
- Jill: There's a lot of that. ... Also, she's been a real friend to me, and filled my life. ... And it's very hard. ... a lot of empty places now that she's not with me.
- C. R.: The old vacuum, sort of, when she's not there.
- Jill: Yes. Yes. I also would like to be the kind of mother that could be strong and say, you know, "Go and have a good life," and this is really hard for me, to do that.
- C. R.: It's very hard to give up something that's been so precious in your life, but also something that I guess has caused you pain when you mentioned guilt.
- Jill: Yeah. And I'm aware that I have some anger toward her that I don't always get what I want. I have needs that are not met. And, uh, I don't feel I have a right to those needs. You know. ... she's a daughter; she's not my mother. Though sometimes I feel as if I'd like her to mother me ... it's very difficult for me to ask for that and have a right to it.
- C. R.: So, it may be unreasonable, but still, when she doesn't meet your needs, it makes you mad.
- Jill: Yeah I get very angry, very angry with her.
- C. R.: (Pauses) You're also feeling a little tension at this point, I guess.
- Jill: Yeah. Yeah. A lot of conflict. ... (C. R.: Mmm-hmm.) A lot of pain.
- C. R.: A lot of pain. Can you say anything more about what that's about? (Farber et al., 1996, pp. 74–75)

Client-centered therapy is practiced widely in college and university counseling centers, not just to help students experiencing, say, anxieties or depression but also to help them make decisions. Many college students have not yet made career choices or wonder whether they should become involved with particular people or in sexual activity. Client-centered therapists do not tell clients what to do. Instead, they help clients arrive at their own decisions.

Gestalt Therapy: Getting It Together

Fritz Perls (1893–1970) originated **Gestalt therapy**. **Question 6: What is Fritz Perls's method of Gestalt therapy?** Like client-centered therapy, Gestalt therapy assumes that people disown parts of themselves that might meet with social disapproval or rejection. People also don social masks, pretending to be things they are not. Therapy aims to help individuals integrate conflicting parts of their personality. Perls used the term *Gestalt* to signify his interest in giving the conflicting parts of the personality an

integrated form or shape. He wanted his clients to become aware of inner conflict, accept the reality of conflict rather than deny it or keep it repressed, and make productive choices despite misgivings and fears. **Truth or Fiction Revisited:** People in conflict frequently find it difficult to make choices, and Perls firmly challenged them to do so.

Although Perls's ideas about conflicting personality elements owe much to psychodynamic theory, his form of therapy, unlike psychoanalysis, focuses on the here and now. In Gestalt therapy, clients perform exercises to heighten their awareness of their current feelings and behavior rather than exploring the past. Perls also believed, along with Rogers, that people are free to make choices and to direct their personal growth. But the charismatic and forceful Perls was unlike the gentle and accepting Rogers in temperament (Prochaska & Norcross, 2010). Thus, unlike client-centered therapy, Gestalt therapy is highly directive. The therapist leads the client through planned experiences.

There are a number of Gestalt exercises and games, including the following:

1. *The dialogue:* In this game, the client undertakes verbal confrontations between opposing wishes and ideas to heighten awareness of internal conflict. An example of these clashing personality elements is “top dog” and “underdog.” One’s top dog might conservatively suggest, “Don’t take chances. Stick with what you have or you might lose it all.” One’s frustrated underdog might then rise up and assert, “You never try anything. How will you ever get out of this rut if you don’t take on new challenges?” Heightened awareness of the elements of conflict can clear the path toward resolution, perhaps through a compromise of some kind.
2. *Playing the projection:* Clients role-play people with whom they are in conflict, expressing, for example, the ideas of their parents.
3. *I take responsibility:* Clients end statements about themselves by adding, “and I take responsibility for it.” The following excerpt from a therapy session with a client named Max shows how Perls would make clients take responsibility for what they experience. One of his techniques is to show how clients are treating something they are doing (a “verb”) like something that is just out there and beyond their control (a “noun”):

Max: I feel the tenseness in my stomach and in my hands.

Perls: The tenseness. Here we’ve got a noun. Now the tenseness is a noun. Now change the noun, the thing, into a verb.

Max: I am tense. My hands are tense.

Perls: Your hands are tense. They have nothing to do with you.

Max: I am tense.

Perls: You are tense. How are you tense? What are you doing?

Max: I am tensing myself.

Perls: That’s it. (Perls, 1971, p. 115)

Once Max understands that he is tensing himself and takes responsibility for it, he can choose to stop tensing himself. The tenseness is no longer something out there that is victimizing him; it is something he is doing to himself.

Body language also provides insight into conflicting feelings. Clients might be instructed to attend to the ways they furrow their eyebrows and tense their facial muscles when they express certain ideas. In this way, they often find that their body language asserts feelings they have been denying in their spoken statements.

Freud viewed dreams as the “royal road” to the unconscious. Perls saw the content of dreams as representing disowned parts of the personality. He would often ask clients to role-play elements of their dreams to get in touch with these parts of their personality.

I do my thing and you do yours. I am not in this world to live up to your expectations, and you are not in this world to live up to mine. You are you and I am I, and if by chance we find each other, then it is beautiful. If not, it can't be helped.

FRITZ PERLS

ACTIVE REVIEW (7) _____ therapies focus on clients' subjective, conscious experience. (8) Client-centered therapy is a (directive or nondirective?) method that provides clients with an accepting atmosphere that enables them to overcome roadblocks to self-actualization. (9) The client-centered therapist shows (conditional or unconditional?) positive regard, empathic understanding, and genuineness. (10) Gestalt therapy provides (directive or nondirective?) methods that are designed to help clients accept responsibility and integrate conflicting parts of the personality.

REFLECT AND RELATE Carl Rogers believed that our psychological well-being is connected with our freedom to

develop our unique frames of reference. Do you think you can separate your “real self” from your sociocultural experiences and religious training? What would you be like if you had been reared by other people in another place?

CRITICAL THINKING Why are the therapies of Rogers and Perls placed in the same category? What do they have in common? How do they differ?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

BEHAVIOR THERAPY: ADJUSTMENT IS WHAT YOU DO

Psychodynamic and humanistic forms of therapy tend to focus on what people think and feel. Behavior therapists tend to focus on what people do. **Question 7: What is behavior therapy?** Behavior therapy—also called *behavior modification*—applies principles of learning to directly promote desired behavioral changes. Behavior therapists rely heavily on principles of conditioning and observational learning. They help clients discontinue self-defeating behavior patterns such as overeating, smoking, and phobic avoidance of harmless stimuli. They also help clients acquire adaptive behavior patterns such as the social skills required to start social relationships or to say no to insistent salespeople. **Truth or Fiction Revisited:** In both cases, behavior therapists may use specific procedures—telling their clients what to do.

Behavior therapists may help clients gain “insight” into their maladaptive behavior by fostering awareness of the circumstances in which it occurs. They do not foster insight in the psychoanalytic sense of unearthing the childhood origins of problems and the symbolic meanings of maladaptive behavior. Behavior therapists, like other therapists, may also build warm, therapeutic relationships with clients, but they see the efficacy of behavior therapy as deriving from specific learning-based procedures (Rachman, 2009). They insist that their methods be established by experimentation and that the outcomes be assessed in terms of measurable behavior. In this section, we consider some frequently used behavior-therapy techniques.

Fear-Reduction Methods

Many people seek therapy because of fears and phobias that interfere with their functioning. This is one of the areas in which behavior therapy has made great inroads. **Question 8: What are some behavior-therapy methods for reducing fears?** Fear-reduction methods include *flooding*, *systematic desensitization*, and *modeling*.

FLOODING

Flooding is a kind of exposure therapy in which the client is exposed to the fear-evoking stimulus until the fear response is extinguished. The rationale is that the fear-evoking stimulus is not causing pain or harm. Therefore, perception of the stimulus is not being associated with physically aversive stimulation and will fade with time. In more technical terms, “the presentation of an emotionally conditioned stimulus (CS) in the absence of a biological unconditioned stimulus (UCS) will lead to the extinction of the conditioned response (CR; the symptom)” (Levis, 2008). Examples include exposing a person

Behavior therapy Systematic application of the principles of learning to the direct modification of a client’s problem behaviors.

to an actual spider or snake (a harmless snake!) or preventing a person with obsessive-compulsive disorder from washing her hands.

SYSTEMATIC DESENSITIZATION

Adam has a phobia for receiving injections. His behavior therapist treats him as he reclines in a comfortable padded chair. In a state of deep muscle relaxation, Adam observes slides projected on a screen. A slide of a nurse holding a needle has just been shown three times, 30 seconds at a time. Each time Adam has shown no anxiety. So now a slightly more discomfoting slide is shown: one of the nurse aiming the needle toward someone's bare arm. After 15 seconds, our armchair adventurer notices twinges of discomfort and raises a finger as a signal (speaking might disturb his relaxation). The projector operator turns off the light, and Adam spends 2 minutes imagining his "safe scene"—lying on a beach beneath the tropical sun. Then the slide is shown again. This time Adam views it for 30 seconds before feeling anxiety.

—The author's files

Truth or Fiction Revisited: Adam is in effect confronting his fear while lying in a recliner and relaxing. Adam is undergoing **systematic desensitization**, a method for reducing phobic responses originated by psychiatrist Joseph Wolpe (1915–1997). Systematic desensitization is a gradual process in which the client learns to handle increasingly disturbing stimuli while anxiety to each one is being counterconditioned. About 10 to 20 stimuli are arranged in a sequence, or *hierarchy*, according to their capacity to elicit anxiety. In imagination or by being shown photos, the client travels gradually up through this hierarchy, approaching the target behavior. In Adam's case, the target behavior was the ability to receive an injection without undue anxiety.

Wolpe developed systematic desensitization on the assumption that anxiety responses, like other behaviors, are learned or conditioned (Rachman, 2009). He reasoned that they can be unlearned by means of counterconditioning or extinction. In counterconditioning, a response that is incompatible with anxiety is made to appear under conditions that usually elicit anxiety. Muscle relaxation is incompatible with anxiety. For this reason, Adam's therapist is teaching him to relax in the presence of the (usually) anxiety-evoking slides of needles.

Remaining in the presence of phobic imagery, rather than running away from it, is also likely to enhance self-efficacy expectations (Deacon et al., 2010). Self-efficacy expectations are negatively correlated with levels of adrenaline in the bloodstream (Bandura et al., 1985). Raising clients' self-efficacy expectations thus may help lower their adrenaline levels and reduce their feelings of nervousness.

MODELING

Modeling relies on observational learning. In this method, clients observe, and then imitate, people who approach and cope with the objects or situations that the clients fear. Albert Bandura and his colleagues (1969) found that modeling worked as well as systematic desensitization—and more rapidly—in reducing fear of snakes. Like systematic desensitization, modeling is likely to increase self-efficacy expectations in coping with feared stimuli.

Systematic desensitization Wolpe's method for reducing fears by associating a hierarchy of images of fear-evoking stimuli with deep muscle relaxation.

Modeling A behavior-therapy technique in which a client observes and imitates a person who approaches and copes with feared objects or situations.



© AP Photo/The Charlotte Observer, Christopher A. Record

Overcoming Fear of Flying One way behavior therapists help clients overcome phobias is by having them gradually approach the feared object or situation while they remain relaxed. This man is gradually reducing his fear of being in an airplane and flying.

Aversive Conditioning

Many people also seek behavior therapy because they want to break bad habits, such as smoking, excessive drinking, nail biting, and the like. One behavior-therapy approach to helping people do so is **aversive conditioning**. **Question 9: How do behavior therapists use aversive conditioning to help people break bad habits?** Aversive conditioning is a controversial procedure that pairs painful or aversive stimuli with unwanted impulses, to make the impulse less appealing. For example, to help people control alcohol intake, tastes of different alcoholic beverages can be paired with drug-induced nausea and vomiting or with electric shock.

Aversive conditioning has been used with problems as diverse as cigarette smoking, sexual abuse, and intellectually-deficient children's self-injurious behavior. *Rapid smoking* is an aversive-conditioning method designed to help smokers quit. With this method, the would-be quitter inhales every 6 seconds. In another method, the hose of a hair dryer is hooked up to a chamber containing several lit cigarettes. Smoke is blown into the quitter's face as he or she also smokes a cigarette. A third method uses branching pipes so that the smoker draws in smoke from several cigarettes at the same time. With these methods, overexposure makes once-desirable cigarette smoke aversive. The quitter becomes motivated to avoid, rather than seek, cigarettes. **Truth or Fiction Revisited:** Therefore, smoking can be a way to stop smoking. However, interest in aversive conditioning for quitting smoking has waned because of side effects (such as raising blood pressure) and the availability of nicotine-replacement techniques.

Aversive stimulation is sometimes used to stop children from punishing themselves, but some people injure themselves to obtain sympathy and attention. If self-injury leads to more pain than anticipated and no sympathy, it might be discontinued.

Aversive conditioning has also been used in the treatment of alcoholism. In one study, 63% of the 685 people treated remained abstinent for 1 year afterward, and about a third remained abstinent for at least 3 years (Wiens & Menustik, 1983).



© Lester Swan/Woodfin Camp & Associates

Aversive Conditioning In aversive conditioning, unwanted behaviors take on a noxious quality as a result of being repeatedly paired with aversive stimuli. Overexposure is making cigarette smoke aversive to this smoker.

Aversive conditioning A behavior-therapy technique in which undesired responses are inhibited by pairing repugnant or offensive stimuli with them.

Operant-Conditioning Procedures

We usually prefer to relate to people who smile at us rather than ignore us and to take courses in which we do well rather than fail. We tend to repeat behavior that is reinforced. Behavior that is not reinforced tends to become extinguished. Behavior therapists have used these principles of operant conditioning with psychotic patients as well as with clients with milder problems. **Question 10: How do behavior therapists apply principles of operant conditioning in behavior modification?**

The staff at one mental hospital was at a loss about how to encourage withdrawn schizophrenic patients to eat regularly. Ayllon and Haughton (1962) observed that staff members were making the problem worse by coaxing patients into the dining room and even feeding them. Staff attention apparently reinforced the patients' lack of cooperation. Some rules were changed. Patients who did not arrive at the dining hall within 30 minutes after serving were locked out. Staff could not interact with patients at mealtime. With uncooperative behavior no longer reinforced, patients quickly changed their eating habits. Then patients were required to pay one penny to enter the dining hall. Pennies were earned by interacting with other patients and showing other socially appropriate behaviors. These target behaviors also became more frequent.

Health professionals are concerned about whether people who are, or have been, dependent on alcohol can exercise control over their drinking. One study showed that rewards for remaining abstinent from alcohol can exert a powerful effect (Petty et al., 2000). In the study, one group of alcohol-dependent veterans was given a standard treatment while another group received the treatment *plus* the chance to win prizes for remaining alcohol-free, as measured by a Breathalyzer test. By the end of

the 8-week treatment period, 84% of the veterans who could win prizes remained in the program compared with 22% of the standard treatment group. The prizes had an average value of \$200, far less than what alcohol-related absenteeism from work and other responsibilities can cost.

THE TOKEN ECONOMY

Many psychiatric wards and hospitals now use **token economies** in which patients must use tokens such as poker chips to purchase TV viewing time, extra visits to the canteen, or a private room (Dickerson et al., 2005). The tokens are reinforcements for productive activities such as making beds, brushing teeth, and socializing. Token economies have not eliminated all symptoms of schizophrenia but have enhanced patient activity and cooperation. Tokens have also been used to modify the behavior of children with conduct disorders.

SUCCESSIVE APPROXIMATIONS

The operant-conditioning method of **successive approximations** is often used to help clients build good habits. Let's use a (not uncommon!) example: You want to study 3 hours each evening but can concentrate for only half an hour. Rather than attempting to increase your study time all at once, you could do so gradually by adding, say, 5 minutes each evening. After every hour or so of studying, you could reinforce yourself with 5 minutes of "people watching" in a busy section of the library.

SOCIAL SKILLS TRAINING

In **social skills training**, behavior therapists decrease social anxiety and build social skills through operant-conditioning procedures that employ self-monitoring (keeping a record of one's own behavior to identify problems and record successes), coaching, modeling, role-playing, behavior rehearsal (practicing), and feedback (receiving information about the effectiveness of behavior). Social skills training has been used to help formerly hospitalized mental patients maintain jobs and apartments in the community. For example, a worker can rehearse politely asking a supervisor for assistance or asking a landlord to fix the plumbing in an apartment.

Social skills training is effective in groups. Group members can role-play key people—such as parents, spouses, or potential dates—in the lives of other members.

BIOFEEDBACK TRAINING

Through **biofeedback training (BFT)**, therapists help clients become more aware of, and gain control over, various bodily functions. Therapists attach devices to clients that measure bodily functions such as heart rate. "Bleeps" or other signals are used to indicate (and thereby reinforce) changes in the desired direction—for example, a slower heart rate. (Knowledge of results is a powerful reinforcer.) One device, the electromyograph (EMG), monitors muscle tension. It has been used to augment control over muscle tension in the forehead and elsewhere, thereby alleviating anxiety, stress, and headaches.

BFT also helps clients voluntarily regulate functions once thought to be beyond conscious control, such as heart rate and blood pressure. Hypertensive clients use a

Token economy A controlled environment in which people are reinforced for desired behaviors with tokens (such as poker chips) that may be exchanged for privileges.

Successive approximations In operant conditioning, a series of behaviors that gradually become more similar to a target behavior.

Social skills training A behavior-therapy method for helping people in their interpersonal relations that uses self-monitoring, behavior rehearsal, and feedback.

Biofeedback training (BFT) The systematic feeding back to an organism of information about a bodily function so that the organism can gain control of that function.



© Janshu/Alix Hines/Getty Images

Social Skills Training Social skills training is effective in groups. Group members can role-play key people—such as parents, spouses, or potential dates—in the lives of other members.



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Getting Some Help from the Situation

Principles of operant conditioning suggest that we can improve our study habits by gradually building the amount of time we study and placing ourselves in situations with few distractions.

Functional analysis A systematic study of behavior in which one identifies the stimuli that trigger problem behavior and the reinforcers that maintain it.

blood pressure cuff and electronic signals to gain control over their blood pressure. The electroencephalograph (EEG) monitors brain waves and can be used to teach people how to produce alpha waves, which are associated with relaxation. Some people have overcome insomnia by learning to produce the brain waves associated with sleep.

Self-Control Methods

Do mysterious forces sometimes seem to be at work in your life? Do these forces delight in wreaking havoc on New Year’s resolutions and other efforts to put an end to your bad habits? Just when you go on a diet, that juicy pizza stares at you from the TV set. Just when you resolve to balance your budget, that sweater goes on sale. **Question 11: How can you—**

yes, you—use behavior therapy to deal with temptation and enhance your self-control?

Behavior therapists usually begin with a **functional analysis** of the problem behavior. In this way, they help determine the stimuli that trigger the behavior and the reinforcers that maintain it. Then clients are taught how to manipulate the antecedents and consequences of their behavior and how to increase the frequency of desired responses and decrease the frequency of undesired responses. You can use a diary to jot down each instance of a problem behavior. Note the time of day, location, your activity at the time (including your thoughts and feelings), and reactions (yours and others’). Functional analysis serves a number of purposes. It makes you more aware of the environmental context of your behavior and can increase your motivation to change. **Truth or Fiction Revisited:** For these reasons, keeping a record of where and when you engage in “bad habits” can help you end them and may occasionally be all that you need to end them (Drossel et al., 2008).

Brian used functional analysis to master his nail biting. Table 16.1 ■ shows a few items from his notebook. He discovered that boredom and humdrum activities seemed to serve as triggers for nail biting. He began to watch out for feelings of boredom as signs to practice self-control. He also made some changes in his life so that he would feel bored less often. There are numerous self-control strategies aimed at the stimuli that trigger behavior, the behaviors themselves, and reinforcers. Table 5.6 on page 184 describes some of them.

Table 16.1 ■ Excerpts from Brian’s Diary of Nail Biting for April 14

Incident	Time	Location	Activity (Thoughts, Feelings)	Reactions
1	7:45 a.m.	Freeway	Driving to work, bored, not thinking	Finger bleeds, pain
2	10:30 a.m.	Office	Writing report	Self-disgust
3	2:25 p.m.	Conference	Listening to dull financial report	Embarrassment
4	6:40 p.m.	Living room	Watching evening news	Self-disgust

Note: A functional analysis of problem behavior like nail biting increases awareness of the environmental context in which it occurs, spurs motivation to change, and in highly motivated people, might lead to significant behavioral change.

LearningConnections • BEHAVIOR THERAPY: ADJUSTMENT IS WHAT YOU DO

ACTIVE REVIEW (11) Behavior therapy applies principles of _____ to bring about desired behavioral changes. (12) Behavior-therapy methods for reducing fears include flooding; systematic _____, in which a client is gradually exposed to more fear-arousing stimuli; and modeling. (13) _____ conditioning associates undesired behavior with painful stimuli to decrease the frequency of the behavior. (14) _____-conditioning methods reinforce desired responses and extinguish undesired responses. (15) In self-control methods, clients first engage in a(n) _____ analysis of problem behavior. (16) Clients are then taught how to change the behavior by manipulating its antecedents and _____.

REFLECT AND RELATE Would any of the methods for reducing fears be helpful to you in your life? If so, which method would you prefer? Explain.

CRITICAL THINKING Behavior therapists argue that their methods are more scientific than those of other therapists. How do they attempt to ensure that their methods are scientific?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

COGNITIVE THERAPIES: ADJUSTMENT IS WHAT YOU THINK (AND DO)

In this line from *Hamlet*, Shakespeare did not mean to suggest that injuries and misfortunes are painless or easy to manage. Rather, he meant that our appraisals of unfortunate events can heighten our discomfort and impair our coping ability. In so doing, Shakespeare was providing a kind of motto for cognitive therapists. **Question 12: What is cognitive therapy?**

Cognitive therapy focuses on changing the beliefs, attitudes, and automatic types of thinking that create and compound their clients' problems (Butler et al., 2006; David et al., 2010). Cognitive therapists, like psychodynamic and humanistic therapists, attempt to foster self-insight, but they aim to heighten insight into *current cognitions* as well as those of the past. Cognitive therapists also aim to directly change maladaptive cognitions to reduce negative feelings, provide insight, and help the client solve problems. Let's look at the approaches and methods of some major cognitive therapists.

Aaron Beck's Cognitive Therapy: Correcting Cognitive Errors

Cognitive therapy is the name of a general approach to therapy as well as Aaron Beck's specific methods. **Question 13: What is Aaron Beck's method of cognitive therapy?** Beck focuses on clients' cognitive distortions (see Butler et al., 2006). He encourages clients to become their own personal scientists and challenge beliefs that are not supported by evidence.

Beck questions people in a way that encourages them to see the irrationality of their ways of thinking. For example, depressed people tend to minimize their accomplishments and to assume that the worst will happen. Both cognitive distortions heighten feelings of depression. Such distortions can be fleeting and automatic, difficult to detect (Walker & Bright, 2009). Beck's therapy methods help clients become aware of these distortions and challenge them.

Beck notes how cognitive distortions or errors contribute to clients' miseries:

1. Clients may *selectively perceive* the world as a harmful place and ignore evidence to the contrary.
2. Clients may *overgeneralize* on the basis of a few examples. For instance, they may perceive themselves as worthless because they were laid off at work or as unattractive because they were refused a date.
3. Clients may *magnify*, or blow out of proportion, the importance of negative events. They may catastrophize failing a test by assuming they will flunk out

— ■ —
*There is nothing either good
or bad, but thinking makes
it so.*

SHAKESPEARE, *HAMLET*
— ■ —

Cognitive therapy A form of therapy that focuses on how clients' cognitions (expectations, attitudes, beliefs, etc.) lead to distress and may be modified to relieve distress and promote adaptive behavior.

A CLOSER LOOK • REAL LIFE

PSYCHOTHERAPY ONLINE: ON THE ELECTRONIC NEARNESS OF YOU

You type or talk away on the Internet when you want to communicate with someone who isn't nearby. In addition, many use the Internet to "talk" to people in the same apartment or house ("Is breakfast ready yet?") when they'd rather not get up or don't want to deal with a face-to-face conversation. How about a therapy session with a psychologist or other helping professional? That's available, too. The number of online counseling services is growing, and so is the controversy concerning their use.

A number of issues are involved in online counseling (Cartreine et al., 2010). One is that psychologists are licensed in particular states, but Internet communications easily cross state and international borders. Your medical doctor may insist that you come into the office before writing you a prescription. This is because ethical problems and liability issues arise when helping professionals treat clients they do not see in person. Interacting with clients only electronically prevents therapists from picking up on nonverbal cues and gestures that might signal deeper levels of distress (Rehm, 2008).

Online therapists who live and normally practice at great distances from their clients may not be able to provide more intensive

services when clients are in an emotional crisis. Professionals also express concern about the potential for unsuspecting clients to be victimized by unqualified practitioners or "quacks." It is sometimes difficult for clients to know whether helping professionals are qualified when they meet them in their offices. How much more difficult, then, is it to determine whether therapists have proper education and training when they are online?

Despite these drawbacks, there is evidence that online mental health services can have therapeutic value (Amstadter et al., 2009; Cuijpers et al., 2009a). They may also be able to reach people who have avoided seeking help because of shyness or embarrassment. For some, online consultation may be a first step toward meeting a therapist in person. Online therapy may also provide treatment to people who lack mobility or live in remote areas.

There is a growing body of evidence that Internet-based treatments can yield therapeutic benefits in treating a wide range of problems, including posttraumatic stress disorder (PTSD), panic disorder, insomnia, social phobia, pathological gambling, smoking, test anxiety, chronic headache pain, and even excessive drinking by college students during 21st birthday celebrations (Amstadter et al., 2009; Cartreine et al., 2010; Trautman & Kröner-Herwig, 2009).

of college or catastrophize losing a job by believing that they will never find another and that serious harm will befall their family as a result.

4. Clients may engage in *absolutist thinking*, or looking at the world in black and white rather than in shades of gray. In doing so, a rejection on a date takes on the meaning of a lifetime of loneliness; an uncomfortable illness takes on life-threatening proportions.

The concept of pinpointing and modifying cognitive distortions or errors may become clearer from the following excerpt from a case of a 53-year-old engineer who obtained cognitive therapy for severe depression. The engineer had left his job and become inactive. As reported by Beck and his colleagues, the first goal of treatment was to foster physical activity—even things like raking leaves and preparing dinner—because activity is incompatible with depression. Then:

[The engineer's] cognitive distortions were identified by comparing his assessment of each activity with that of his wife. Alternative ways of interpreting his experiences were then considered.

In comparing his wife's résumé of his past experiences, he became aware that he had (1) undervalued his past by failing to mention many previous accomplishments, (2) regarded himself as far more responsible for his "failures" than she did, and (3) concluded that he was worthless since he had not succeeded in attaining certain goals in the past. When the two accounts were contrasted, he could discern many of his cognitive distortions. In subsequent sessions, his wife continued to serve as an "objectifier."

In midtherapy, [he] compiled a list of new attitudes that he had acquired since initiating therapy:

1. "I am starting at a lower level of functioning at my job, but it will improve if I persist."
2. "I know that once I get going in the morning, everything will run all right for the rest of the day."

In Profile

Aaron Beck and Albert Ellis are two of the preeminent cognitive therapists in the United States. Aaron Beck used cognitive and behavioral techniques on himself before he became a psychiatrist. In fact, one of the reasons Beck went into medicine was to confront his own fear of blood. He had a series of operations as a child, and from then on, the sight of blood made him feel faint. During his first year of medical school, he forced himself to watch operations. In his second year, he became a surgical assistant. Soon the sight of blood became normal to him. Later, he essentially argued himself out of an irrational fear of tunnels. He convinced himself that the tunnels did not cause the fear because the symptoms of faintness and shallow breathing would appear before he entered them.

As a psychiatrist, Beck first practiced psychoanalysis. However, he could not find scientific evidence for psychoanalytic beliefs. Psychoanalytic theory explained depression as anger turned inward so that it is transformed into a need to suffer. Beck's own clinical experiences led him to believe that it is more likely that depressed people experience cognitive distortions such as the cognitive triad. That is, they expect the worst of themselves ("I'm no good"), the world at large ("This is an awful place"), and their future ("Nothing good will ever happen"). Beck's approach to therapy is active. He encourages clients to challenge beliefs that are not supported by evidence. He also



AARON BECK AND ALBERT ELLIS

© Photography by Michael Fendich, www.fendich.com

challenges his own points of view. "I am a big self-doubter," Beck (2000) admits. "I always doubt what I do, which is one of the reasons I do so much research and encourage research." Beck teaches health professionals his form of therapy—and scientific skepticism—at the University of Pennsylvania.

Psychologist Albert Ellis (1913–2007), like Aaron Beck, was originally trained in psychoanalysis but became frustrated with the slow rate of progress made by clients. He also found himself uncomfortable with the psychoanalyst's laid-back approach and took to engaging in sometimes heated discussions with his clients about their irrational and self-defeating ways of viewing themselves and other people. Ellis was even more argumentative than Beck with his clients. He confronted them with the ways that their irrational beliefs, especially those that give rise to excessive needs for social approval and perfect performance, make them miserable.

Ellis was a workaholic and a prolific writer, having the ability to connect with both professionals and the public. Just a few of his dozens of mass-market books are *A Guide to Rational Living*, *How to Live with a Neurotic*, *How to Keep People from Pushing Your Buttons*, *Optimal Aging: Getting Over Getting Older*, and *Sex Without Guilt*.



Go to Psychology CourseMate at www.cengagebrain.com to access more information about Aaron Beck and Albert Ellis.

3. "I can't achieve everything at once."
4. "I have my periods of ups and downs, but in the long run I feel better."
5. "My expectations from my job and life should be scaled down to a realistic level."
6. "Giving in to avoidance [e.g., staying away from work and social interactions] never helps and only leads to further avoidance."

He was instructed to reread this list daily for several weeks even though he already knew the content. (Rush et al., 1975)

The engineer gradually became less depressed and returned to work and an active social life. Along the way, he learned to combat inappropriate self-blame for problems, perfectionist expectations, magnification of failures, and overgeneralization from failures.

Becoming aware of cognitive errors and modifying catastrophizing thoughts helps us cope with stress. As we saw in Chapter 15, internal, stable, and global attributions of failure lead to depression and feelings of helplessness. Cognitive therapists also alert clients to cognitive errors such as these so that the clients can change their attitudes and pave the way for more effective overt behavior.

Albert Ellis's Rational-Emotive Behavior Therapy: Overcoming "Musts" and "Shoulds"

In **rational-emotive behavior therapy (REBT)**, Albert Ellis (1913–2007) pointed out that our beliefs *about* events, not only the events themselves, shape our responses to them. Moreover, many of us harbor a number of irrational beliefs that can give rise to problems or magnify their impact. Two of the most important are the belief

Rational-emotive behavior therapy (REBT) Albert Ellis's form of therapy that encourages clients to challenge and correct irrational beliefs and maladaptive behaviors.

I get people to truly accept themselves unconditionally, whether or not their therapist or anyone loves them.

ALBERT ELLIS

The best years of your life are the ones in which you decide your problems are your own. You do not blame them on your mother, the ecology, or the president. You realize that you control your own destiny.

ALBERT ELLIS

that we must have the love and approval of people who are important to us and the belief that we must prove ourselves to be thoroughly competent, adequate, and achieving. **Question 14: What is Albert Ellis's method of rational-emotive behavior therapy?**

Albert Ellis, like Aaron Beck, began as a psychoanalyst. But he became disturbed by the passive role of the analyst and by the slow rate of obtaining results—if they were obtained at all. Still, Ellis found a role for Freud's views: "One of the main things [Freud] did was point out the importance of unconscious thinking. Freud pointed out that when people are motivated to do things, ... they unconsciously think, and even feel, certain things. We use that concept," Ellis (2000) admitted, "although Freud, as usual, ran it into the ground."

Ellis's REBT methods are active and directive. He did not sit back like the traditional psychoanalyst and occasionally offer an interpretation. Instead, he urged clients to seek out their irrational beliefs, which can be unconscious, though not as deeply buried as Freud believed. Nevertheless, they can be hard to pinpoint without some direction. Ellis showed clients how those beliefs lead to misery and challenged clients to change them. When Ellis saw clients behaving according to irrational beliefs, he refuted the beliefs by asking, "Where is it written that you must ... ?" or "What evidence do you have that ... ?" According to Ellis, we need less misery and less blaming in our lives and more action.

Albert Ellis and Windy Dryden (1987) present the case of 27-year-old Jane, who was socially inhibited, especially with attractive men. REBT helped Jane identify some of the irrational beliefs that underlay her shyness—for example, "I must speak well to people I find attractive" and "When I don't speak well and impress people as I should, I'm a stupid, inadequate person!" REBT encouraged Jane to challenge her irrational beliefs by asking herself, (a) *Why* must I speak well to people I find attractive?" and (b) "When I don't speak well and impress people, how does that make me a *stupid and inadequate person?*" She learned to form rational responses to her questions. For example, (a) "There is no reason I must speak well to people I find attractive, but it would be desirable if I do so, so I shall make an effort—but not kill myself—to do so," and (b) "When I speak poorly and fail to impress people, that only makes me a *person who spoke unimpressively this time*—not a *totally stupid or inadequate person!*" With therapy, she replaced her irrational beliefs with rational alternatives, such as "If people do reject me for showing them how anxious I am, that will be most unfortunate, but I can stand it." After 9 months of REBT, Jane was conversing comfortably with appealing men and preparing to take a teaching job she would have previously avoided due to fear of facing a class.

Ellis straddled behavioral and cognitive therapies. He originally dubbed his method of therapy *rational-emotive therapy* because he focused on the cognitive-irrational beliefs and how to change them. However, Ellis also promoted behavioral changes to cement cognitive changes. Thus, he eventually changed the name of rational-emotive therapy to rational-emotive *behavior* therapy.

Cognitive-Behavior Therapy

Many theorists consider cognitive therapy to be a collection of techniques that are part of the overall approach known as behavior therapy. Some members of this group use the term "cognitive-behavioral therapy." Others argue that the term *behavior therapy* is broad enough to include cognitive techniques. Many cognitive therapists and behavior therapists differ in focus, however. Behavior therapists deal with client cognitions to change *overt* behavior. Cognitive therapists also see the value of tying treatment outcomes to observable behavior, but they believe that cognitive change, not just behavioral change, is a key goal in itself.

The following case shows how behavioral techniques (exposure to fearful situations) and cognitive techniques (changing maladaptive thoughts) were used in the treatment of a case of *agoraphobia*, a type of anxiety disorder characterized by excessive fears of venturing out in public.

[Ms. _____] was a 41-year-old woman with a 12-year history of agoraphobia. She feared venturing into public places alone and required her husband or

children to accompany her from place to place. In vivo (actual) exposure sessions were arranged in a series of progressively more fearful encounters (a fear-stimulus hierarchy). The first step in the hierarchy ... involved taking a shopping trip while accompanied by the therapist. After accomplishing this task, [Ms. _____] gradually moved upward in the hierarchy. By the third week of treatment, she was able to complete the last step in her hierarchy: shopping by herself in a crowded supermarket.

Cognitive restructuring was conducted along with [exposure. She] was asked to imagine herself in various fearful situations and to report [her thoughts]. The therapist helped her identify disruptive [thoughts] such as, “I am going to make a fool of myself.” The therapist [asked] whether it was realistic to believe that she would actually lose control and [disputed] the belief that the consequences of losing control ... would truly be disastrous. [Ms. _____] progressed rapidly. ...

—Adapted from Biran, 1988, pp. 173–176

Cognitive-behavior therapy has been effective in treating a wide range of psychological disorders, including anxiety disorders, depression, and personality disorders (e.g., Butler et al., 2006; Gibbons et al., 2010; Rachman, 2009; Stewart & Chambless, 2009). It has been used to help individuals with anorexia and bulimia challenge their perfectionism and their attitudes toward their bodies (Cooper & Shafran, 2008). It has also been used to systematically reinforce appropriate eating behavior.

LearningConnections • COGNITIVE THERAPIES: ADJUSTMENT IS WHAT YOU THINK (AND DO)

ACTIVE REVIEW (17) _____ therapists focus on the beliefs, attitudes, and automatic thoughts that create and compound their clients’ problems. (18) Aaron Beck notes four types of cognitive errors that contribute to clients’ miseries: selective abstraction of the world as a harmful place; overgeneralization; magnification of the importance of negative events, and _____ thinking, or looking at the world in black and white rather than shades of gray. (19) Albert Ellis’s REBT confronts clients with the ways in which _____ beliefs contribute to problems such as anxiety and depression.

REFLECT AND RELATE Do you believe that you must have the love and approval of people who are important

to you? Do you believe that you must prove yourself to be thoroughly competent, adequate, and achieving? If you do, do these beliefs make you miserable? What can you do about them?

CRITICAL THINKING Many therapists call themselves cognitive-behavioral therapists. Does it seem possible to combine behavior therapy and cognitive therapy?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

GROUP THERAPIES: ON BEING IN IT TOGETHER

When a psychotherapist has several clients with similar problems—anxiety, depression, adjustment to divorce, lack of social skills—it often makes sense to treat them in a group rather than in individual sessions. The methods and characteristics of the group reflect the needs of the members and the theoretical orientation of the leader. In group psychoanalysis, clients might interpret one another’s dreams. In a client-centered group, they might provide an accepting atmosphere for self-exploration. Members of behavior therapy groups might be jointly desensitized to anxiety-evoking stimuli or might practice social skills together. **Question 15: What are the advantages and disadvantages of group therapy?**

Group therapy has the following advantages:

1. It is economical (Prochaska & Norcross, 2010). It allows the therapist to work with several clients at once.

2. Compared with one-to-one therapy, group therapy provides more information and life experience for clients to draw upon.
3. Appropriate behavior receives group support. Clients usually appreciate an outpouring of peer approval.
4. When we run into troubles, it is easy to imagine that we are different from other people or inferior to them. Affiliating with people who have similar problems is reassuring.
5. Group members who show improvement provide hope for other members.
6. Many individuals seek therapy because of problems in relating to other people. People who seek therapy for other reasons also may be socially inhibited. Members of groups have the opportunity to practice social skills in a relatively nonthreatening atmosphere. In a group consisting of men and women of different ages, group members can role-play one another's employers, employees, spouses, parents, children, and friends. Members can role-play asking one another out on dates, saying no (or yes), and so on.

Yet group therapy is not for everyone. Some clients fare better with individual treatment. Many prefer not to disclose their problems to a group. They may be overly shy or want individual attention. It is the responsibility of the therapist to insist that group disclosures be kept confidential, to establish a supportive atmosphere, and to ensure that group members obtain the attention they need.

Many types of therapy can be conducted either individually or in groups. Couple therapy and family therapy are conducted only in groups.

Couple Therapy

Question 16: What is couple therapy? **Couple therapy** helps couples enhance their relationship by improving their communication skills and helping them manage conflict (Prochaska & Norcross, 2010). There are often power imbalances in relationships, and couple therapy helps individuals find “full membership” in the couple. Correcting power imbalances increases happiness and can decrease the incidence of domestic violence. Ironically, in situations of domestic violence, the partner with *less* power in the relationship is usually the violent one. Violence sometimes appears to be a way of compensating for an inability to share power in other aspects of the relationship (Rathus & Sanderson, 1999).

Today, the main approach to couple therapy is cognitive-behavioral (Rathus & Sanderson, 1999). It teaches couples communications skills (such as how to listen and how to express feelings), ways of handling feelings like depression and anger, and ways of solving problems.

Family Therapy

Question 17: What is family therapy? **Family therapy** is a form of group therapy in which one or more families constitute the group. Family therapy may be undertaken from various theoretical viewpoints. One is the *systems approach*, in which family interaction is studied and modified to enhance the growth of individual family members and of the family unit as a whole (Prochaska & Norcross, 2010).

Family members with low self-esteem often cannot tolerate different attitudes and behaviors in other family members. Faulty communication within the family also creates problems. In addition, it is not uncommon for the family to present an “identified

Couple therapy A form of therapy in which a couple is treated as the client and helped to improve communication skills and manage conflict.

Family therapy A form of therapy in which the family unit is treated as the client.



Group Therapy Benefits Members of therapy groups can practice their social skills in a nonthreatening atmosphere.

and behaviors in other family members. Faulty communication within the family also creates problems. In addition, it is not uncommon for the family to present an “identified

patient”—that is, the family member who has *the* problem and is *causing* all the trouble. Yet family therapists usually assume that the identified patient is a scapegoat for other problems within and among family members. It is a sort of myth: Change the bad apple—or identified patient—and the barrel—or family—will be functional once more.

The family therapist—often a specialist in this field—attempts to teach the family to communicate more effectively and encourages growth and autonomy in each family member.

Self-Help and Support Groups

Millions of people in the United States and elsewhere are involved in self-help and support groups that meet in person, online, or even by telephone. **Question 18: What do we know about self-help and support groups, such as AA?** Some self-help and support groups enable people who have been treated for psychological disorders to reach out to others who have had similar experiences (Greidanus & Everall, 2010). These groups tend to be quite specific, such as those in which members help one another cope with dental anxiety (Barak et al., 2008). Other groups help people cope with problems with children and other people in their lives—for example, groups for parents of children with autistic disorders, intellectual deficiency, or Down syndrome. Other groups help stressed caregivers cope with aging parents, including parents with Alzheimer’s disease (Yap et al., 2008). Members share problems and possible solutions. Self-help and support groups also help people cope with the aftermath of their own physical diseases, such as cancer (Hunt, 2010).

The best-known of self-help and support groups is Alcoholics Anonymous (AA), whose 12-step program has been used by millions of people in the United States and around the world. The group was founded in 1935 and has a religious orientation, with the initial members being Protestants. However, the members are now drawn from all ethnic groups. Members meet regularly and call other members between meetings when they are tempted to “fall off the wagon” and drink. The 12 steps require admitting before the group that one’s drinking is out of control, calling upon a higher power for strength, examining errors and injurious behavior and attempting to make amends, and bringing the message to other people. Thus, AA has something of a missionary quality.

Does AA work? The organization itself admits that the majority of new recruits drop out within a year, but all kinds of treatment have their dropouts. Of greater concern is a meta-analysis that concluded that AA is actually less effective than no treatment at all (Kownacki & Shadish, 1999). But this analysis is something of an outlier. Most analyses suggest that AA is as effective as all forms of psychotherapy tested. It has been compared with therapies such as motivational enhancement, relapse prevention training (strategies for *not* falling off the wagon), aversive conditioning, psychodynamic treatment, behavioral self-control training, and others (Imel et al., 2008; Project MATCH Research Group, 1997). When treatments, including AA, are effective, it seems to be because alcoholics remain in treatment for many years (Moos & Moos, 2006), manage to alleviate feelings of depression that are typical of alcoholics (Kelly et al, 2010), and heighten their self-efficacy—their self-confidence that they can navigate the challenges of the world while coping with the desire to drink (Forcehimes & Tonigan, 2008).

LearningConnections • GROUP THERAPIES: ON BEING IN IT TOGETHER

ACTIVE REVIEW (20) Group therapy is (more or less?) economical than individual therapy. (21) In the _____ approach to family therapy, family interaction is modified to enhance the growth of family members and the family unit as a whole. (22) Most analyses of Alcoholics Anonymous find it (less effective than, more effective than, or about as effective as?) other forms of treatment of alcoholism.

REFLECT AND RELATE Do you think you could share your intimate problems with a group of strangers? Can you see any advantages or disadvantages to doing so?

CRITICAL THINKING Why would you think that various forms of treatment for alcoholism are about equally effective?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.



Does Psychotherapy Work? To answer this question, psychologists must first deal with the problems in running experiments on the effects of psychotherapy.

DOES PSYCHOTHERAPY WORK?

In 1952, British psychologist Hans Eysenck published a review of psychotherapy research—“The Effects of Psychotherapy”—that sent shock waves through the psychotherapy community. On the basis of his review of the research, Eysenck concluded that the rate of improvement among people in psychotherapy was no greater than the rate of “spontaneous remission”—that is, the rate of improvement that would be shown by people with psychological disorders who received no treatment at all. Eysenck was not addressing people with schizophrenia, who typically profit from biological forms of therapy, but he argued that whether or not people with problems such as anxiety and depression received therapy, two of three reported substantial improvement within 2 years.

That was more than half a century ago. Since that time, sophisticated research studies—many of them employing a statistical averaging method called **meta-analysis**—have strongly suggested that psychotherapy is, in fact, effective. Before we report on the research dealing with the effectiveness of therapy, let’s review some of the problems of this kind of research (Shadish, 2002). **Question 19: What kinds of problems do researchers encounter when they conduct research on psychotherapy?**

Problems in Conducting Research on Psychotherapy

It is not easy to evaluate the effectiveness of psychotherapy. Many problems bedevil the effort.

PROBLEMS IN RUNNING EXPERIMENTS ON PSYCHOTHERAPY

The ideal method for evaluating a treatment—such as a method of therapy—is the experiment. However, experiments on therapy methods are difficult to arrange and control. The outcomes can be difficult to define and measure (Kazdin, 2008; Levy & Ablon, 2009).

Consider psychoanalysis. In well-run experiments, people are assigned at random to experimental and control groups. A true experiment on psychoanalysis would require randomly assigning people seeking therapy to psychoanalysis and to a control group or other kinds of therapy for comparison. But a person may have to remain in traditional psychoanalysis for years to attain beneficial results. Can researchers wait all this time or compare traditional psychoanalysis to briefer treatment methods? Moreover, some people seek psychoanalysis per se, not psychotherapy in general. Would it be ethical to assign them at random to other treatments or to a no-treatment control group? Clearly not.

In an ideal experiment, subjects and researchers are “blind” with regard to the treatment the subjects receive. Blind research designs allow researchers to control for subjects’ expectations. In an ideal experiment on therapy, individuals would be blind regarding the type of therapy they are obtaining—or whether they are obtaining a placebo. But how does a researcher mask the type of therapy clients are obtaining? Even if we could conceal it from clients, could we hide it from therapists?

PROBLEMS IN MEASURING OUTCOMES OF THERAPY

Consider the problems we run into when measuring outcomes of therapy (Shadish, 2002). Behavior therapists define their goals in behavioral terms—such as a formerly phobic individual being able to obtain an injection or look out of a 20th-story window. Therefore, behavior therapists do not encounter many problems in this area. But

Meta-analysis A method for combining and averaging the results of individual research studies.

what about the client-centered therapist who fosters insight and self-actualization? We cannot directly measure these qualities. The psychoanalytic process is educational as well as therapeutic, and some argue that different standards must be applied in evaluating what the client gains from treatment (Kazdin, 2008; Levy & Ablon, 2009).

DOES THERAPY HELP BECAUSE OF THE METHOD OR BECAUSE OF “NONSPECIFIC FACTORS”?

Sorting out the benefits of a specific therapy method from broader aspects of the therapy situation is a staggering task. These broader aspects are termed *nonspecific factors*, and they refer to features that are found in most therapies, such as the instillation of hope and the client’s relationship with the therapist. That relationship involves (a) the empathy, support, and attention shown by the therapist; (b) the attachment the client develops toward the therapist and the therapy process (the “therapeutic alliance”); and (c) the development of an effective working relationship in which the therapist and client work together to identify and confront the important issues and problems the client faces (the “working alliance”) (Baldwin et al., 2007).

WHAT IS THE EXPERIMENTAL TREATMENT IN PSYCHOTHERAPY OUTCOME STUDIES?

We may also ask, what exactly is the experimental “treatment” being evaluated? Various therapists may say they are practicing psychoanalysis, but they differ as individuals and in their training. It can therefore be difficult to specify just what is happening in the therapeutic session.

Analyses of the Effectiveness of Psychotherapy

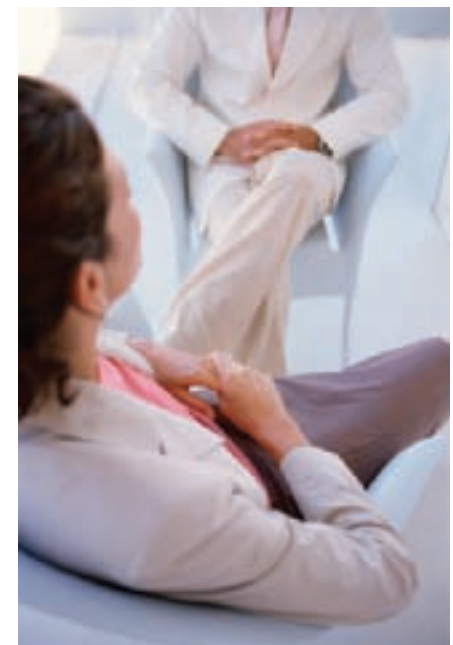
Question 20: What, then, do we know about the effectiveness of psychotherapy? Despite these evaluation problems, research on the effectiveness of therapy has been encouraging (Driessen et al., 2010; Shedler, 2010).

In their classic early use of meta-analysis, Mary Lee Smith and Gene Glass (1977) analyzed the results of dozens of outcome studies of various types of therapies. They concluded that people who obtained psychodynamic therapy showed greater well-being, on the average, than 70% to 75% of those who did not obtain treatment. Similarly, nearly 75% of the clients who obtained client-centered therapy were better off than people who did not obtain treatment. Psychodynamic and client-centered therapies appear to be most effective with well-educated, verbal, strongly motivated clients who report problems with anxiety, depression (of light to moderate proportions), and interpersonal relationships. Neither form of therapy appears to be effective with people with psychotic disorders such as major depression, bipolar disorder, and schizophrenia. Smith and Glass (1977) found that people who obtained Gestalt therapy showed greater well-being than about 60% of those who did not obtain treatment. The effectiveness of psychoanalysis and client-centered therapy thus was reasonably comparable. Gestalt therapy fell behind.

Smith and Glass (1977) did not include cognitive therapies in their meta-analysis because at the time of their study, many cognitive approaches were relatively new. Because behavior therapists also incorporate many cognitive techniques, it can be difficult to sort out which aspects—cognitive or otherwise—of behavioral treatments are most effective. However, many meta-analyses of cognitive-behavioral therapy have been conducted since the early work of Smith and Glass. Their results are encouraging.

A meta-analysis of 90 studies by William Shadish and his colleagues (2000) concurred that psychotherapy is generally effective. Usually, people who have more psychotherapy tend to fare better than people who have less. Therapy also appears to be more effective when the outcome measures reflect the treatment (for example, when the effects of treatment aimed at fear reduction are measured in terms of people’s ability to approach fear-inducing objects and situations).

Studies of cognitive therapy have shown that modifying irrational beliefs of the type described by Albert Ellis helps people with problems such as anxiety and depression (David et al., 2010). Modifying self-defeating beliefs of the sort outlined by Aaron Beck



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Is Psychotherapy Effective? They’re talking over problems, but is it of any help? How would we determine the answer?

also frequently alleviates anxiety and depression (Butler et al., 2006). Cognitive therapy may help people with severe depression, who had been thought responsive only to biological therapies (Hollon & Shelton, 2001; Simons et al., 1995). Cognitive therapy has also helped people with personality disorders (A. T. Beck et al., 2001; Trull et al., 2003).

Behavioral and cognitive therapies have provided strategies for treating anxiety disorders, social skills deficits, and problems in self-control (DeRubeis & Crits-Christoph, 1998). These therapies—which are often integrated as cognitive-behavior therapy—have also helped couples and families in distress (Baucom et al., 2002) and modified behaviors related to health problems such as headaches (Verhagen et al., 2009), smoking, chronic pain, and bulimia nervosa (Agras et al., 2000; Butler et al., 2006). Cognitive-behavior therapists have innovated treatments for sexual dysfunctions for which there previously were no effective treatments. One meta-analysis of psychodynamic therapy and cognitive-behavior therapy found both treatments effective with personality disorders (Leichsenring & Leibling, 2003). It is perhaps of interest that of hundreds of studies reviewed, the researchers found only 14 psychodynamic studies and 11 cognitive-behavior studies that were rigorous enough to be included in the meta-analysis.

Interestingly, different forms of psychotherapy for mild to moderate depression—including cognitive-behavior therapy, nondirective therapy, behavior therapy, psychodynamic psychotherapy, and interpersonal psychotherapy—seem to produce nearly equivalent effects when they are directly compared to one another (Cuijpers et al., 2008b).

Evidence-Based Practices

Experimentation is the gold standard for research in psychology, and a number of methods of therapy have been shown to be effective in carefully conducted, random controlled experiments (RCEs)—that is, experiments in which participants are assigned at random to a specific treatment or to a control treatment. The researchers in many of these studies also rely on treatment manuals that concretely outline the treatment methods. Treatment methods that survive these grueling tests and are still found effective are called **evidence-based practices** (Anchin & Pincus, 2010; Bruce & Sanderson, 2004). Table 16.2 ■ shows a number of such evidence-based practices and the problems for which they have been found effective. The list is a work in progress because other treatments may eventually be added as more evidence accumulates.

Note that the inclusion of a particular treatment as an evidence-based practice does not guarantee it will always be effective. Moreover, the methods used to determine effectiveness are controversial among psychotherapists. Many therapists argue that evidence-based practices favor cognitive-behavioral therapies because they are more readily standardized in treatment manuals and can be followed more accurately by practitioners in experiments (Kazdin, 2008; Levy & Ablon, 2009). Alternative treatments,

Evidence-based practices Method of therapy that has been shown effective in experiments in which participants are assigned at random to the treatment under investigation or to another treatment or placebo and in which the methods being tested are clearly outlined.

Table 16.2 ■ Examples of Evidence-Based Practices

Treatment	Condition for Which Treatment Is Effective
Cognitive therapy	Depression Headache
Behavior therapy or behavior modification	Depression Developmental disabilities Enuresis (bed-wetting)
Cognitive-behavior therapy	Panic disorder with and without agoraphobia Generalized anxiety disorder Bulimia nervosa
Exposure treatment	Agoraphobia and specific phobia
Exposure and response prevention	Obsessive–compulsive disorder
Interpersonal psychotherapy	Depression Personality disorders
Parent training programs	Children with oppositional behavior

such as psychodynamic therapy, are not so easily standardized or practiced. Therefore, they may not hold up as well in controlled trials, even though they may be as effective in practice. Second, critics assert that most studies supportive of evidence-based practices do not capture the complexity and uniqueness of real clients seen in community settings (Westen et al., 2006).

As we see in the following section on ethnicity and psychotherapy, we must also consider the sociocultural features of clients in determining how to make therapy most effective. Failure to do so leaves by the wayside many people who would profit from therapy. And in some cases, inappropriate methods of therapy may do more harm than good.

Ethnicity and Psychotherapy

Americans from ethnic minority groups are less likely than European Americans to seek therapy (Chen & Rizzo, 2010; Sue et al., 2009). Reasons for their lower participation rate include

- Unawareness that therapy would help
- Lack of information about the availability of professional services or inability to pay for them
- Distrust of professionals, particularly European American professionals and (for women) male professionals
- Language barriers
- Reluctance to open up about personal matters to strangers—especially strangers who are not members of one’s own ethnic group
- Cultural inclinations toward other approaches to problem solving, such as religious approaches and psychic healers
- Negative experiences with professionals and authority figures

There are thus many reasons that clinicians need to be sensitive to the cultural heritage, language, and values of their clients. That is, they need to develop multicultural competence (Sue et al., 2009). Let’s consider some of the issues involved in conducting psychotherapy with African Americans, Asian Americans, Latino and Latina Americans, and Native Americans.

African Americans often are reluctant to seek psychological help because of cultural assumptions that people should manage their own problems (González et al., 2010; Jackson & Greene, 2000). Signs of emotional weakness such as tension, anxiety, and depression are stigmatized. Many African Americans are also suspicious of their therapists—especially when the therapist is a European American (Mohr et al., 2010). They may withhold personal information because of society’s history of racial discrimination (Dana, 2002).

Asian Americans also tend to stigmatize people with psychological disorders. As a result, they may deny problems and refuse to seek help for them (Spencer et al., 2010). Asian Americans, especially recent immigrants, also may not understand or believe in Western approaches to psychotherapy. For example, Western psychotherapy typically encourages people to express their feelings. This mode of behavior may conflict with the Asian tradition of public restraint. Many Asians also experience psychological problems as physical symptoms (Kim & Omizo, 2003; Sue et al., 2009). Rather than thinking of themselves as anxious, they may focus on physical features of anxiety, such as a pounding heart and heavy sweating. Rather than thinking of themselves as depressed, they may focus on fatigue and low energy levels.



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Therapists need to be aware of potential conflicts between the traditional Latino and Latina American value of interdependence in the family and the typical European American belief in independence and self-reliance (Garza & Watts, 2010).

Many psychological disorders experienced by Native Americans involve the disruption of their traditional culture caused by European colonization (Olson, 2003; Viets et al., 2009). Loss of cultural identity and social disorganization have set the stage for problems such as alcoholism, substance abuse, and depression. Efforts to prevent psychological disorders do well to focus on strengthening Native American cultural identity, pride, and cohesion.

Psychotherapy is most effective when therapists attend to and respect people's cultural as well as individual differences. Although it is the individual who experiences psychological anguish, the fault can often be traced to cultural issues.

LearningConnections • DOES PSYCHOTHERAPY WORK?

ACTIVE REVIEW (23) Smith and Glass used the method of _____-analysis to analyze the results of dozens of outcome studies of various types of therapies. (24) Current research shows that psychotherapy (is or is not?) effective in the treatment of psychological disorders. (25) There may be conflict between the traditional Latino and Latina American value of _____ in the family and the typical European American belief in independence.

REFLECT AND RELATE If a medical doctor or a psychotherapist recommended a course of treatment for a problem, would you have any difficulty asking that medical doctor or

psychotherapist about evidence as to whether that form of treatment has been shown effective? Why or why not?

CRITICAL THINKING Justin swears he feels much better because of psychoanalysis. "I feel so much better now," he claims. Deborah swears by her experience with Gestalt therapy. Are these anecdotal endorsements acceptable as scientific evidence? Why or why not?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

BIOLOGICAL THERAPIES

The kinds of therapy we have discussed are psychological in nature—forms of *psycho*-therapy. Psychotherapies apply *psychological* principles to treatment, principles based on psychological knowledge of matters such as learning and motivation. However, people with psychological disorders are also often treated with biological therapies. Biological therapies apply what is known of people's *biological* structures and processes to the amelioration of psychological disorders. For example, they may work by altering events in the nervous system, as by changing the action of neurotransmitters. In this section, we discuss three biological, or medical, approaches to treating people with psychological disorders: drug therapy, electroconvulsive therapy, and psychosurgery. **Question 21: What kinds of drug therapy are available for psychological disorders?**

Drug Therapy: In Search of the Magic Pill?

In the 1950s, Fats Domino popularized the song "My Blue Heaven." Fats was singing about the sky and happiness. Today, "blue heavens" is one of the street names for the 10-milligram dose of the antianxiety drug Valium. Clinicians prescribe Valium and other drugs for people with various psychological disorders.

ANTIANSXIETY DRUGS

Most antianxiety drugs (also called minor tranquilizers) belong to the chemical class known as benzodiazepines. Valium (diazepam) is a benzodiazepine. Other benzodiazepines include chlordiazepoxide (for example, Librium), oxazepam (Serax), and alprazolam (Xanax). Antianxiety drugs are usually prescribed for outpatients who complain of generalized anxiety or panic attacks, although many people also use them as sleeping pills. Valium and other antianxiety drugs depress the activity of the central nervous system (CNS). The CNS, in turn, decreases sympathetic activity, reducing the heart rate,

respiration rate, and feelings of nervousness and tension. Many people come to tolerate antianxiety drugs very quickly. When tolerance occurs, dosages must be increased for the drug to remain effective.

Sedation (feelings of being tired or drowsy) is the commonest side effect of antianxiety drugs. Problems associated with withdrawal from these drugs include **rebound anxiety**. That is, some people who have been using these drugs regularly report that their anxiety becomes worse than before once they discontinue them. Antianxiety drugs can induce physical dependence, as evidenced by withdrawal symptoms such as tremors, sweating, insomnia, and rapid heartbeat.

ANTIPSYCHOTIC DRUGS

People with schizophrenia are often given antipsychotic drugs (also called major tranquilizers). In most cases, these drugs reduce agitation, delusions, and hallucinations. Many antipsychotic drugs, including phenothiazines (for example, Thorazine) and clozapine (Clozaril) are thought to act by blocking dopamine receptors in the brain (Porsolt et al., 2010). Research along these lines supports the theory that schizophrenia is connected with overactivity of the neurotransmitter dopamine.

ANTIDEPRESSANTS

People with major depression often take so-called **antidepressant** drugs. **Truth or Fiction Revisited:** These drugs are also helpful for some people with eating disorders, panic disorder, obsessive-compulsive disorder, and social phobia (Zohar & Westenberg, 2007). Problems in the regulation of noradrenaline and serotonin may be involved in eating and panic disorders as well as in depression. Antidepressants are believed to work by increasing levels of one or both of these neurotransmitters, which can affect both depression and the appetite (Dagyte et al., 2010). However, as noted in the section on the effectiveness of psychotherapy, cognitive-behavioral therapy addresses irrational attitudes concerning weight and body shape, fosters normal eating habits, and helps people resist the urges to binge and purge, often making this form of therapy more effective with people with bulimia than antidepressants (G. T. Wilson et al., 2002). But when cognitive-behavioral therapy does not help people with bulimia nervosa, drug therapy may.

There are various antidepressants. Each increases the concentration of noradrenaline or serotonin in the brain (Dagyte et al., 2010). *Monoamine oxidase (MAO) inhibitors* block the activity of an enzyme that breaks down noradrenaline and serotonin. *Tricyclic and tetracyclic antidepressants* prevent the reuptake of noradrenaline and serotonin by the axon terminals of the transmitting

Rebound anxiety Anxiety that can occur when one discontinues use of a tranquilizer.

Antidepressant Acting to relieve depression.



Selective serotonin-reuptake

inhibitors (SSRIs) Antidepressant drugs that work by blocking the reuptake of serotonin by presynaptic neurons.

Electroconvulsive therapy (ECT)

Treatment of disorders like major depression by passing an electric current (that causes a convulsion) through the head.

Sedative A drug that relieves nervousness or agitation or puts one to sleep.

neurons. **Selective serotonin-reuptake inhibitors (SSRIs)** such as Prozac, Zoloft, and Effexor also block the reuptake of serotonin by presynaptic neurons. As a result, serotonin remains in the synaptic cleft longer, influencing receiving neurons. SSRIs appear to be more effective than other antidepressants.

Antidepressant drugs must usually build up to a therapeutic level over several weeks. Because overdoses of antidepressant drugs can be lethal, some people stay in a hospital during the buildup to a therapeutic level to prevent suicide attempts. There are also side effects, some of which are temporary, such as nausea, agitation, and weight gain.

LITHIUM

The ancient Greeks and Romans were among the first to use the metal lithium as a psychoactive drug. They prescribed mineral water—which contains lithium—for people with bipolar disorder. They had no inkling as to why this treatment sometimes helped. A salt of the metal lithium (lithium carbonate), in tablet form, flattens out cycles of manic behavior and depression in most people. Lithium can also be used to strengthen the effects of antidepressant medication (Redrobe & Bourin, 2009). It is not known exactly how lithium works, although it affects the functioning of neurotransmitters.

People with bipolar disorder may have to use lithium indefinitely, as a person with type 1 diabetes must use insulin to control the illness. Lithium also has been shown to have side effects such as hand tremors, memory impairment, and excessive thirst and urination (Porsolt et al., 2010). Memory impairment is reported as the main reason people discontinue lithium.



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Electroconvulsive Therapy With ECT, electrodes are placed on each side of the patient's head and a current is passed between them, inducing a seizure. ECT is used mainly in cases of major depression when antidepressant drugs and psychotherapy are not sufficient.

Electroconvulsive Therapy

Question 22: What is electroconvulsive therapy (ECT)? Electroconvulsive therapy (ECT) is a biological form of therapy for psychological disorders that was introduced by the Italian psychiatrist Ugo Cerletti in 1939. Cerletti had noted that some slaughterhouses used electric current to render animals unconscious. The shocks also produced convulsions. Along with other European researchers of the period, Cerletti erroneously believed that convulsions were incompatible with schizophrenia and other major psychological disorders.

ECT was originally used for a variety of psychological disorders. Because of the advent of antipsychotic drugs, however, it is now used mainly for people with major depression who do not respond to antidepressants (Piccinni et al., 2009). People typically obtain one ECT treatment three times a week for up to 10 sessions. Electrodes are attached to the temples and an electrical current strong enough to produce a convulsion is induced. The shock causes unconsciousness, so the patient does not recall it. Nevertheless, patients are given a **sedative** so that they are asleep during the treatment.

Controversy in Psychology SHOULD HEALTH PROFESSIONALS USE ELECTROCONVULSIVE THERAPY?

ECT is controversial for many reasons, such as the fact that many professionals are distressed by the thought of passing an electric current through a patient's head and producing convulsions. There are also side effects, including memory problems in the form of retrograde amnesia

(Gregory-Roberts et al., 2010). However, research suggests that for most people, cognitive impairment tends to be temporary (Rayner et al., 2009). One study followed up ten adolescents who had received ECT an average of 3 1/2 years earlier. Six of the ten had complained of memory impairment

immediately after treatment, but only one complained of continued problems at the follow-up. Nevertheless, psychological tests did not reveal any differences in cognitive functioning between severely depressed adolescents who had received ECT and others who had not (D. Cohen et al., 2000).

Psychosurgery

Psychosurgery is more controversial than ECT. **Question 23: What is psychosurgery?** The most famous—or infamous—technique, **prefrontal lobotomy**, has been used with people with severe disorders. In this method, a picklike instrument severs the nerve pathways that link the prefrontal lobes of the brain to the thalamus. This method was pioneered by the Portuguese neurologist Antonio Egas Moniz and was brought to the United States in the 1930s. The theoretical rationale for the operation was vague and misguided, and Moniz’s reports of success were exaggerated. Nevertheless, by 1950, prefrontal lobotomies had been performed on more than a thousand people in an effort to reduce violence and agitation. **Truth or Fiction Revisited:** Anecdotal evidence of the method’s unreliable outcomes is found in an ironic footnote to history: One of Dr. Moniz’s “failures” shot the doctor, leaving a bullet lodged in his spine and paralyzing his legs. Thus, it is true that the originator of a surgical technique intended to reduce violence learned that it was not always successful ... when one of his patients shot him.

Prefrontal lobotomy also has a host of side effects, including hyperactivity and distractibility, impaired learning ability, overeating, apathy and withdrawal, epileptic-type seizures, reduced creativity, and now and then, death. Because of these side effects and because of the advent of antipsychotic drugs, this method has been largely discontinued in the United States.

Does Biological Therapy Work?

There are thus a number of biological approaches to the therapy of psychological disorders. **Question 24: What do we know about the effectiveness of biological therapies?**

There is little question that drug therapy has helped many people with severe psychological disorders. For example, antipsychotic drugs largely account for the reduced need for the use of restraint and supervision (padded cells, straitjackets, hospitalization, and so on) with people diagnosed with schizophrenia. Antipsychotic drugs have allowed hundreds of thousands of former mental hospital residents to lead

Psychosurgery Surgery intended to promote psychological changes or to relieve disordered behavior.

Prefrontal lobotomy The severing or destruction of a section of the frontal lobe of the brain.

A CLOSER LOOK • RESEARCH

EYE-MOVEMENT DESENSITIZATION AND REPROCESSING

Helping professionals are often inspired to develop therapy methods based on their personal experiences. A troubled young man named Carl Rogers discovered that his strict authoritarian father had coldly communicated values that were preventing him from becoming his own person. Rogers developed a therapy method that provides a warm atmosphere to help clients learn about and act on their genuine feelings. Aaron Beck found that he could argue himself out of his fear of driving through tunnels. Thus, he developed cognitive therapy methods based on encouraging clients to recognize and challenge irrational fears and concerns.

So, too, with Francine Shapiro. As she paints it, Shapiro (1989) had troubling thoughts on her mind when she entered the park. But as her eyes darted about, taking in the scene, she found her troubled thoughts disappearing. Thus, she developed a therapy method called *eye-movement desensitization and reprocessing (EMDR)* to join the arsenal of therapeutic weapons against stress disorders. With this method, the client is asked to imagine a traumatic scene while the therapist moves a finger rapidly back and forth before his or her eyes for about 20–30 seconds. The client follows the finger while keeping the troubling scene in mind. The client tells the therapist what he or she was thinking and how he or she felt during the procedure. The procedure is repeated until the

client’s feelings of anxiety are dissipated. Treatment takes about three 90-minute sessions.

Evidence from a number of studies suggests that EMDR helps decrease the anxiety associated with traumatic events (Engelhard et al., 2010; Van der Kolk et al., 2007). One study, for example, compared the effectiveness of EMDR with two alternative treatments: exposure therapy (used, for instance, with firefighter Stephen King to reduce his anxieties over the attacks of 9/11) and relaxation training (Taylor et al., 2003). Another study looked at the effectiveness of EMDR on numerous people following September 11 (Silver et al., 2005). These studies and others suggest that EMDR is effective, but there are questions, including how effective EMDR is and why it works (May, 2005; Schubert & Lee, 2009). Devilly (2002) allows that EMDR is often effective, but his review finds other exposure therapies are more effective. Research also challenges the idea that eye movements are necessary (Devilly, 2002; Schubert & Lee, 2009).

Perhaps the effects of EMDR can be attributed to a combination of nonspecific therapy factors and to exposure. Clients receiving EMDR may profit from a “therapeutic alliance” with the helping professional and from expectations of success. Moreover, the client is to some degree exposed to the trauma that haunts him or her under circumstances in which the client believes he or she will be able to manage the trauma.

Conclusion? Exposure helps people cope with trauma. Eye movements may not be needed.

A CLOSER LOOK • RESEARCH

CONTEMPORARY PSYCHOSURGERY FOR TREATMENT-RESISTANT OBSESSIVE–COMPULSIVE DISORDER AND DEPRESSION

“It got so bad, I didn’t want any contact with people,” said Ross, now in his 20s. “I couldn’t hug my own parents” (in Carey, 2009).

At the age of 12, Ross realized that it took him longer than other people to wash his hands. He changed his clothes several times a day. After a while, he remained in his room whenever he could, being careful about touching things when he came out.

“I just looked horrible,” said Leonard, in his 60s. “I had a big, ugly beard. My skin turned black. I was afraid to be seen out in public. I looked like a street person. If you were a policeman, you would have arrested me.”

Leonard had been a successful businessman. Then the phobia for spiders and insects descended upon him. Although he dealt with the phobias, he developed powerful aversions to shaving, brushing his teeth, and washing himself.

Ross and Leonard tried psychotherapy and drug therapy. Psychotherapists tried cognitive-behavior therapy for obsessive–compulsive disorder (OCD) with them, using gradual exposure to their most feared situations, such as a moldy shower stall, and taught them rational thinking and relaxation techniques to relieve their anxieties. The methods failed. Antianxiety drugs and antidepressant drugs like Prozac were also tried. They failed as well. As Ross said, they worked for a while but did not last. “I just thought my life was over.”

With their disorders deemed severe and disabling, with standard treatments exhausted, Ross and Leonard were guided not to prefrontal lobotomy but to current methods of psychosurgery. The informed-consent papers they signed specified that their treatment was experimental and that success could not be guaranteed. But they went ahead, opting for a procedure called *gamma knife surgery*. In gamma knife surgery, physicians beam radiation into the skull. They cause no damage except where they converge, destroying spots of tissue from the circuits believed to be overactive in severe OCD (Tyagi et al., 2010).

In addition to gamma knife surgery, three other psychosurgery procedures are being tried, with caution, today (Bear et al., 2010). One is called a *cingulotomy*. Physicians drill through the skull and thread wires into the anterior cingulate of the limbic system (see Figure 16.1 ■). There they destroy small areas of tissue that connect the emotional centers of the brain to the frontal cortex, the brain’s executive center. These areas seem to be overactive in people with the most severe OCD, and the surgery apparently calms that activity. Although the method is often helpful, there are occasional reported side effects of seizures (Read & Greenberg, 2009).

In another method, a *capsulotomy*, surgeons go into a deeper area called the internal capsule and destroy tissue believed to be overactive. A 25-year follow-up of capsulotomy found positive effects but also side effects in many patients who had undergone the procedure (Ruck et al., 2008). The side effects included weight gain and some problems in apathy, decision making, and planning.

In *deep brain stimulation*, surgeons sink electrodes into the internal capsule and leave them there. A device sends an electric current to the area, disrupting the activity of the circuits believed to be overactive in people with OCD (and in people with deep depression). The current is adjustable. A recent study found that four of six patients undergoing this procedure showed improvement in OCD and in depressive symptoms (Goodman et al., 2010).

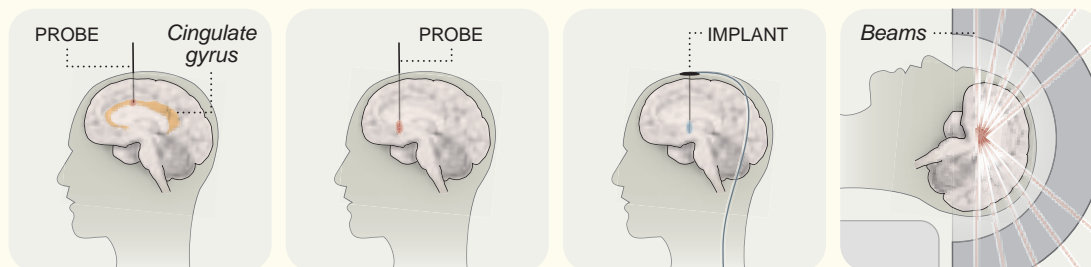
Two years after his surgery, Ross, in college, was appreciative. “It saved my life,” he said. “I really believe that.”

Leonard, however, saw no benefits. “I still don’t leave the house,” he said.

Darin D. Dougherty, M.D., director of neurotherapeutics at Massachusetts General Hospital, one of the few hospitals that carries out these forms of psychosurgery, acknowledged treatment failures, such as Leonard’s. Because of the history of disturbing side effects and failed psychosurgical methods, he voiced concern that “if this effort somehow goes wrong, it’ll shut down this approach for another hundred years.”

Psychiatric Neurosurgery

A handful of medical centers have been conducting several experimental brain surgeries as a last resort for severe obsessive-compulsive disorders that are beyond the range of standard treatment.



Cingulotomy

Probes are inserted into the brain to destroy a spot on the anterior cingulate gyrus, to disrupt a circuit that connects the emotional and conscious planning centers of the brain.

Capsulotomy

Probes are inserted deep into the brain and heated to destroy part of the anterior capsule, to disrupt a circuit thought to be overactive in people with severe O.C.D.

Deep brain stimulation

As an alternative to capsulotomy, an electrode is permanently implanted on one or both sides of the brain. A pacemaker-like device then delivers an adjustable current.

Gamma knife surgery

An M.R.I.-like device focuses hundreds of small beams of radiation at a point within the brain, destroying small areas of tissue.

THE NEW YORK TIMES

Figure 16.1 ■ Contemporary Methods of Psychosurgery Being Tried in Cases of Obsessive–Compulsive Disorder and Major Depressive Disorder That Do Not Respond to Other Treatments

largely normal lives in the community, hold jobs, and maintain family lives. Most of the problems related to these drugs concern their side effects. **Truth or Fiction Revisited:** Therefore, people with psychological disorders should *not* always say no to drugs.

Comparisons of the effectiveness of psychotherapy and pharmacotherapy (medicine) for depression have yielded mixed results. Studies from the 1990s concluded that cognitive therapy is as effective as, or more effective than, antidepressants (Antonuccio, 1995; Muñoz et al., 1994). Researchers noted that cognitive therapy provides coping skills that reduce the risk of recurrence of depression once treatment ends (Hollon & Shelton, 2001). At least one study suggested that a combination of cognitive therapy and antidepressant medication is superior to either treatment alone with chronically depressed people (Keller et al., 2000). A more recent meta-analysis of 30 randomized controlled experiments concluded that SSRIs may be more effective than psychological methods in the treatment of major depressive disorder, although the differences were small and, according to the researchers, might not have much clinical meaning (Cuijpers et al., 2008a). Still another analysis of the literature—in this case, analysis of 14 experiments and 5 meta-analyses—concluded that both SSRIs and cognitive-behavior therapy were more effective than placebos in treating depression (Wagner, 2005; see Table 16.3 ■). The chapter's Life Connections section discusses cognitive-behavioral methods for tackling depression.

Pim Cuijpers and his colleagues (2009b) undertook a meta-analysis of randomly controlled experiments to attempt to answer the question of whether there was a difference in effectiveness of the treatment of depression when an antidepressant drug was added to a psychological treatment. Only 18 studies met their strict scientific standards for inclusion in their analysis. They found that a treatment package that included psychotherapy and pharmacotherapy was more effective than psychological treatment alone, but it was not clear that the antidepressants offered much of an advantage.

In some cases, cognitive-behavior therapy appears to have helped relieve the positive symptoms of schizophrenia (Gregory, 2010; Wykes et al., 2008). Cognitive-behavior therapy is apparently more effective, however, when it is combined with medication in the treatment of schizophrenia (Chadwick & Lowe, 1990).

Many psychologists and psychiatrists are comfortable with the short-term use of antianxiety drugs in helping clients manage periods of unusual anxiety or tension. However, many people use antianxiety drugs routinely to dull the arousal stemming from anxiety-producing lifestyles or interpersonal problems. Rather than make the often painful decisions required to confront their problems and change their lives, they prefer to take a pill.

Despite the controversies surrounding ECT, it helps many people who do not respond to antidepressant drugs (Piccinni et al., 2009). That is, ECT may be a useful “last resort” when other treatment methods are of no avail.

In sum, drug therapy and perhaps ECT seem to be effective for some disorders that do not respond to psychotherapy alone. Yet common sense and research evidence suggest that psychotherapy is preferable for problems such as anxiety and mild depression. No chemical can show a person how to change an idea or solve an interpersonal problem.

Table 16.3 ■ Average Percentage of Participants Responding to Treatments for Depression

Selective Serotonin-Reuptake Inhibitors	47.9%
Cognitive-behavior therapy	55.5%
Placebo	32.5%

Source: J. J. Wagner. (2005). A meta-analysis/literature review comparing the effectiveness of SSRI antidepressants, cognitive behavioral therapy, and placebo for the treatment of depression. *Dissertation Abstracts International: Section B: The Sciences and Engineering*. 66 (4-B), p. 2319.

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ACTIVE REVIEW (26) (Minor or Major?) tranquilizers are usually prescribed for people who complain of anxiety or tension. (27) (Minor or Major?) tranquilizers are used to reduce agitation, delusions, and hallucinations. (28) Major tranquilizers that belong to the chemical class of phenothiazines are thought to work by blocking the action of the neurotransmitter _____. (29) _____ have been used to treat panic disorder, obsessive-compulsive disorder, depression, and eating disorders. (30) Antidepressants heighten the action of the neurotransmitters _____ and noradrenaline. (31) ECT is mainly used to treat severe cases of _____. (32) The best-known psychosurgery technique is the _____ lobotomy.

REFLECT AND RELATE Consider your own sociocultural background. In your experience, do people from your background express any particular attitudes toward people who use antianxiety drugs or antidepressants? Explain.

CRITICAL THINKING Are there times when it is appropriate to prescribe medical treatment for a psychological disorder? How would you make that decision?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Psychodynamic Therapies

Assume disorders stem from unresolved unconscious conflict.

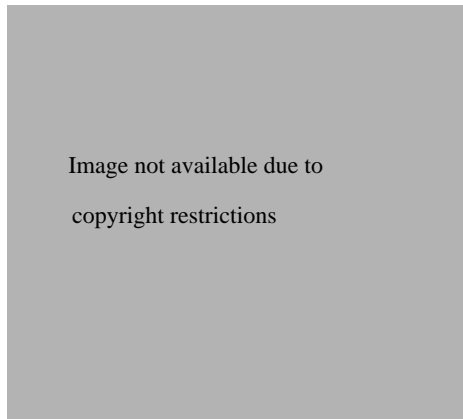


© Freud Museum, London

Freud's Consulting Room

Humanistic Therapies

Assume disorders reflect feelings of alienation from one's genuine beliefs and feelings.



Behavior Therapies

Assume disorders reflect learning of maladaptive responses (such as maladaptive fear responses or phobias) or failure to acquire adaptive responses (such as social skills).



© AP Photo/The Charlotte Observer, Christopher A. Record

One way behavior therapists help clients overcome phobias is to have them gradually approach the feared object or situation while they remain relaxed.

Goals

To strengthen the ego; to provide self-insight into unconscious conflict.

To help clients get in touch with parts of themselves that they have “disowned” and actualize their unique desires and abilities.

To use principles of learning to help clients engage in adaptive behavior and discontinue maladaptive behavior.

Methods

Traditional psychoanalysis is lengthy and nondirective and involves methods such as free association and dream analysis.

Client-centered therapy is nondirective. It provides an atmosphere of “unconditional positive regard” from the therapist in which clients can engage in self-exploration without fear. Gestalt therapy uses highly directive methods to help clients integrate conflicting parts of the personality into a healthy Gestalt, or whole.

Behavior therapy is directive and uses fear-reduction methods (including systematic desensitization) to overcome phobias such as fear of flying, aversive conditioning (to help clients discontinue bad habits), operant-conditioning procedures (e.g., social skills training), and self-control methods (beginning with functional analysis of behavior).

Comments

Most effective with verbal, “upscale” clients. Modern ego-analytic approaches are briefer and more directive than traditional psychoanalysis.

Client-centered therapy is practiced widely in college and university counseling centers to help students make academic and personal decisions.

Behavior therapists have developed treatment for problems (e.g., smoking, phobias, sexual dysfunctions) for which there previously were no effective treatment methods.

Principal proponent: Sigmund Freud (1856–1939) formulated his psychodynamic theory of personality a century ago. His method of therapy, psychoanalysis, achieved its greatest prominence in the 1940s and 1950s.

Principal proponents: Carl Rogers (1902–1970) developed client-centered therapy in the mid-20th century. Fritz Perls (1893–1970) originated Gestalt therapy, which reached its greatest prominence in the 1960s.

Principal proponents: Joseph Wolpe (1915–1997) introduced systematic desensitization in the late 1950s. Albert Bandura integrated behavioral and cognitive factors in forming his therapeutic methods, such as modeling.



© Bettmann/Corbis

Sigmund Freud



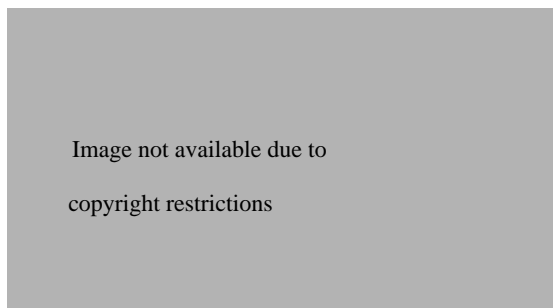
© Bettmann/Corbis

Carl Rogers



© Courtesy The Gestalt Journal Press

Fritz Perls



Cognitive Therapies

Assume disorders reflect cognitive errors such as excessive self-blame, pessimism, and selective focus on negative events.



© David Buffington/Photographer's Choice/Getty Images

The therapist seeks to guide the client to correct cognitive errors and recognize irrational beliefs.

Biological Therapies

Assume that disorders reflect the interaction of genetic vulnerability with other factors, such as imbalances of neurotransmitters or hormones or situational stressors; for example, depression may reflect interaction of genetic vulnerability with low levels of serotonin and with a personal failure.



© P. Petersen/Custom Medical Stock

Many drugs have been used to combat psychological disorders.

To make clients aware of the beliefs, attitudes, and automatic types of thinking that create and compound their problems; to help them correct these kinds of thinking to reduce negative feelings and solve problems.

Aaron Beck's cognitive therapy helps people recognize and correct cognitive errors such as selective perception, overgeneralization, magnification of negative events, and absolutist thinking. Rational-emotive behavior therapists show clients how irrational beliefs catastrophize events and make them miserable.

To decrease anxiety, alleviate depression, lessen mood swings in bipolar disorder, eliminate or lessen symptoms of schizophrenia.

Antianxiety drugs (also known as *anxiolytic* drugs or “minor tranquilizers”), antidepressant drugs, lithium and other drugs for treatment of bipolar disorder, antipsychotic drugs (“major tranquilizers”), electroconvulsive shock therapy (ECT) for treatment of depression that is unresponsive to drug therapy, psychosurgery.

Many theorists consider cognitive therapy part of behavior therapy, and some call it cognitive-behavioral therapy.

Principal proponents: Aaron Beck introduced his approach, cognitive therapy, in the 1960s. Albert Ellis developed what he first called “rational-emotive therapy” (RET) in the late 1950s and 1960s. More recently, he changed the name to rational-emotive behavior therapy (REBT).



© Photography by Michael Fendel, www.fendel.com

Aaron Beck and Albert Ellis

Most psychologists prefer psychotherapy to biological therapies as being more helpful in developing strategies for solving problems. There is controversy as to whether cognitive therapy is as effective as biological therapy for depression. Most psychologists agree that biological therapies may be appropriate when disorders are severe and unresponsive to psychotherapy.



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Electroconvulsive therapy is used mainly in cases of major depression after other therapies have failed.



Go to Psychology CourseMate at www.cengagebrain.com to access an interactive version of this Concept Review designed to help you test yourself on the topics presented here.

Life Connections ALLEVIATING DEPRESSION: GETTING OUT OF THE DUMPS

Be not afraid of life. Believe that life is worth living and your belief will help create the fact.

—William James

Depression is characterized by inactivity, feelings of sadness, and cognitive distortions. When we suspect that our feelings may fit the picture of a major depressive episode or bipolar disorder, it might be helpful to talk things over with our instructor or visit the college counseling or health center. Some of us may also want to try to get at the deep-seated roots of our feelings of depression, and doing so in some cases might require long-term talk therapy. On the other hand, cognitive-behavioral therapists have pointed out that there are many things we can do on our own to cope with milder feelings of depression. These methods attempt to directly reverse the characteristics of depression. They include

- Engaging in pleasant events.
- Thinking rationally.
- Exercising.
- Asserting ourselves.

Engaging in Pleasant Events

There is a relationship between our moods and what we do. Losses, failures, and tension can trigger feelings of depression. Pleasant events can generate feelings of happiness and joy. You may be able to use pleasant events to lift your mood purposefully by taking the following steps:

1. Check off items in Table 16.4 ■ that appeal to you.
2. Engage in at least three pleasant events each day.
3. Record your activities in a diary. Add other activities and events that strike you as pleasant, even if they are unplanned.
4. Toward the end of each day, rate your response to each activity, using a scale like this one:

- +3 Wonderful
- +2 Very nice
- +1 Somewhat nice
- 0 No particular response
- 1 Somewhat disappointing
- 2 Rather disappointing
- 3 The pits

5. After a week or so, check the items in the diary that received positive ratings.
6. Repeat successful activities and experiment with new ones.

Thinking Rationally

Public opinion is a weak tyrant compared with our own private opinion. What a man thinks of himself, that it is which determines ... his fate.

—Henry David Thoreau

Depressed people tend to blame themselves for failures and problems, even when they are not at fault. They *internalize* blame and see their problems as *stable* and *global*—as all but impossible to change. Depressed people also make cognitive errors such as *catastrophizing* their problems and *minimizing* their accomplishments.

Column 1 in Table 16.5 ■ illustrates a number of irrational, depressing thoughts. How many of them have you had? Column 2 indicates the type of cognitive error being made (such as internalizing or catastrophizing), and column 3 shows examples of rational alternatives.

You can pinpoint irrational, depressing thoughts by identifying the kinds of thoughts you have when you feel low. Look for the fleeting thoughts that can trigger mood changes. It helps to jot them down. Then challenge their accuracy. Do you characterize difficult situations as impossible and hopeless? Do you expect too much from yourself and minimize your achievements? Do you internalize more than your fair share of blame?

You can use Table 16.5 to classify your cognitive errors and construct rational alternatives. Write these next to each irrational thought. Review them from

time to time. When you are alone, you can read the irrational thought aloud. Then follow it by saying to yourself firmly, “No, that’s irrational!” Then read the rational alternative aloud twice, *emphatically*.

After you have thought or read aloud the rational alternative, think, “That makes more sense! That’s a more accurate view of things! I feel better now that I have things in perspective.”

Exercising

Exercise not only fosters physical health. It can also enhance psychological well-being and help us cope with depression. Depression is characterized by inactivity and feelings of helplessness. Exercise is, in a sense, the opposite of inactivity. It might also help alleviate feelings of helplessness. In one experiment, 156 adult volunteers who were depressed were randomly assigned to 4 months of either aerobic exercise, antidepressant medication, or a combination of the two (Babyak et al., 2000). Following treatment, all three groups showed comparable relief from depression. But at a further 6-month follow-up, subjects from the exercise groups who had continued to exercise showed the greatest improvement. Other experiments also find that exercise alleviates feelings of depression (Krogh et al., 2010; Mead et al., 2009). It has also been shown to decrease feelings of anxiety (Herring et al., 2010).

Asserting Ourselves: Stand Up!

We humans are social creatures, and social interactions are important to us. Unassertive behavior patterns are linked to feelings of depression. Learning to express our feelings and relate to others has been shown to alleviate feelings of depression (Gallagher-Thompson et al., 2008; Hersen et al., 1984). Assertive behavior permits more effective interactions with family members, friends, coworkers, and strangers. In this way, we remove sources of frustration and expand our social support. Expressions of positive feelings—saying you love

Table 16.4 ■ Catalog of Pleasant Events

- | | | |
|---|---|--|
| 1. Being in the country | 38. Exploring (hiking away from known routes, spelunking, etc.) | 77. Cooking meals |
| 2. Wearing expensive or formal clothes | 39. Singing | 78. Washing your hair |
| 3. Making contributions to religious, charitable, or political groups | 40. Going to a party | 79. Going to a restaurant |
| 4. Talking about sports | 41. Going to church functions | 80. Using cologne, perfume |
| 5. Meeting someone new | 42. Playing a musical instrument | 81. Getting up early in the morning |
| 6. Going to a rock concert | 43. Snow skiing, ice skating | 82. Writing a diary |
| 7. Playing baseball, softball, football, or basketball | 44. Wearing informal clothes, "dressing down" | 83. Giving massages or backrubs |
| 8. Planning trips or vacations | 45. Acting | 84. Meditating or doing yoga |
| 9. Buying things for yourself | 46. Being in the city, downtown | 85. Doing heavy outdoor work |
| 10. Being at the beach | 47. Taking a long, hot bath | 86. Snowmobiling, dune bugging |
| 11. Doing art work (painting, sculpture, drawing, moviemaking, etc.) | 48. Playing pool or billiards | 87. Being in a body-awareness, encounter, or "rap" group |
| 12. Rock climbing or mountaineering | 49. Bowling | 88. Swimming |
| 13. Reading the Scriptures | 50. Watching wild animals | 89. Running, jogging |
| 14. Playing golf | 51. Gardening, landscaping | 90. Walking barefoot |
| 15. Rearranging or redecorating your room or house | 52. Wearing new clothes | 91. Playing Frisbee or catch |
| 16. Going naked | 53. Dancing | 92. Doing housework or laundry, cleaning things |
| 17. Going to a sports event | 54. Sitting or lying in the sun | 93. Listening to music |
| 18. Going to the races | 55. Riding a motorcycle | 94. Knitting, crocheting |
| 19. Reading stories, novels, poems, plays, magazines, newspapers | 56. Just sitting and thinking | 95. Making love |
| 20. Going to a bar, tavern, club | 57. Going to a fair, carnival, circus, zoo, park | 96. Petting, necking |
| 21. Going to lectures or talks | 58. Talking about philosophy or religion | 97. Going to a barber or beautician |
| 22. Creating or arranging songs or music | 59. Gambling | 98. Being with someone you love |
| 23. Boating | 60. Listening to sounds of nature | 99. Going to the library |
| 24. Restoring antiques, refinishing furniture | 61. Dating, courting | 100. Shopping |
| 25. Watching television or listening to the radio | 62. Having friends come to visit | 101. Preparing a new or special dish |
| 26. Camping | 63. Going out to visit friends | 102. Watching people |
| 27. Working in politics | 64. Giving gifts | 103. Bicycling |
| 28. Working on machines (cars, bikes, radios, television sets) | 65. Getting massages or backrubs | 104. Writing letters, cards, or notes |
| 29. Playing cards or board games | 66. Photography | 105. Talking about politics or public affairs |
| 30. Doing puzzles or math games | 67. Collecting stamps, coins, rocks, etc. | 106. Watching attractive women or men |
| 31. Having lunch with friends or associates | 68. Seeing beautiful scenery | 107. Caring for houseplants |
| 32. Playing tennis | 69. Eating good meals | 108. Having coffee, tea, or soda, with friends |
| 33. Driving long distances | 70. Improving your health (having teeth fixed, changing diet, having a checkup, etc.) | 109. Beachcombing |
| 34. Woodworking, carpentry | 71. Wrestling or boxing | 110. Going to auctions, garage sales, etc. |
| 35. Writing stories, novels, poems, plays, articles | 72. Fishing | 111. Water skiing, surfing, diving |
| 36. Being with animals | 73. Going to a health club, sauna | 112. Traveling |
| 37. Riding in an airplane | 74. Horseback riding | 113. Attending the opera, ballet, or a play |
| | 75. Protesting social, political, or environmental conditions | 114. Looking at the stars or the moon |
| | 76. Going to the movies | 115. Surfing the Internet |
| | | 116. Playing video games |

Source: Adapted from D. J. MacPhillamy & P. M. Lewinsohn, Pleasant Events Schedule, Form III-S, University of Oregon, Mimeograph, 1971.

Table 16.5 ■ IRRATIONAL, DEPRESSING THOUGHTS AND RATIONAL ALTERNATIVES

Irrational Thought	Type of Thought	Rational Alternative
"There's nothing I can do."	Catastrophizing (the size of the problem), minimizing (one's coping ability), stabilizing (making into a permanent problem)	"I can't think of anything to do right now, but if I work at it, I may."
"I'm no good."	Internalizing, globalizing, stabilizing	"I did something I regret, but that doesn't make me evil or worthless as a person."
"This is absolutely awful!"	Catastrophizing	"This is pretty bad, but it's not the end of the world."
"I just don't have the brains for college."	Stabilizing, globalizing	"I guess I really need to go back over the basics in that course."
"I just can't believe I did something so disgusting!"	Catastrophizing	"That was a bad experience. Well, I won't be likely to try that again soon."
"I can't imagine ever feeling right."	Stabilizing, catastrophizing	"This is painful, but if I try to work it through step by step, I'll probably eventually see my way out of it."
"It's all my fault."	Internalizing	"I'm not blameless, but I wasn't the only one involved. It may have been my idea, but he went into it with his eyes open."
"I can't do anything right."	Globalizing, stabilizing, catastrophizing, minimizing	"I sure screwed this up, but I've done a lot of things well, and I'll do other things well."
"I hurt everybody who gets close to me."	Internalizing, globalizing, stabilizing	"I'm not totally blameless, but I'm not responsible for the whole world. Others make their own decisions, and they have to live with the results, too."
"If people knew the real me, they would have it in for me."	Globalizing, minimizing (the positive in yourself)	"I'm not perfect, but nobody's perfect. I have positive as well as negative features, and I am entitled to self-interests."

Many of us create or compound feelings of depression because of cognitive errors such as those in this table. Have you had any of these irrational, depressing thoughts? Are you willing to challenge them?

someone or simply saying “Good morning” cheerfully—help reduce feelings of hostility and pave the way toward further social involvement.

Assertive behavior involves the expression of one’s genuine feelings, standing up for one’s legitimate rights, and refusing unreasonable requests. It means resisting undue social influences, disobeying *arbitrary* authority figures, and resisting conformity to *arbitrary* group standards. But many feelings such as love and admiration are positive, so assertive behavior also means expressing positive feelings (“That was great!” “You’re wonderful!”). You may wish to take the Self-Assessment on page 609 to gain insight into how assertive you are as part of the process of deciding whether to become more assertive.

Perhaps you can’t become completely assertive overnight, but you

can decide *now* that you have been unassertive long enough and plan to change. There may be times when you want to quit and revert to your unassertive ways. Expressing your genuine beliefs may lead to some immediate social disapproval. Others may have a stake in your remaining a doormat, and the people we wind up confronting are sometimes those who are closest to us: parents, spouses, supervisors, and friends.

Perhaps the strategies presented here will work for you. If they don’t, why

not talk things over with your professor or visit the college health or counseling center?



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Tackling Depression or Just Having Fun? Many cognitive-behavior therapists tackle depression directly, by focusing on what depressed people do (or don't do) and think. Depressed people are often inactive and withdrawn from activities they used to enjoy. Therefore, cognitive-behavior therapists may prescribe these very activities as “homework assignments” as part of the treatment of depression.

SELF ASSESSMENT

Do You Speak Your Mind or Do You Wimp Out? The Assertiveness Schedule

What about you? Do you enrich the pockets of every telemarketer, or do you say no? Do you stick up for your rights, or do you allow others to walk all over you? Do you say what you feel or what you think other people want you to say? Do you initiate relationships with attractive people, or do you shy away from them?

One way to gain insight into how assertive you are is to take the following assertiveness schedule. Once you have finished, turn to the Appendix to find out how to calculate your score. A table in the appendix will also allow you to compare your assertiveness to that of a sample of 1,400 students drawn from 35 college campuses across the United States.

Directions: Indicate how well each item describes you by using this code:

- 3 very much like me
 - 2 rather like me
 - 1 slightly like me
 - 1 slightly unlike me
 - 2 rather unlike me
 - 3 very much unlike me
- _____ 1. Most people seem to be more aggressive and assertive than I am.*
- _____ 2. I have hesitated to make or accept dates because of “shyness.”*
- _____ 3. When the food served at a restaurant is not done to my satisfaction, I complain about it to the waiter or waitress.
- _____ 4. I am careful to avoid hurting other people’s feelings, even when I feel that I have been injured.*
- _____ 5. If a salesperson has gone to considerable trouble to show me merchandise that is not quite suitable, I have a difficult time saying “No.”*
- _____ 6. When I am asked to do something, I insist upon knowing why.
- _____ 7. There are times when I look for a good, vigorous argument.
- _____ 8. I strive to get ahead as well as most people in my position.
- _____ 9. To be honest, people often take advantage of me.*
- _____ 10. I enjoy starting conversations with new acquaintances and strangers.
- _____ 11. I often don’t know what to say to people who are sexually attractive to me.*
- _____ 12. I will hesitate to make phone calls to business establishments and institutions.*
- _____ 13. I would rather apply for a job or for admission to a college by writing letters than by going through with personal interviews.*
- _____ 14. I find it embarrassing to return merchandise.*
- _____ 15. If a close and respected relative were annoying me, I would smother my feelings rather than express my annoyance.*
- _____ 16. I have avoided asking questions for fear of sounding stupid.*
- _____ 17. During an argument I am sometimes afraid that I will get so upset that I will shake all over.*
- _____ 18. If a famed and respected lecturer makes a comment which I think is incorrect, I will have the audience hear my point of view as well.
- _____ 19. I avoid arguing over prices with clerks and salespeople.*
- _____ 20. When I have done something important or worthwhile, I manage to let others know about it.
- _____ 21. I am open and frank about my feelings.
- _____ 22. If someone has been spreading false and bad stories about me, I see him or her as soon as possible and “have a talk” about it.
- _____ 23. I often have a hard time saying “No.”*
- _____ 24. I tend to bottle up my emotions rather than make a scene.*
- _____ 25. I complain about poor service in a restaurant and elsewhere.
- _____ 26. When I am given a compliment, I sometimes just don’t know what to say.*
- _____ 27. If a couple near me in a theater or at a lecture were conversing rather loudly, I would ask them to be quiet or to take their conversation elsewhere.
- _____ 28. Anyone attempting to push ahead of me in a line is in for a good battle.
- _____ 29. I am quick to express an opinion.
- _____ 30. There are times when I just can’t say anything.*

Reprinted from Rathus, 1973, pp. 398–406.

*These asterisks are explained in the answer key.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this quiz.

What Is Psychotherapy?

1. What is psychotherapy?

Psychotherapy is a systematic interaction between a therapist and a client that applies psychological principles to affect the client's thoughts, feelings, and/or behavior to help the client overcome psychological disorders, adjust to problems in living, or develop as an individual.

2. How have people with psychological problems and disorders been treated throughout the ages?

In the past, it was assumed that psychological disorders represented possession due to witchcraft or divine retribution, and cruel methods such as exorcism were used to try to rid the person of evil spirits. Asylums were the first institutions for people with psychological disorders, and eventually mental hospitals and the community mental health movement came into being.

Psychodynamic Therapies: Digging Deep Within

3. How do psychoanalysts conduct a traditional Freudian psychoanalysis?

The goals of psychoanalysis are to provide self-insight, encourage the spilling forth (catharsis) of psychic energy, and replace defensive behavior with coping behavior. The main method is free association, but dream analysis and interpretations are used as well. For example, a psychoanalyst may help clients gain insight into the ways they are transferring feelings toward their parents onto a spouse or even onto the analyst.

4. How do modern psychodynamic approaches differ from traditional psychoanalysis?

Modern approaches are briefer and more directive, and the therapist and client usually sit face to face.

Humanistic Therapies: Strengthening the Self

5. What is Carl Rogers's method of client-centered therapy?

Client-centered therapy uses nondirective methods to help clients overcome obstacles to self-actualization. The therapist shows unconditional positive regard, empathic understanding, and genuineness.

6. What is Fritz Perls's method of Gestalt therapy?

Perls's highly directive method aims to help people integrate conflicting parts of their personality. He tried to make clients aware of conflict, and he encouraged them to accept its reality and make choices despite fear.

Behavior Therapy: Adjustment Is What You Do

7. What is behavior therapy?

Behavior therapy relies on learning principles (for example, conditioning and observational learning) to help clients

develop adaptive behavior patterns and discontinue maladaptive ones.

8. What are some behavior-therapy methods for reducing fears?

These include flooding, systematic desensitization, and modeling. Flooding exposes a person to fear-evoking stimuli without aversive consequences until fear is extinguished. Systematic desensitization counterconditions fears by gradually exposing clients to a hierarchy of fear-evoking stimuli while they remain relaxed. Modeling encourages clients to imitate another person (the model) in approaching fear-evoking stimuli.

9. How do behavior therapists use aversive conditioning to help people break bad habits?

Aversive conditioning is a behavior-therapy method for discouraging undesirable behaviors by repeatedly pairing clients' self-defeating impulses (for example, alcohol, cigarette smoke, deviant sex objects) with aversive stimuli so that the impulses become aversive rather than tempting.

10. How do behavior therapists apply principles of operant conditioning in behavior modification?

These are behavior-therapy methods that foster adaptive behavior through principles of reinforcement. Examples include token economies, successive approximations, social skills training, and biofeedback training.

11. How can you use behavior therapy to deal with temptation and enhance your self-control?

Behavior-therapy methods for adopting desirable behavior patterns and breaking bad habits begin with a functional analysis to determine the antecedents and consequences of the problem behavior, along with the details of the behavior itself. They then focus on modifying the antecedents (stimuli that act as triggers) and consequences (reinforcers) of behavior and on modifying the behavior itself.

Cognitive Therapies: Adjustment Is What You Think (and Do)

12. What is cognitive therapy?

Cognitive therapies aim to give clients insight into irrational beliefs and cognitive distortions and replace these cognitive errors with rational beliefs and accurate perceptions.

13. What is Aaron Beck's method of cognitive therapy?

Aaron Beck notes that clients develop emotional problems such as depression because of cognitive distortions or errors that lead them to minimize accomplishments and catastrophize failures. He found that depressed people experience cognitive distortions such as the cognitive triad; that is, they expect the worst of themselves, the world

at large, and the future. Beck teaches clients to dispute cognitive errors.

14. What is Albert Ellis's method of rational-emotive behavior therapy?

Albert Ellis originated rational-emotive behavior therapy, which holds that people's beliefs *about* events, not only the events themselves, shape people's responses to them. Ellis showed how irrational beliefs, such as the belief that we must have social approval, can worsen problems. He literally argued clients out of irrational beliefs.

Group Therapies: On Being in It Together

15. What are the advantages and disadvantages of group therapy?

Group therapy is more economical than individual therapy. Moreover, group members benefit from the social support and experiences of other members. However, some clients cannot disclose their problems in the group setting or risk group disapproval. They need individual attention.

16. What is couple therapy?

Couple therapy addresses the couple as the unit of treatment and focuses on helping couples enhance their relationship by improving communication skills and helping them manage conflict.

17. What is family therapy?

In family therapy, one or more families make up the group. Family therapy undertaken from the "systems approach" modifies family interactions to enhance the growth of individuals in the family and the family as a whole.

18. What do we know about self-help and support groups, such as AA?

Self-help and support groups enable people with psychological and other problems to share information and receive social support. Most analyses suggest that AA is about as effective as other forms of treatment in helping alcoholics remain abstinent.

Does Psychotherapy Work?

19. What kinds of problems do researchers encounter when they conduct research on psychotherapy?

It is difficult and perhaps impossible to randomly assign clients to therapy methods such as traditional psychoanalysis. Moreover, clients cannot be kept blind as to the treatment they are receiving. Further, it can be difficult to sort out the effects of nonspecific therapeutic factors such as instillation of hope from the effects of specific methods of therapy.

20. What do we know about the effectiveness of psychotherapy?

Statistical analyses such as meta-analysis show that people who obtain most forms of psychotherapy fare better than people who do not. Psychodynamic and client-centered approaches are particularly helpful with highly verbal and motivated individuals. Cognitive and behavior therapies are probably most effective. Cognitive therapy appears to be as effective as drug therapy in the treatment of depression.

Biological Therapies

21. What kinds of drug therapy are available for psychological disorders?

Antianxiety drugs, such as benzodiazepines, help alleviate feelings of anxiety in people with anxiety disorders. Antipsychotic drugs help many people with schizophrenia by blocking the action of dopamine receptors. Antidepressants often help people with severe depression, apparently by raising levels of serotonin available to the brain. Lithium often helps people with bipolar disorder.

22. What is electroconvulsive therapy (ECT)?

In ECT, an electrical current is passed through the temples, inducing a seizure and frequently relieving severe depression. ECT is controversial because of side effects such as loss of memory and because nobody knows why it works.

23. What is psychosurgery?

The best-known psychosurgery technique, prefrontal lobotomy, has been largely discontinued because of side effects. However, many other surgical techniques remain under study, including several for obsessive-compulsive disorder.

24. What do we know about the effectiveness of biological therapies?

There is controversy as to whether psychotherapy or drug therapy should be used with people with anxiety disorders or depression. Drugs do not teach people how to solve problems and build relationships, yet antidepressants may be of use when psychotherapy does not help people with depression; furthermore, ECT appears to be helpful in some cases when neither psychotherapy nor drug therapy (antidepressants) is of help. Although the prefrontal lobotomy has been discontinued, other psychosurgery methods may hold promise. Most health professionals agree that antipsychotic drugs benefit large numbers of people with schizophrenia.

KEY TERMS

- Antidepressant (p. 599)
Asylum (p. 573)
Aversive conditioning (p. 584)
Behavior therapy (p. 582)
Biofeedback training (BFT) (p. 585)
Catharsis (p. 576)
Client-centered therapy (p. 579)
Cognitive therapy (p. 587)
Couple therapy (p. 592)
Ego analyst (p. 578)
Electroconvulsive therapy (ECT) (p. 600)
Empathic understanding (p. 580)
Evidence-based practices (p. 596)
Family therapy (p. 592)
Frame of reference (p. 580)
Free association (p. 576)
Functional analysis (p. 586)
Genuineness (p. 580)
Gestalt therapy (p. 580)
Humanistic therapy (p. 579)
Interpretation (p. 576)
Latent content (p. 578)
Manifest content (p. 578)
Meta-analysis (p. 594)
Modeling (p. 583)
Phallic symbol (p. 578)
Prefrontal lobotomy (p. 601)
Psychoanalysis (p. 575)
Psychodynamic therapy (p. 575)
Psychosurgery (p. 601)
Psychotherapy (p. 573)
Rational-emotive behavior therapy (REBT) (p. 589)
Rebound anxiety (p. 599)
Resistance (p. 576)
Sedative (p. 600)
Selective serotonin-reuptake inhibitors (SSRIs) (p. 600)
Social skills training (p. 585)
Successive approximations (p. 585)
Systematic desensitization (p. 583)
Token economy (p. 585)
Transference (p. 576)
Unconditional positive regard (p. 580)
Wish fulfillment (p. 578)

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17 | Social Psychology



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MAJOR TOPICS

Attitudes: “The Good, the Bad, and the Ugly”

Prejudice: A Particularly Troublesome Attitude

Social Perception: Looking Out, Looking Within

Social Influence: Are You an Individual or One of the Crowd?

Group Behavior: Is a Camel a Horse Made by a Committee?

FEATURES

A Closer Look—Research: The Foot-in-the-Door Technique

A Closer Look—Real Life: Who Are the Suicide Terrorists? A Case of the Fundamental Attribution Error?

A Closer Look—Research: On the Milgram Experiments—in Their Own Words

Life Connections: Combating Prejudice

TRUTH OR FICTION ?

- T F** People act in accord with their consciences.
- T F** Airing a TV commercial repeatedly turns off the audience and decreases sales.
- T F** We appreciate things more when we have to work for them.
- T F** Being compelled by the law to recycle can change a person's attitude toward recycling.
- T F** People have condemned billions of other people without ever meeting them or learning their names.
- T F** You should just "be yourself" in a job interview. There's no point to getting dressed up and watching your language.
- T F** We tend to hold others responsible for their misdeeds but to see ourselves as victims of circumstances when we misbehave.
- T F** Most people will torture an innocent person, just because they are ordered to do so.
- T F** Seeing is believing.
- T F** Nearly 40 people stood by and did nothing while a woman was being stabbed to death.



Go to Psychology CourseMate at www.cengagebrain.com to answer and score this Truth or Fiction quiz.

Consider some news from the early years of the 21st century. On July 2, 2010, six suicide bombers attacked the compound of an American contractor in northern Afghanistan, killing four security officers. On December 27, 2007, Benazir Bhutto, the two-time prime minister of Pakistan, was killed by a suicide bomber during a political rally as she was campaigning to hold that post for a third time. On July 7, 2005, four suicide bombers blew themselves up aboard three London commuter trains and a bus, killing more than 50 people and wounding 700. And of course, in the United States, there were the 19 suicide terrorists who used fully fueled airplanes as bombs on September 11, 2001, flying them into the World Trade Center and the Pentagon, killing 3,000.

A major strategic intent of modern terrorists is to create huge numbers of secondary psychological casualties by means of large-scale physical attacks.

BRUCE BONGAR



London, July 7, 2005 Commuters coming into London on this summer morning were accompanied by four suicide bombers, who detonated the bombs, and themselves, at the peak of rush hour on three subway trains and aboard a bus. More than 50 people died, along with the bombers, and 700 were wounded. The bombers were apparently expressing their displeasure over Britain's support of the United States in Iraq.

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As noted by political scientist Mark Danner, “There have been suicide truck bombs, suicide tanker bombs, suicide police cars, suicide bombers on foot, suicide bombers posing as police officers, suicide bombers posing as soldiers, even suicide bombers on bicycles” (2005, p. 52).

Although you might think of suicide terrorism as a recent development, it dates back thousands of years (Kazim et al., 2008). But we have become most recently aware of suicide terrorism by strikes throughout the Muslim world, in Israel, and—with the attacks on New York, Washington, Madrid, and London—in the Western world. The word *suicide* in the phrase “suicide bomber” leads people to turn to psychologists for understanding, with the idea that something must be very wrong psychologically with these terrorists (Pastor, 2004). But many social scientists assert that suicide terrorists have no telltale psychological profile (Consortium of Social Science Associations, 2003; Leenaars, 2006). Ariel Merari and his colleagues (2010) at the University of Tel Aviv could not interview “successful” suicide bombers, but they interviewed and tested would-be suicide bombers—Palestinians who had been caught in the act and arrested. They report that they found two groups among the would-be suicide terrorists: Some were dependent types with a tendency to follow leaders and public influences. Others were emotionally unstable and impulsive. And among both types, some were depressed but would not be diagnosed with major depressive disorder. We still have no way to predict who will become a suicide terrorist.

Because of the difficulty in identifying suicide terrorists, social psychologist Philip Zimbardo (2004) argues that we must look to the psychology of social influence to understand them. As we will see, social psychologist Stanley Milgram (1974), who conducted famous—some would say “infamous”—studies on obedience to authority some 50 years ago, concluded, “Often, it is not so much the kind of person a man is, as the kind of situation in which he finds himself that determines how he will act.”

Question 1: What is social psychology? **Social psychology** is the field of psychology that studies the nature and causes of behavior and mental processes in social situations. Social psychologists study the ways people can be goaded by social influences into doing things that are not necessarily consistent with their personalities. In particular, Zimbardo (2007) has investigated the relative ease with which “ordinary” men and women can be incited by social influence to behave in evil ways. He dubbed the transformation *the Lucifer effect*. The social psychological topics we discuss in this chapter include attitudes, social perception, social influence, and group behavior. As we explore each of these, we will ask what they might offer to those of us who have difficulty imagining why people would surrender their own lives to take the lives of others.

We begin by exploring the topic of attitudes.

ATTITUDES: “THE GOOD, THE BAD, AND THE UGLY”

How do you feel about abortion, amnesty for illegal immigrants, and exhibiting the Ten Commandments in public buildings, like courthouses? These are hot-button topics because people have strong attitudes toward them. They each give rise to cognitive evaluations (such as approval or disapproval), feelings (liking, disliking, or something stronger), and behavioral tendencies (such as approach or avoidance). **Question 2: What are attitudes?** **Attitudes** are enduring behavioral and cognitive tendencies that are expressed by evaluating particular people, places, or things with favor or disfavor (Eagly & Chaiken, 2007). Although I asked how you “feel,” attitudes are not just feelings or emotions. Many psychologists view thinking—or judgment—as more basic to attitudes. They believe that feelings and behavior follow cognition.

Attitudes are largely learned, and they affect behavior. For example, if you learn that an Apple iPad is a wonderful “toy,” you may feel the urge to buy one. Attitudes can foster love or hate. They can give rise to helping behavior or to mass destruction.

Terrorism is about one thing: Psychology. It is the psychology of fear.

PHILIP G. ZIMBARDO

Terrorism applies the science and practice of psychology for political purposes in much the same way that thermonuclear weapons apply the science of physics for military purposes.

DENNIS D. EMBRY

Social psychology The field of psychology that studies the nature and causes of behavior and mental processes in social situations.

Attitude An enduring mental representation of a person, place, or thing that typically evokes an emotional response and related behavior.

They can lead to social conflict or to the resolution of conflicts. Attitudes can change, but not easily.

Let’s return to Pakistan to see how the killing of Benazir Bhutto affected attitudes toward terrorism in that country. A Pakistani study found that the majority of respondents to a survey condemned suicide terrorism and denied that Islam, or any other religion, supports it (Kazim et al., 2008). Most respondents believed that suicide terrorism was associated with religious fundamentalism, and many thought that the bombers had some underlying psychological disorder. These beliefs are widespread but, as we have seen, not necessarily accurate.

One might suspect that the attitudes of Muslim Americans toward the police and other authorities who question them about fellow Muslims would be negative, but this assumption might be far from accurate. Many Muslim Americans cooperate with the local police and other authorities in identifying and dealing with terrorist threats from members of their community because they view the police as a legitimate authority (Tyler et al., 2010). Some Muslims might cooperate because they fear earning the disfavor of the authorities, but most do not resent being questioned.

The A–B Problem: Do We Act in Accord with Our Beliefs?

Our definition of attitude implies that our behavior is consistent with our cognitions—that is, with our beliefs and feelings. **Question 3: Do people do as they think?** (For example, do people really vote their consciences?) When we are free to do as we wish, our behavior is often consistent with our cognitions. But as suggested by the term **A–B problem**, there are exceptions. **Truth or Fiction Revisited:** In fact, the links between attitudes (A) and behaviors (B) tend to be weak to moderate (Petty et al., 2009a, 2009b). For example, research reveals that people who say that drinking alcohol, smoking, and drunken driving are serious threats to their health do not necessarily curb these activities (Stacy et al., 1994).

It also appears that we tend to live up to our **stereotypes**—even our stereotypes of ourselves. For example, when older people are reminded that they are “elderly,” they tend to walk more slowly (Wheeler & Petty, 2001).

A number of factors influence the likelihood that we can predict behavior from attitudes:

1. **Specificity.** We can better predict specific behavior from specific attitudes than from global attitudes. For example, we can better predict church attendance by knowing people’s attitudes toward church attendance than by knowing whether they are Christian.
2. **Strength of attitudes.** Strong attitudes are more likely to determine behavior than weak attitudes (DeMarree et al., 2007). A person who believes that the nation’s destiny depends on Republicans taking control of Congress is more likely to vote than a person who leans toward the Republican Party but does not believe that the outcome of elections makes much difference.
3. **Vested interest.** People are more likely to act on their attitudes when they have a vested interest in the outcome (Lehman & Crano, 2002). People are more likely to vote for (or against) unionization of their workplace, for example, when they believe that their job security depends on the outcome.
4. **Accessibility.** People are more likely to behave in accord with their attitudes when these are accessible—that is, when they are brought to mind (DeMarree, et al., 2007). This is why politicians attempt to “get out the vote” by means of media blitzes just prior to an election. It does them

A–B problem The issue of how well we can predict behavior on the basis of attitudes.

Stereotype A fixed, conventional idea about a group.



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Do People Always Vote Their

“Conscience”? The A–B problem refers to the research finding that people do not always act in accord with their attitudes.

little good to have supporters who forget them on Election Day. Attitudes with a strong emotional impact are more accessible, which is one reason that politicians strive to get their supporters “worked up” over the issues.

Origins of Attitudes

You were not born a Republican or a Democrat. You were not born a Christian, a Jew, or a Muslim, although your parents may have practiced one of these religions when you came along. **Question 4: Where do attitudes come from?** Political, religious, and other attitudes are learned or derived from cognitive processes. In this section, we describe some of the processes that result in acquiring attitudes.

CONDITIONING

Conditioning may play a role in acquiring attitudes. Experiments have shown that attitudes toward national groups can be influenced by associating them with positive words (such as *gift* or *happy*) or negative words (such as *ugly* or *failure*) (De Houwer et al., 2001). Parents often reward children for saying and doing things that agree with their own attitudes. Patriotism is encouraged by showing approval to children when they sing the national anthem or wave the flag.

OBSERVATIONAL LEARNING

Attitudes formed through direct experience may be stronger and easier to recall, but we also acquire attitudes by observing others. The approval or disapproval of peers leads adolescents to prefer certain styles of clothes and music. Children and adolescents also acquire attitudes from their parents and other adults in their communities. The media inform us that body odor and bad breath are dreaded diseases—and, perhaps, that people who use harsh toilet paper are somehow un-American.

COGNITIVE APPRAISAL

Despite what we have said, the acquisition of attitudes is not so mechanical. People are also motivated to have a valid understanding of reality so that they can make predictions and exercise some control over their environment (Wood, 2000). Thus, people also evaluate information and form or change attitudes, including stereotypes, on the basis of new information (Petty et al., 2009a, 2009b). For example, we may believe that a car is more reliable than we had thought if a survey by *Consumer Reports* finds that it has an excellent repair record. We may check out reviewers’ attitudes toward movies and books before we attend or read them ourselves.

Muslims Praying in London Although the majority of Muslims do not support Islamic terrorism against Western targets, terrorism deeply affects the attitudes of non-Muslim Europeans and Americans toward Muslims.



Even so, initial attitudes act as *cognitive anchors* (Wegener et al., 2001; Wood, 2000). We often judge new ideas in terms of how much they deviate from our existing attitudes. Accepting larger deviations requires more information processing—that is, more intellectual work (Petty et al., 2009a, 2009b). For this reason, perhaps, great deviations—such as changes from liberal to conservative attitudes, or vice versa—are apt to be resisted.

Changing Attitudes Through Persuasion: How Persuasive?

Rogers's comment sounds on the mark, but he was probably wrong. It does little good to have a wonderful product if its existence remains a secret. **Question 5: Can you really change people?—their attitudes and behavior, that is?**

CENTRAL AND PERIPHERAL ROUTES TO PERSUASION

The **elaboration likelihood model** describes the ways people respond to persuasive messages (Petty et al., 2009a). Consider two routes to persuading others to change their attitudes. The **central route to persuasion** inspires thoughtful consideration of arguments and evidence. Politicians might present the details of a tax bill before Congress to the public and explain how it will affect citizens in various income groups. The **peripheral route to persuasion** associates objects with positive or negative cues. Politicians may avow, "This bill is supported by Nancy Pelosi (or John Boehner)" without explaining what it will actually do to evoke predictable, knee-jerk reactions, without careful consideration of a bill's merits. Other peripheral routes to persuasion are rewards (such as a smile or a hug), punishments (such as parental disapproval), and such factors as the trustworthiness and attractiveness of the communicator.

Advertisements, which are a form of persuasive communication, also rely on central and peripheral routes. Some ads focus on the quality of the product; that is, they take the central route. For example, ads for Total cereal may highlight its nutritional benefits, providing information about the quality of the product. Other ads take the peripheral route; they attempt to associate the product with appealing images. Ads that show football players heading to Walt Disney World or choosing a brand of beer offer little or no information about the product itself but may persuade us nonetheless.

In this section, we look at one central factor in persuasion—the nature of the message. We also examine three peripheral factors—the communicator of the message, the context of the message, and the audience.

THE NATURE OF THE PERSUASIVE MESSAGE: SAY WHAT? SAY HOW? SAY HOW OFTEN?

How do we respond when TV commercials are repeated until we have memorized every dimple on the actors' faces? Research suggests that familiarity breeds content, not contempt (Förster, 2009; Macrae et al., 2002).

You might not be crazy about *zebulons* and *afworbus* at first, but Robert Zajonc (1968) found that people began to react favorably toward these bogus foreign words on the basis of repeated exposure. **Truth or Fiction Revisited:** It appears that repeated exposure to people and things as diverse as the following enhances their appeal (Banaji & Heiphetz, 2008; Tormala & Petty, 2007):

- Political candidates (who are seen in repeated TV commercials).
- Photographs of African Americans.
- Photographs of college students.
- Abstract art.
- Classical music.

Research suggests that the more complex the stimuli, the more likely frequent exposure will have favorable effects (Ohlsson, 2005; G. F. Smith & Dorfman, 1975). The 100th playing of a Bach fugue may be less tiresome than the 100th performance of a pop tune.

Let advertisers spend the same amount of money improving their product that they do on advertising and they wouldn't have to advertise it.

WILL ROGERS

Many a small thing has been made large by the right kind of advertising.

MARK TWAIN

Familiarity breeds contempt—and children.

MARK TWAIN

Elaboration likelihood model The view that persuasive messages are evaluated (elaborated) on the basis of central and peripheral cues.

Central route In persuasive arguments, providing substantive information about the issues involved.

Peripheral route In persuasive arguments, associating viewpoints with tangential issues, such as who endorses a product, rather than with the qualities of the product itself.

If one plays good music, people don't listen, and if one plays bad music, people don't talk.

OSCAR WILDE

Most Valuable Players or Most Valuable Endorsers? Advertisers use a combination of central and peripheral cues to sell their products. What factors contribute to the persuasiveness of messages? To the persuasiveness of communicators? Why are race-car driver Danica Patrick (left) and basketball player LeBron James (right) sought-after commodities by advertisers?



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When trying to persuade someone, is it helpful or self-defeating to alert them to the arguments presented by the opposition? In two-sided arguments, the communicator recounts the arguments of the opposition to refute them. In research concerning a mock trial, college undergraduates were presented with two-sided arguments—those of the prosecution and those of the defendant (McKenzie et al., 2002). When one argument was weak, the college “jurors” expressed more confidence in their decision than when they did not hear the other side at all. Theologians and politicians sometimes forewarn their followers about the arguments of the opposition and then refute each one. Forewarning creates a kind of psychological immunity to them (Eisend, 2007; Taber et al., 2009).

It would be nice to think that people are too sophisticated to be persuaded by a message’s **fear appeal**. However, many women who are warned of the dire risk they run if they fail to be screened for breast cancer are more likely to obtain mammograms than women who are informed of the *benefits* of mammography (Ruiter et al., 2001). Interestingly, although suntanning has been shown to increase the likelihood of skin cancer, warnings against suntanning were shown to be more effective when students were warned of risks to their *appearance* (premature aging, wrinkling, and scarring of the skin) than when the warning dealt with the risk to their health (J. Jones & Leary, 1994). That is, students informed of tanning’s cosmetic effects were more likely to say they would protect themselves from the sun than were students informed about the risk of cancer. Fear appeals are most effective when the audience believes that the risks are serious—as in causing wrinkles!—and that the audience members can change their behavior to avert the risks—as in preventing cancer or wrinkling (de Hoog et al., 2007; Thompson et al., 2009).

Audiences also tend to believe arguments that appear to run counter to the vested interests of the communicator (Lehman & Crano, 2002). If the president of Chrysler or General Motors said that Toyotas and Hondas were superior, you can bet that we would prick up our ears.

THE COMMUNICATOR OF THE MESSAGE: WHOM DO YOU TRUST?

Would you buy a used car from a person who had been convicted of larceny? Would you leaf through fashion magazines featuring homely models? Probably not. Research shows that persuasive communicators are characterized by expertise, trustworthiness, attractiveness, or similarity to their audiences (Petty et al., 2009a, 2009b).

People find it painful when they are confronted with information that discredits their own opinions (Garrett, 2009). Therefore, they often show **selective avoidance** and **selective exposure** (Bryant & Davies, 2006). That is, they switch channels when the news coverage runs counter to their own attitudes. They also seek communicators whose outlook coincides with their own. Whom would you prefer to listen to? Rush Limbaugh and Sean Hannity or Chris Matthews and Keith Olbermann?



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© Bill Pugliano/Getty Images

Chris Matthews (left) and Rush Limbaugh (right)

From whom would you rather get your news and political options, Chris Matthews or Rush Limbaugh? Would you switch the channel if you saw one of them speaking out? Which one? Why?

THE CONTEXT OF THE MESSAGE: “GET ’EM IN A GOOD MOOD”

You are too shrewd to let someone persuade you by buttering you up, but perhaps someone you know would be influenced by a sip of wine, a bite of cheese, and a sincere compliment. Aspects of the immediate environment, such as music, increase the likelihood of persuasion. When we are in a good mood, we apparently are less likely to evaluate the situation carefully (Briñol et al., 2007; Park & Banaji, 2000).

It is also counterproductive to call your dates fools when they differ with you—even though their ideas are bound to be foolish if they do not agree with yours. Agreement and praise are more effective ways to encourage others to embrace your views. Appear sincere, or else your compliments will look manipulative. (It seems unfair to share this advice with you and not everyone.)

THE PERSUADED AUDIENCE

Why are some people capable of saying no to salespeople? Why do others enrich the lives of every door-to-door salesperson? Perhaps people with high self-esteem and low concern about how strangers will evaluate them are more likely to resist social pressure (Ellickson et al., 2001).

A classic study by Schwartz and Gottman (1976) reveals the cognitive nature of the social anxiety that can make it difficult for some people to refuse requests. The researchers found that people who comply with unreasonable requests are more apt to report thoughts like the following:

- “I was worried about what the other person would think of me if I refused.”
- “It is better to help others than to be self-centered.”
- “The other person might be hurt or insulted if I refused.”

People who refuse unreasonable requests reported thoughts like these:

- “It doesn’t matter what the other person thinks of me.”
- “I am perfectly free to say no.”
- “This request is unreasonable.”

— ■ —
*Arguments are to be avoided:
 they are always vulgar and
 often convincing.*

OSCAR WILDE

— ■ —

Fear appeal A type of persuasive communication that influences behavior on the basis of arousing fear instead of rational analysis of the issues.

Selective avoidance Diverting one’s attention from information that is inconsistent with one’s attitudes.

Selective exposure Deliberately seeking and attending to information that is consistent with one’s attitudes.

A CLOSER LOOK • RESEARCH

THE FOOT-IN-THE-DOOR TECHNIQUE

You might suppose that contributing money to door-to-door solicitors for charity will get you off the hook. Perhaps they'll take the cash and leave you alone for a while. Actually, the opposite is true. The next time they mount a campaign, they may call on you to go door to door on their behalf! Organizations compile lists of people they can rely on. Because they have gotten their “foot in the door,” this is known as the **foot-in-the-door technique**.

Consider a classic experiment by Freedman and Fraser (1966). Groups of women received phone calls from a consumer group requesting that they let a six-person crew come to their home to catalog their household products. The job could take hours. Only

22% of one group acceded to this irksome request. But 53% of another group of women assented to a visit. Why was the second group more compliant? They had been phoned a few days earlier and had agreed to answer a few questions about the soap products they used. Thus, they had been primed for the second request: The caller had gotten a foot in the door.

Research suggests that people who accede to small requests become more amenable to larger ones for a variety of reasons, including conformity and self-perception as the kind of people who help in this way (Burger, 2009). Regardless of how the foot-in-the-door technique works, if you want to say no, it may be easier to do so (and stick to your guns) the first time a request is made. Later may be too late.

Which of these thoughts are more characteristic of what you think when someone tries to sell you something? Are you satisfied with your thoughts and your sales resistance? The nearby Closer Look will afford you insight into how salespeople try to get their foot in the door—literally and figuratively.

Changing Attitudes and Behavior by Means of Cognitive Dissonance: “I Think, Therefore I Am . . . Consistent”?

Question 6: What is cognitive-dissonance theory? According to **cognitive-dissonance theory**, people are thinking creatures who seek consistency in their behaviors and their attitudes—their views of the world (Harmon-Jones & Harmon-Jones, 2008). People apparently must mentally represent the world accurately to predict and control events. Consistency in beliefs, attitudes, and behavior helps make the world seem like a predictable place. Therefore, if we find ourselves in the uncomfortable spot where two cherished ideas conflict, we are motivated to reduce the discrepancy—just as the Seekers did when their prophet, Marian Keech, was shown to be in error when the flying saucers she said were coming did not land on schedule (see Chapter 9, pp. 305–306).

In the first and still one of the best-known studies on cognitive dissonance, one group of participants received \$1 (worth \$5 to \$10 today) for telling someone else that a boring task was interesting (Festinger & Carlsmith, 1959). Members of a second group received \$20 (worth \$100 to \$200 today) to describe the chore positively. Both groups were paid to engage in **attitude-discrepant behavior**—that is, behavior that ran counter to what they actually thought. After presenting their fake enthusiasm for the boring task, the participants were asked to rate their own liking for it. Ironically, those who were paid *less* rated the task as more interesting than their better-paid colleagues reported.

EFFORT JUSTIFICATION

Learning theorists (see Chapter 6) might predict a different outcome. They might predict that the more we are reinforced for doing something (given more money, for example), the more we should like it (not find the task quite as boring, that is). But that is not what happened here. Cognitive-dissonance theorists rightly predicted this outcome. Because the ideas (cognitions) of (a) “I was paid very little” and (b) “I told someone that this assignment was interesting” are dissonant, people will tend to engage in **effort justification**. The discomfort of cognitive dissonance motivates people to explain their behavior to themselves in such a way that unpleasant undertakings seem worth it (Harmon-Jones et al., 2009). Participants who were paid only \$1 may have justified their lie by concluding that they may not have been lying in the first place. **Truth or Fiction Revisited:** It also turns out to be true that we usually appreciate things more when we have to work for them (Stone & Fernandez, 2008). After all, we may tell ourselves, we didn’t do all that hard work for nothing.

— ■ —
*The brain within its groove
Runs evenly and true . . .*

EMILY DICKINSON
— ■ —

Foot-in-the-door technique A method for inducing compliance in which a small request is followed by a larger request.

Cognitive-dissonance theory The view that we are motivated to make our cognitions or beliefs consistent with each other and with our behavior.

Attitude-discrepant behavior Behavior inconsistent with an attitude that may have the effect of modifying an attitude.

Effort justification In cognitive-dissonance theory, the tendency to seek justification (acceptable reasons) for strenuous efforts.

It might seem obvious that changing people's attitudes can lead to changes in behavior. This is why parents argue with their children about what they are doing and who their friends are. And this is why health professionals attempt to persuade patients to quit smoking and to avoid gaining weight. However, it also seems that behavioral changes in themselves can lead to changes in attitudes. Consider the history of recycling of wastes. Recycling laws were at first quite unpopular because they required people to change their years-long habits for disposing of wastes. **Truth or Fiction Revisited:** However, being compelled by the law to recycle actually led to more positive attitudes toward recycling as time went on (Stone & Fernandez, 2008). Recyclers apparently reduced the cognitive dissonance between what they were doing (recycling) and their attitudes (opposition to recycling) by changing their attitudes (becoming supportive of recycling).

LearningConnections • ATTITUDES: “THE GOOD, THE BAD, AND THE UGLY”

ACTIVE REVIEW (1) _____ psychology is the study of the nature and causes of our behavior and mental processes in social situations. (2) A(n) _____ is a behavioral and cognitive tendency expressed by evaluating people, places, or things with favor or disfavor. (3) When we are free to do as we wish, our behavior (is or is not?) usually consistent with our attitudes. (4) Attitudes are acquired through conditioning, observational learning, and _____ appraisal. (5) Early attitudes serve as _____ anchors. (6) According to the _____ likelihood model, there are central and peripheral routes to persuasion. (7) According to the _____-in-the-door effect, people are more likely to agree to large requests after they have agreed to smaller ones. (8) According to cognitive-_____ theory, we

are motivated to make our cognitions consistent with one another and with our behavior.

REFLECT AND RELATE Here's a mini-experiment: Keep a log of radio or TV commercials you hear or see for a few days. Which ones grab your attention? Why? Which ones do you believe? Why? Which ones tempted you to consider buying or trying a product? Why?

CRITICAL THINKING How can you use the information in this section to develop sales resistance?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

PREJUDICE: A PARTICULARLY TROUBLESOME ATTITUDE

Truth or Fiction Revisited: It is true that people have condemned billions of other people without ever meeting them—without ever learning their names. In this section, we discuss some of the reasons for this. We will be dealing with a particularly troubling kind of attitude: prejudice. **Question 7: What are prejudice and discrimination?**

Prejudice is an attitude toward a group that leads people to evaluate members of that group negatively—even though they have never met them. On a cognitive level, prejudice is linked to expectations that members of the target group will behave poorly, say, in the workplace, or engage in criminal behavior. On an emotional level, prejudice is associated with negative feelings such as fear, dislike, or hatred. In behavioral terms, it is connected with avoidance, aggression, and discrimination. Prejudice is the most troubling kind of attitude. It is connected with the genocide of millions upon millions of people.

Prejudice involves stereotyping—that is, erroneous assumptions that all members of a group share the same traits or characteristics. Have you heard anyone stereotype Jewish Americans as shrewd and ambitious? Have people you know characterized African Americans as superstitious and musical? What about gays and lesbians? Are they unfit for military service? Stereotypes are prejudices about certain groups that may lead people to view members of those groups in a biased fashion.

On the other hand, some stereotypes are positive rather than negative, such as the cultural stereotypes about physically attractive people. By and large, we assume that “good things come in pretty packages.” Attractive children and adults are judged and treated more positively than their unattractive peers (Langlois et al., 2000). We expect attractive people to be poised, sociable, popular, intelligent, mentally healthy, fulfilled, persuasive, and successful in their jobs and marriages (Eagly et al., 1991;

Prejudice An attitude toward a group that leads people to evaluate members of that group negatively.

Discrimination Hostile behavior that is directed against groups toward whom one is prejudiced.

Griffin & Langlois, 2006). Research shows that attractiveness is positively correlated with popularity, social skills, and sexual experience (Griffin & Langlois, 2006; Langlois et al., 2000). Attractive people are more likely to be judged innocent of crimes in mock jury experiments, and when they are found guilty, they are handed down less severe sentences (Sporer & Goodman-Delahunty, 2009). Perhaps we assume that attractive people have less need to resort to deviant behavior to achieve their goals. Even when they have erred, perhaps they will be more likely to change their evil ways.

Discrimination

One form of behavior that results from prejudice is **discrimination**. Many groups in the United States have experienced discrimination—women, gays and lesbians, older people, and ethnic groups such as African Americans, Asian Americans, Latino and Latina Americans, Irish Americans, Jewish Americans, and Native Americans. Discrimination takes many forms, including denial of access to jobs, the voting booth, and housing.

The U.S. Department of Housing and Urban Development (HUD) has been tracking discrimination in the availability of housing for ethnic minority groups and the extent to which landlords and real estate agents encourage people from ethnic minority groups to rent an advertised apartment or house. Many landlords would prefer to rent to European Americans rather than African Americans and Latino and Latina Americans. However, HUD found that housing discrimination against African Americans decreased by 18% between 1989 and 2000 (U.S. Department of Housing and Urban Development, 2002). There was no such decline in housing discrimination for Latino and Latina Americans.

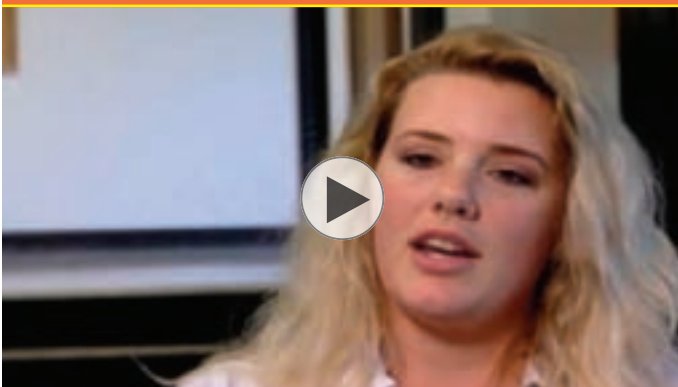
WHAT'S IN A NAME? PERHAPS A SOURCE OF PREJUDICE

Adrian Carpusor and William Loges (2006) also ran an experiment in Los Angeles County to test whether people from apparently different ethnic backgrounds would be treated differently by landlords when they expressed an interest in an apartment that was advertised. Landlords advertising apartments for rent online were sent standardized one-line e-mail inquiries as to whether the advertised apartment was still available. The wording of the inquiry was identical for all landlords, but the inquiry was signed “Patrick McDougall” for one group of randomly selected landlords, “Tyrell Jackson” for a second group of landlords, and “Said Al-Rahman” for a third group. The study was conducted for 10 weeks, and e-mail inquiries were sent concerning 1,115 listings. The name Patrick McDougall, which sounds European American, received the highest percentage (89%) of encouraging replies from landlords. Two-thirds (66%) of the replies to the Arab-sounding name Said Al-Rahman were encouraging. Only 56% of the replies to Tyrell Jackson, which sounds African American, were encouraging. With the HUD report that housing discrimination against African Americans was declining, the authors had predicted that the Arab-sounding name would meet with the greatest discrimination. But they were wrong: The African American name was most likely to be discriminated against, even after the outbreak of the war in Iraq.

AUTOMATIC PREJUDICE

Many people in the United States endorse racial equality but continue to hold negative views of people from other ethnic groups—views they might not even consciously recognize (Dovidio et al., 2009). They respond without racial bias in explicit or overt tasks, such as expressing nonprejudicial attitudes in interviews and on survey questions. Yet to be completely without prejudice, they may have to overcome years of exposure to prejudiced information from their families, peer groups, and the media (Devine et al., 2002; Plant & Devine, 2009). As a result, they may show implicit prejudiced attitudes on responses that they are less able to control. For example, they may choose to sit next to a European American rather than an African American on a bus or train or at a table with European Americans rather than Latino and Latina Americans in

Video Connections—Stereotype Threat



“Nobody ever takes it for granted that I am very skilled at what I do,” says this young mathematician. Why would she say this? We encounter stereotypes nearly every day. Watch the video to learn more about stereotypes and how Claude Steele induced and reduced stereotype threat in his experiments.



Go to Psychology CourseMate at www.cengagebrain.com to watch this video.

a college cafeteria at lunchtime. Or they may provide “logical reasons” why immigration laws should be tightened or gays and lesbians should not be allowed to serve in the military without realizing that prejudice is coloring their attitudes.

Sources of Prejudice

Question 8: What are the sources of prejudice? The sources of prejudice are many and varied:

1. *Dissimilarity.* We are apt to like people who share our attitudes. In forming impressions of others, we are influenced by attitudinal similarity and dissimilarity (Cunningham, 2008). People of different religions and races often have different backgrounds, however, giving rise to dissimilar attitudes. Even when people of different races share important values, they may assume that they do not.
2. *Social conflict.* There is often social and economic conflict between people of different races and religions. For example, for many decades, southern European Americans and African Americans have competed for jobs, giving rise to negative attitudes, even lynchings (Reid, 2008).
3. *Social learning.* Children tend to imitate their parents, and parents reinforce their children for doing so. In this way, prejudices can be transmitted from generation to generation. The mass media also perpetuate stereotypes. TV commercials tend to portray European Americans, especially men, as more prominent and wielding more authority than African Americans (Coltraine & Messineo, 2000; Ramasubramanian & Oliver, 2007). European Americans, especially women, are portrayed as more likely to obtain romantic and domestic fulfillment. In general, European American men tend to be portrayed as powerful, European American women as sex objects, African American men as aggressive, and African American women as unimportant.
4. *Information processing.* One cognitive view is that prejudices act as cognitive filters through which we perceive the social world. The brain tends to automatically place people into categories such as “familiar” and “foreign” and “good” and “bad.” Such categorization may then bias people’s feelings and reactions toward others (Azar, 2002). It is also easier to attend to, and remember, instances of behavior that are consistent with our biases than it is to reconstruct our mental categories (Park & Judd, 2005). If you believe that Jewish Americans are stingy, it is easier to recall a Jewish American’s negotiation of a price than a Jewish American’s charitable donation. If you believe that Californians are airheads, it may be easier to recall TV images of surfing than of scientific conferences at Cal Tech and Berkeley.
5. *Social categorization.* A second cognitive perspective focuses on the tendency to divide our social world into “us” and “them.” People usually view those who belong to their own groups—the “in-group”—more favorably than those who do not—the “out-group” (Park & Judd, 2005). Moreover, there is a tendency to assume that members of the out-group are more similar in their attitudes and behavior than members of our own groups (Mussweiler & Bodenhausen, 2002). Our isolation from the out-group makes it easier to maintain our stereotypes.

LearningConnections • PREJUDICE: A PARTICULARLY TROUBLESOME ATTITUDE

ACTIVE REVIEW (9) On a _____ level, prejudice is linked to expectations that members of the target group will behave poorly. (10) _____ is hostile behavior toward a group of people, such as denial of access to housing. (11) Prejudice may be based on factors such as social _____, or the tendency to divide the world into us and them.

REFLECT AND RELATE How do you feel when people around you make prejudiced remarks against ethnic minority groups?

CRITICAL THINKING Why do you think people tend to be prejudiced against others who are different from them?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

SOCIAL PERCEPTION: LOOKING OUT, LOOKING WITHIN

An important area of social psychology concerns the ways in which we perceive other people—for example, the importance of the first impressions they make on us. Next we explore some factors that contribute to **social perception**: the *primacy and recency effects*, *attribution theory*, and *body language*.

Primacy and Recency Effects: The Importance of First Impressions

Why do you wear a suit to a job interview? Why do defense attorneys make sure their clients dress neatly and get their hair cut before they are seen by the jury? **Question 9: What are the primacy and recency effects?** Do first impressions really matter? Apparently, they do—a great deal.

Whether we are talking about the business or social worlds, or even the relationship between a therapist and a client, first impressions are important (Bidell et al., 2002; Laungani, 2002). First impressions are an example of the primacy effect. Let's have a look at the primacy and recency effects.

When I was a teenager, a young man was accepted or rejected by his date's parents the first time they were introduced. If he was considerate and made small talk, her parents would allow the couple to stay out past curfew—perhaps even to watch submarine races at the beach during the early morning hours. If he was boorish or uncommunicative, he was seen as a cad forever after. Her parents would object to him no matter how hard he worked to gain their favor.

My experiences demonstrated to me that first impressions often make or break us. This phenomenon is known as the **primacy effect**. **Truth or Fiction Revisited:** It is apparently not true that you should just “be yourself” in a job interview. Dressing down or cursing may very well cost you the job.

Why are first impressions so important? The answer may be because we infer traits from behavior. If we act considerately at first, we are labeled considerate. The *trait* of consideration is used to explain and predict our future behavior. If, after being labeled considerate, one keeps a

date out past curfew, this lapse is likely to be seen as an exception to a rule—excused by circumstances or external causes. If one is first seen as inconsiderate, however, several months of considerate behavior may be perceived as a cynical effort to “make up for it.”

Participants in a classic experiment on the primacy effect read different stories about “Jim” (Luchins, 1957). There were four conditions (see Table 17.1 ■). In two conditions, the stories were one paragraph long. In the other two conditions, the stories were two paragraphs long. One of the single-paragraph stories portrayed Jim as friendly; the other single-paragraph story portrayed him as unfriendly. The same paragraphs were used in the two-paragraph stories, but their order was alternated. Some participants read the “friendly” paragraph first, and others read the “unfriendly” paragraph first. As noted in Table 17.1,



© Photo: Photography/Reer

First Impressions Why is it so important to make a good first impression? What are some ways of doing so?

Social perception A subfield of social psychology that studies the ways in which we form and modify impressions of others.

Primacy effect The tendency to evaluate others in terms of first impressions.

Table 17.1 ■ Luchins's Study of the Primacy Effect—The Story of “Jim”

Number of Paragraphs	Nature of Story or Stories	Percent of Participants Rating Jim as Friendly
One	Friendly	95%
One	Unfriendly	3%
Two	Friendly–unfriendly	78%
Two	Unfriendly–friendly	18%

95% of participants reading only the “friendly” paragraph rated Jim as friendly compared with 3% of those who read only the “unfriendly” paragraph. Of those who read two-paragraph stories in the “friendly–unfriendly” order, 78% labeled Jim as friendly. When they read the paragraphs in the reverse order, only 18% rated Jim as friendly.

How can we encourage people to pay more attention to impressions occurring *after* the first encounter? Abraham Luchins accomplished this by allowing time to elapse between the presentations of the two paragraphs. In this way, fading memories allowed more recent information to take precedence. The tendency to respond to the most freshly presented piece of information is known as the **recency effect**. Luchins found a second way to counter first impressions: He simply asked participants to avoid making snap judgments and to weigh all the evidence.

There is some interesting research on the role of the handshake in making a first impression. In the United States, a firm handshake is a key to making a good first impression, by women as well as men. Researchers find that a firm handshake is perceived as an indication of being outgoing and open to new experience. A weak handshake was perceived as indicative of shyness and social anxiety (Chaplin et al., 2000).

Attribution Theory: You’re Free to Choose, but I’m Caught in the Middle?

When she was 3 years old, one of my daughters believed that a friend’s son was a boy because he *wanted* to be a boy. Since she was 3 at the time, this error in my daughter’s **attribution** of the boy’s gender is understandable. Adults tend to make somewhat similar attribution errors, however. Although they do not believe that people’s preferences have much to do with their gender, they do tend to exaggerate the role of choice in their behavior. **Question 10: What is attribution theory?**

An *attribution* is an assumption or belief about why people behave in a certain way. When you assume that one child is mistreating another child because she is “mean,” you are making an attribution. The process by which we make inferences about the motives and traits of others through observation of their behavior is the **attribution process**. An English mock-trial study of guilt for rape found that “jurors” were less likely to find a defendant guilty of rape if he claimed that he had been intoxicated at the time the crime was committed (Finch & Munro, 2007). Many members of the jury believed that if the rapist was intoxicated, they could attribute the sexual assault to the alcohol and not to the drinker.

This section focuses on *attribution theory*, or the processes by which people draw conclusions about the factors that influence one another’s behavior. Attribution theory is important because attributions lead us to perceive others either as purposeful actors or as victims of circumstances.

DISPOSITIONAL AND SITUATIONAL ATTRIBUTIONS

Social psychologists describe two types of attributions. **Dispositional attributions** ascribe a person’s behavior to internal factors such as personality traits and free will. If you assume that one child is mistreating another because she is “mean,” you are making a dispositional attribution. **Situational attributions** attribute a person’s actions to external factors such as circumstances, pressure from other people, or socialization. If you assume that the child is mistreating the other child because her parents have given her certain attitudes toward the other child, you are making a situational attribution. The jurors in the mock trial of a rapist made a situational attribution when they blamed the alcohol for the rape and not the rapist. (Would *you* let a rapist off the hook because he was drinking at the time of the assault?)

THE FUNDAMENTAL ATTRIBUTION ERROR

In cultures that view the self as independent, such as ours, people tend to make dispositional attributions: They tend to attribute other people’s behavior primarily to internal factors such as personality, attitudes, and free will (Chiu & Chao, 2009; Reeder, 2009). This bias in the attribution process is known as the **fundamental attribution error**. In such individualistic societies, people tend to focus on the behavior of others rather than on the circumstances surrounding their behavior. For example, if a teenager gets into

Recency effect The tendency to evaluate others in terms of the most recent impression.

Attribution A belief concerning why people behave in a certain way.

Attribution process The process by which people draw inferences about the motives and traits of others.

Dispositional attribution An assumption that a person’s behavior is determined by internal causes such as personal traits.

Situational attribution An assumption that a person’s behavior is determined by external circumstances such as the social pressure found in a situation.

Fundamental attribution error The assumption that others act predominantly on the basis of their dispositions, even when there is evidence suggesting the importance of their circumstances.

A CLOSER LOOK • REAL LIFE

WHO ARE THE SUICIDE TERRORISTS? A CASE OF THE FUNDAMENTAL ATTRIBUTION ERROR?

Following the attacks of September 11, President George W. Bush labeled the suicide terrorists “evil cowards.” Senator John Warner declared, “Those who would commit suicide in their assaults on the free world are not rational and are not deterred by rational concepts.” Attempting to fend off anti-Islamic rage, some Islamic leaders advised their followers to say that “terrorists are extremist maniacs who don’t represent Islam at all” (cited by Altran, 2006).

Evil. Cowardly. Irrational. Maniacal. Do these concepts paint a psychological portrait of suicide terrorists? Information about them comes from people who knew them before they committed their acts and from studies of would-be suicide terrorists who were prevented from carrying out their missions.

So, what do we actually know? Those who have studied the nature of evil, such as Stanley Milgram, find that many, perhaps most, perpetrators of evil are “ordinary people” (Zimbardo, 2007). The Consortium of Social Science Associations (COSSA) (2003) testified to Congress that they had to conclude there was no clear profile of the suicide terrorist. They averaged 21 or 22 years of age, but some were younger and many were older. Some were devout Muslims, but most seemed to be no more devout than others in their communities. Most had at least some high school education, and some had attended college.

The U.S. Council on Foreign Relations (2002) reported on a study of Palestinian suicide terrorists recruited by Hamas. Whereas suicidal people in general tend to be depressed, even desperate, many suicide bombers had held paying jobs, even in poverty-stricken communities. They harbored hatred of Israel, just as the suicide bombers of 9/11 harbored hatred of the United States. COSSA and the Council speculate that some of the suicide terrorists might have had “masculine self-image problems” and been seeking recognition—but not all of them. Some are dependent types; others are impulsive (Merari et al., 2010).

In seeking a profile, are we making a fundamental attribution error? According to attribution theory, we tend to attribute too much of other people’s behavior to internal factors such as attitudes and choice. People tend to explain behavior in terms of personal traits and personal choice, even when significant factors are at work in the person’s society (L. Miller, 2006). As noted by Scott Altran (2006), who has studied suicide terrorism:

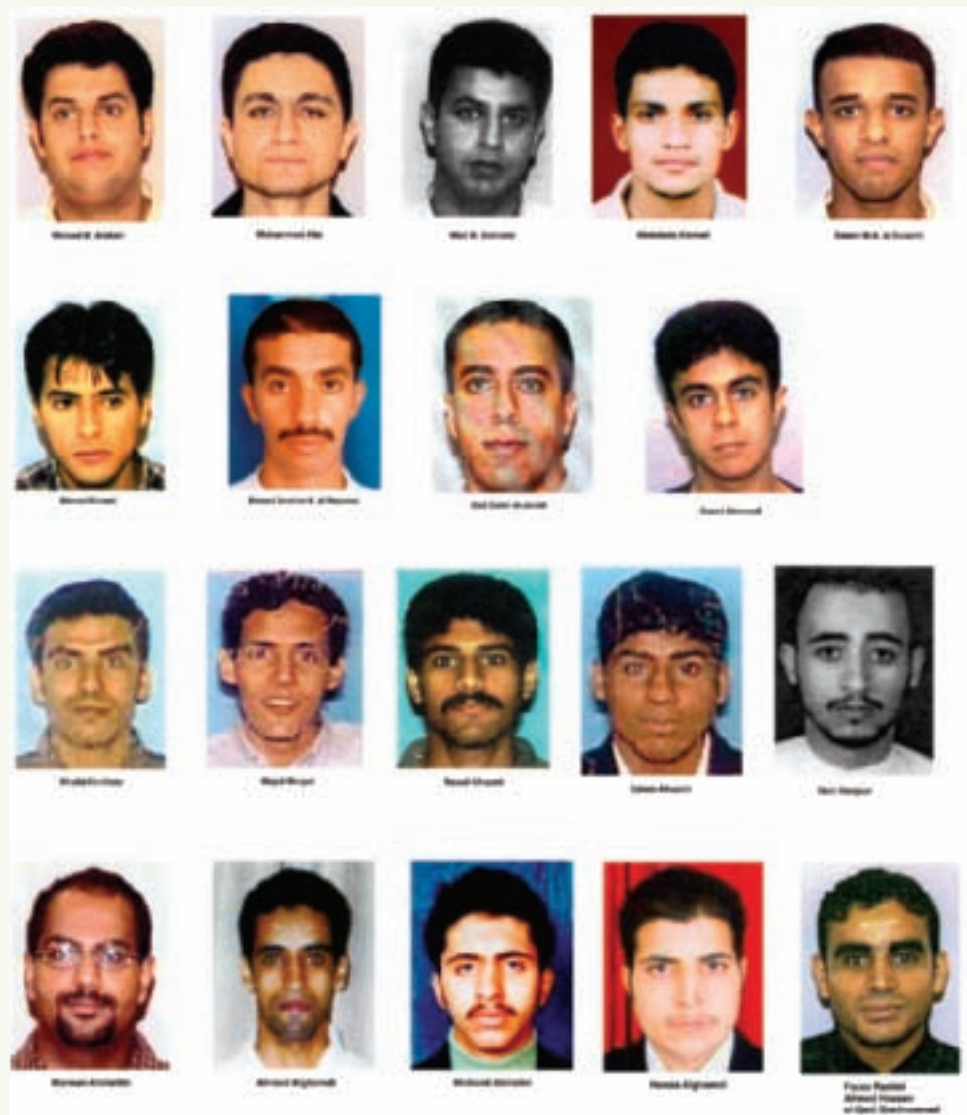
U.S. government and media characterizations of Middle East suicide bombers as craven homicidal lunatics may suffer from a fundamental attribution error: No instances of religious or political suicide terrorism stem from lone actions of cowering or unstable bombers.

Stanley Milgram found that ordinary Americans also readily obey destructive orders under the right circumstances.

If suicide terrorists are responding to group pressure and magnetic leaders, do we absolve them of guilt for their crimes? Not at all. But perhaps we need to recognize that there is little if anything that is special or extraordinary about them.

Why Did They Fly into the World Trade Center and the Pentagon?

Was it a matter of personality and personal choice? Was it a web of situational factors? What does social psychology have to teach us about the nature of evil?



© FBI/Getty Images

trouble with the law, individualistic societies are more likely to blame the teenager than the social environment in which the teenager lives. When involved in difficult negotiations, there is a tendency to attribute the toughness to the personalities of the negotiators on the other side rather than the nature of the process of negotiation (M. W. Morris et al., 1999). **Truth or Fiction Revisited:** Therefore, we do tend to hold others responsible for their misdeeds but to see ourselves as victims of circumstances when we misbehave.

One reason for the fundamental attribution error is that we tend to infer traits from behavior. But in collectivist cultures that stress interdependence, such as Asian cultures, people are more likely to attribute other people's behavior to a person's social roles and obligations (Chiu & Chao, 2009). For example, Japanese people might be more likely to attribute a businessperson's extreme competitiveness to the "culture of business" rather than to his or her personality.

THE ACTOR-OBSERVER EFFECT

We already noted that we are biased toward making dispositional attributions when we are explaining other people's behavior. When we see other people doing things that we do not like, we tend to judge them as willful actors (Baron et al., 2009). But when we find ourselves doing things that we ordinarily disapprove of, we tend to judge ourselves as being victims of circumstances (Baron et al., 2009). The combination of the tendency to attribute other people's behavior to dispositional factors and our own behavior to situational influences is called the **actor-observer effect**.

Consider an example. Parents and children often argue about the children's choice of friends or dates. When they do, the parents tend to infer traits from behavior and to see the children as stubborn and resistant. The children also infer traits from behavior. Thus, they may see their parents as bossy and controlling. Parents and children alike attribute the others' behavior to internal causes. That is, both make dispositional attributions about other people's behavior.

How do the parents and children perceive themselves? The parents probably see themselves as being forced into combat by their children's foolishness. If they become insistent, it is in response to the children's stubbornness. The children probably see themselves as responding to peer pressures and, perhaps, to sexual urges that may have come from within but seem like a source of outside pressure. The parents and the children both tend to see their own behavior as motivated by external forces. That is, they make situational attributions for their own behavior.

The actor-observer effect extends to our perceptions of both the in-group (an extension of ourselves) and the out-group. Consider conflicts between nations, for example. Both sides may engage in brutal acts of violence. Each side usually considers the other to be calculating, inflexible, and—not infrequently—sinister. Each side also typically views its own people as victims of circumstances and its own violent actions as justified or dictated by the situation. We tend to look at the other side as being in the wrong, but can we expect them to agree with us?

Try a mini-experiment: The next time you observe friends or family members having an argument, ask one of them afterward why the argument occurred—who had done something wrong and why. If the individual admits to having done something wrong himself or herself, does he or she make a dispositional or a situational attribution? If he or she blames the other person, is he or she making a dispositional or a situational attribution?

THE SELF-SERVING BIAS

There is also a **self-serving bias** in the attribution process. We are likely to ascribe our successes to internal, dispositional factors but our unacceptable behavior, including our failures, to external, situational influences (Duval & Silvia, 2002; Pronin et al., 2002). When we have done well on a test or impressed a date, we are likely to credit our intelligence and charm. But when we fail, we are more likely to blame bad luck, an unfair test, or our date's bad mood.

We can extend the self-serving bias to sports. A study with 27 college wrestlers found that they tended to attribute their wins to stable and internal conditions such as their abilities. But their losses

Actor-observer effect The tendency to attribute our own behavior to situational factors but to attribute the behavior of others to dispositional factors.

Self-serving bias The tendency to view one's successes as stemming from internal factors and one's failures as stemming from external factors.

The Actor-Observer Effect Who is at fault here? People tend to make dispositional attributions for other people's behavior, but they tend to see their own behavior as motivated by situational factors. Thus, people are aware of the external forces acting on themselves when they behave, but they tend to attribute other people's behavior to choice and will.



were due to unstable and external conditions such as an error by a referee (De Michele et al., 1998). Sports fans fall into the same trap. They tend to attribute their team's victories to internal conditions and their losses to external conditions (Rees et al., 2005; Wallace & Hinsz, 2009).

There are exceptions to the self-serving bias. In accord with the bias, when we work in groups, we tend to take the credit for the group's success but to pin the blame for group failure on someone else. But the outcome is different when we are friends with other group members: Then we tend to share the credit for success or the blame for failure (Campbell et al., 2000). Another exception is found in the fact that depressed people are more likely than other people to ascribe their failures to internal factors, even when external forces are mostly to blame (A. T. Beck & Alford, 2009).

Another interesting attribution bias is a gender difference in attributions for friendly behavior. Men are more likely than women to interpret a woman's smile or friendliness toward a man as flirting (Abbey, 1987; Buss, 2000). Perhaps traditional differences in gender roles still lead men to expect that women with whom they have not established relationships should be passive in social settings.

FACTORS CONTRIBUTING TO THE ATTRIBUTION PROCESS

Our attribution of behavior to internal or external causes can apparently be influenced by three factors: *consensus*, *consistency*, and *distinctiveness* (Kelley & Michela, 1980). When few people act in a certain way—that is, when **consensus** is low—we are likely to attribute behavior to dispositional (internal) factors. Consistency refers to the degree to which the same person acts in the same way on other occasions. Highly consistent behavior can often be attributed to dispositional factors. Distinctiveness is the extent to which the person responds differently in different situations. If the person acts similarly in different situations, distinctiveness is low. We therefore are likely to attribute his or her behavior to dispositional factors.

Let's apply the criteria of consensus, consistency, and distinctiveness to the behavior of a customer in a restaurant. She takes one bite of her strawberry cheesecake and calls the waiter. She tells him that her food is inedible and demands that it be replaced. Now, has she complained as a result of internal causes (for example, because she is hard to please) or external causes (that is, because the food really is bad)? Under the following circumstances, we are likely to attribute her behavior to internal, dispositional causes: (a) No one else at the table is complaining, so consensus is low. (b) She has returned her food on other occasions, so consistency is high. (c) She complains in other restaurants also, so distinctiveness is low (see Table 17.2 ■).

But under the following circumstances, we are likely to attribute the customer's behavior to external, situational causes: (a) Everyone else at the table is also complaining, so consensus is high. (b) She does not usually return food, so consistency is low. (c) She usually does not complain at restaurants, so distinctiveness is high. Given these conditions, we are likely to believe that the cheesecake really is awful and that the customer is justified in her response.

Body Language: The Body Speaks

Body language is important in social perception. **Question 11: What is body language?** Body language is nonverbal language; it refers to the meanings we infer from the ways people carry themselves and the gestures they make (Flack et al., 1999; McClave, 2000). At an early age, we learn that the way people carry themselves provides cues to how they feel and are likely to behave. You may have noticed that when people are “uptight,”

Consensus General agreement.

Table 17.2 ■ Factors Leading to Internal or External Attributions of Behavior

	Internal Attribution	External Attribution
Consensus	Low: Few people behave this way.	High: Most people behave this way.
Consistency	High: The person behaves this way frequently.	Low: The person does not behave this way frequently.
Distinctiveness	Low: The person behaves this way in many situations.	High: The person behaves this way in few situations.

they may also be rigid and straight-backed. People who are relaxed are more likely to “hang loose.” Factors such as eye contact, posture, and the distance between two people provide cues to the individuals’ moods and their feelings toward their companions. When people face us and lean toward us, we may assume that they like us or are interested in what we are saying. If we overhear a conversation between a couple and observe that the woman is leaning toward the man while the man is sitting back and toying with his hair, we are likely to infer that he is not interested in what she is saying.

Here’s a mini-experiment: The next time you are out among people, look around. Can you tell whether other people are enjoying being with one another or whether they are finding the experience annoying? How can you tell?

TOUCHING: PUTTING THE ARM ON PEOPLE (LITERALLY)

Touching also communicates. Women are more likely than men to touch other people when they are interacting with them (Stier & Hall, 1984). In one “touching” experiment, Kleinke (1977) showed that appeals for help can be more effective when the distressed person makes physical contact with people who are asked for aid. A woman obtained more coins for phone calls when she touched the arm of the person she was asking for money. In another experiment, waitresses obtained higher tips when they touched patrons on the hand or the shoulder while making change (Crusco & Wetzel, 1984).

In these experiments, the touching was noncontroversial. It was usually gentle, brief, and done in familiar settings. However, when touching suggests greater intimacy than is desired, it can be seen as negative. A study in a nursing home found that responses to being touched depended on factors such as the status of the staff member, the type of touch, and the part of the body that was touched (Hollinger & Buschmann, 1993). Touching was considered positive when it was appropriate to the situation and did not appear to be condescending. It was seen as negative when it was controlling, unnecessary, or overly intimate.

GAZING AND STARING: THE EYES HAVE IT

We usually feel that we can learn much from eye contact. When other people “look us squarely in the eye,” we may assume that they are being assertive or open with us. Avoidance of eye contact may suggest deception or depression. Gazing is interpreted as a sign of liking or friendliness (Itier & Batty, 2009). In one penetrating study, men and women were asked to gaze into each other’s eyes for 2 minutes (Kellerman et al., 1989). After doing so, they reported having passionate feelings toward one another. (Watch out!)

Of course, a gaze is not the same thing as a persistent hard stare. A hard stare is interpreted as a provocation or a sign of anger. Adolescent males sometimes engage in staring contests as an assertion of dominance. The male who looks away first loses the contest. In a classic series of field experiments, Phoebe Ellsworth and her colleagues (1972) subjected drivers stopped at red lights to hard stares by riders of motor scooters. When the light changed, people who were stared at crossed the intersection more rapidly than people who were not. People who are stared at exhibit higher levels of physiological arousal than people who are not (Strom & Buck, 1979).



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Gazing versus Staring Gazing into an attractive person’s eyes can give rise to feelings of passion, but people interpret a hard stare as an aversive challenge.

LearningConnections • SOCIAL PERCEPTION: LOOKING OUT, LOOKING WITHIN

ACTIVE REVIEW (12) The psychology of social _____ involves the ways we perceive other people and ourselves. (13) The tendency to perceive others in terms of first impressions is an example of the _____ effect. (14) Our inference of the motives and traits of others through observation of their behavior is called the _____ process. (15) People who feel (positive or negative?) toward one another tend to position themselves close together. (16) Gazing into another’s eyes can be a sign of love, but a hard _____ is an aversive challenge.

REFLECT AND RELATE Did you ever try to “make a good first impression”? What was the occasion? What did you do? Was your effort successful? Explain.

CRITICAL THINKING Why do we tend to hold others accountable for their misdeeds but excuse ourselves for the bad things we do? How can you use this information to enhance your social relationships?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

SOCIAL INFLUENCE: ARE YOU AN INDIVIDUAL OR ONE OF THE CROWD?

Most people would be reluctant to wear blue jeans to a funeral, walk naked on city streets, or for that matter, wear clothes at a nudist colony. This is because other people and groups can exert enormous pressure on us to behave according to their norms. **Social influence** is the area of social psychology that studies the ways people influence the thoughts, feelings, and behavior of others (Nolan et al., 2008). We already learned how attitudes can be changed through persuasion. In this section, we describe a couple of classic experiments that demonstrate how people influence others to engage in destructive obedience or conform to social norms.

A Vietnam veteran, a student in one of my social psychology classes, told of an incident that illustrates [obedience to authority]. He was a member of a unit patrolling the coastline. He saw a boat approaching in the distance. As it got nearer, he realized that it was only a fishing sloop and, therefore, presumably harmless. The officer in charge asked him, “What are you waiting for? Blow it out of the water.” “But it’s only a fishing sloop,” the soldier replied. “No,” said the officer, “it’s a gunboat.” The soldier blew it out of the water.

THOMAS BLASS

Obedience to Authority: Does Might Make Right?

Throughout history, soldiers have followed orders—even when it comes to slaughtering innocent civilians. The Turkish slaughter of Armenians, the Nazi slaughter of Jews, the mutual slaughter of Hutus and Tutsis in Rwanda—these are all examples of the tragedies that can arise from simply following orders. We may say we are horrified by such crimes, and we cannot imagine why people engage in them. But how many of us would refuse to follow orders issued by authority figures? **Question 12: Why will so many people commit crimes against humanity if they are ordered to do so?** Why don’t they just say no?

THE MILGRAM STUDIES: SHOCKING STUFF AT YALE

Yale University psychologist Stanley Milgram also wondered how many people would resist immoral requests made by authority figures. To find out, he undertook a series of classic experiments at the university that have become known as the Milgram studies on obedience.

In an early phase of his work, Milgram (1963) placed ads in New Haven (Connecticut) newspapers for people who would be willing to participate in studies on learning and memory. He enlisted 40 people ranging in age from 20 to 50—teachers, engineers, laborers, salespeople, people who had not completed elementary school, people with graduate degrees.

Let’s suppose that you have answered the ad. You show up at the university in exchange for a reasonable fee (\$4.50, which in the early 1960s might easily fill your gas tank) and to satisfy your own curiosity. You may be impressed. After all, Yale is a venerable institution that dominates the city. You are no less impressed by the elegant labs, where you meet a distinguished behavioral scientist dressed in a white coat and another person who has responded to the ad. The scientist explains that the purpose of the experiment is to study the *effects of punishment on learning*. The experiment requires a “teacher” and a “learner.” By chance, you are appointed the teacher, and the other recruit is the learner.

You, the scientist, and the learner enter a laboratory room that contains a threatening chair with dangling straps. The scientist straps the learner in. The learner expresses some concern, but this is, after all, for the sake of science. And this is Yale University, isn’t it? What could happen to a person at Yale?

You follow the scientist to an adjacent room, from which you are to do your “teaching.” This teaching promises to have an impact. You are to punish the learner’s errors by pressing levers marked from 15 to 450 volts on a fearsome-looking console. Labels describe 28 of the 30 levers as running the gamut from “Slight Shock” to

Social influence The area of social psychology that studies the ways in which people influence the thoughts, feelings, and behavior of others.



Figure 17.1 ■ The Experimental Set-up in the Milgram Studies When the "learner" makes an error, the experimenter prods the "teacher" to deliver a painful electric shock.

"Danger: Severe Shock." The last two levers are simply labeled "XXX." Just in case you have no idea what electric shock feels like, the scientist gives you a sample 45-volt shock. It stings. You pity the person who might receive more.

Your learner is expected to learn pairs of words, which are to be read from a list. After hearing the list once, the learner is to produce the word that pairs with the stimulus word from a list of four alternatives. This is done by pressing a switch that lights one of four panels in your room. If it is the correct panel, you proceed to the next stimulus word. If not, you are to deliver an electric shock. With each error, you are to increase the voltage of the shock (see Figure 17.1 ■).

You probably have some misgivings. Electrodes have been strapped to the learner's wrists, and the scientist has applied electrode paste "to avoid blisters and burns." You have also been told that the shocks will cause "no permanent tissue damage," although they might be extremely painful. Still, the learner is going along. And after all, this is Yale.

The learner answers some items correctly and then makes some errors. With mild concern, you press the levers up through 45 volts. You've tolerated that much yourself. Then a few more mistakes are made. You press the 60-volt lever, then 75. The learner makes another mistake. You pause and look at the scientist, who is reassuring: "Although the shocks may be painful, there is no permanent tissue damage, so please go on." The learner makes more errors, and soon you are up to a shock of 300 volts. But now the learner is pounding on the other side of the wall! Your chest tightens, and you begin to perspire. "Damn science and the \$4.50!" you think. You hesitate and the scientist says, "The experiment requires that you continue." After the delivery of the next stimulus word, the learner chooses no answer at all. What are you to do? "Wait for 5 to 10 seconds," the scientist instructs, "and then treat no answer as a wrong answer." But after the next shock, the pounding on the wall resumes! Now your heart is racing, and you are convinced you are causing extreme pain and discomfort. Is it possible that no lasting damage is being done? Is the experiment that important, after all? What to do? You hesitate again, and the scientist says, "It is absolutely essential that you continue." His voice is very convincing. "You have no other choice," he says, "you *must* go on." You can barely think straight, and for some unaccountable reason, you feel laughter rising in your throat. Your finger shakes above the lever. *What are you to do?*

Milgram had foreseen that some "teachers" in his experiment would hesitate. He had therefore conceived standardized statements that his assistants would use when participants balked—for example: "Although the shocks may be painful, there is no permanent tissue damage, so please go on." "The experiment requires that you continue." "It is absolutely essential that you continue." "You have no other choice, you *must* go on."

To repeat: If you are a "teacher" in the Milgram study, what do you do? Milgram (1963, 1974) found out what most people in his sample would do. The sample was a cross-section of the male population of New Haven. Of the 40 men in this phase of his

Strapped In In the Milgram experiment, the “learner” was strapped to electrodes while the “teacher”—the actual participant in the study—looked on.



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research, about one-third refused to go beyond the 150-volt level, at which the learner cried out: “Stop, let me out! I don’t want to do this anymore” (Packer, 2008). One in eight refused to go beyond the 300-volt level, the level at which the learner pounded the wall. But nearly two-thirds of the participants complied with the scientist throughout the series, believing they were delivering 450-volt, XXX-rated shocks. **Truth or Fiction Revisited:** Therefore, it appears to be true that most people will torture an innocent person, just because they are ordered to do so.

Were these participants unfeeling? Not at all. Milgram was impressed by their signs of stress. They trembled, they stuttered, they bit their lips. They groaned, they sweated, they dug their fingernails into their flesh. Some had fits of laughter, which was an apparent defense against the brutality of the situation, although laughter was inappropriate. One salesperson’s laughter was so convulsive that he could not continue with the experiment.

In various phases of Milgram’s research, nearly half or the majority of the participants complied throughout the series, believing that they were delivering 450-volt, XXX-rated shocks. These findings held for men from the New Haven community, for male students at Yale, and for women.

ON DECEPTION AND TRUTH AT YALE

I have said that the “teachers” in the Milgram studies *believed* that they were shocking other people when they pressed the levers on the console. They weren’t. The only real shock in this experiment was the 45-volt sample given to the teachers. Its purpose was to make the procedure believable.

The learners in the experiment were actually *confederates* of the experimenter. They had not answered the newspaper ads but were in on the truth from the start. The “teachers” were the only real participants. They were led to believe they had been chosen at random for the teacher role, but the choice was rigged so that newspaper recruits would always become teachers.

Milgram debriefed his participants after the experiment was complete. He explained the purpose and methods of his research in detail. He emphasized the fact that they had not actually harmed anyone. But of course, the participants did believe that they were hurting other people as the experiment was being carried out. As you can imagine, the ethics of the Milgram studies have been debated by psychologists for four decades.

A CLOSER LOOK • RESEARCH

ON THE MILGRAM EXPERIMENTS: IN THEIR OWN WORDS

Looking back from the vantage point of the 21st century, social psychologist Thomas Blass (2009) wrote that the Milgram studies on obedience “were to become the most famous, controversial, and, arguably, most important psychological experiments of our time. For over 45 years, they have served as the prime example of the use of experimental realism in the service of a question of deep social and moral significance” (p. 37).

Psychologist Alan C. Elms assisted Milgram in his work at Yale. Elms (2009) records that he met Stanley Milgram in

the spring semester of 1961, when he was required to give a talk about his research interests to first-year psychology graduate students and I was required to listen. I listened to many psychology faculty members talk about their research interests that semester, but only two really stirred my curiosity: Milgram and another new assistant professor, Lawrence Kohlberg, who was starting his research program on stages of moral development. Both Milgram and Kohlberg were looking for a research assistant. I was looking for a summer job. . . . Kohlberg was not a dynamic speaker, and his research ideas seemed still somewhat vague, so I decided it would be more fun to work with Milgram, . . . As far as I know, no one else applied for the job.

At the age of 13, Milgram (1946) had his bar mitzvah and revealed some of the feelings that would later motivate his research: “As I come of age and find happiness in joining the ranks of Israel, the knowledge of the tragic suffering of my fellow Jews throughout war-torn Europe makes this also a solemn event and an occasion to reflect upon the heritage of my people.”

Some 15 years later, Milgram undertook his research at Yale. In 1979, he recalled his feelings at the time:

There was a certain amount of excitement and anticipation as we awaited the first subject. The study [was] carried out by my small groups class under my supervision. . . . The behavior of the subjects astonished the undergraduates and me as



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Stanley Milgram

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well. . . . I do not believe that the students could fully appreciate the significance of what they were viewing, but there was a general sense that something extraordinary had happened. And they expressed their feelings by taking me to Mory’s tavern when we had finished with our work, a locale then off limits to mere faculty. (pp. 4–5)

Milgram (1965) and his assistants discovered that

With numbing regularity good people were seen to knuckle under the demands of authority and perform actions that were callous and severe. Men who are in everyday life responsible and decent were seduced by the trappings of authority, by the control of their perceptions, and by the uncritical acceptance of the experimenter’s definition of the situation, into performing harsh acts. A substantial proportion of people do what they are told to do, irrespective of the content of the act and without limitations of conscience, so long as they perceive that the command comes from a legitimate authority. (p. 74)

When his research at Yale was complete, Milgram (1962, June 1) notified the chair of the Psychology Department, revealing mixed feelings: “I wish to announce my departure from the Linsly-Chittenden basement laboratory. It served us well. Our last subject was run on Sunday, May 27. The experiments on ‘obedience to authority’ are, Praise the Lord, completed.”

Looking back, psychologist Jean M. Twenge (2009) writes,

From the first grainy black and white frame of film, it is obvious that the Milgram obedience experiment is from another era. Men wear horn-rimmed glasses and call the experimenter “sir.” They light cigarettes and smoke them in the lab. When the “learner” says his heart condition was checked out at the veterans’ hospital, no one is surprised—back then, almost all men had served in the military at some point.

Milgram (1974) would encapsulate his findings as follows: “[The] social psychology of [the 20th] century reveals a major lesson: Often, it is not so much the kind of person a man is as the kind of situation in which he finds himself that determines how he will act” (p. 205).



© Mike Harland

Linsly-Chittenden Hall, Yale University

REPLICATION OF THE ORIGINAL EXPERIMENT

The Milgram experiments have been replicated many times and in many places (Blass, 2009; Elms, 2009). Milgram's initial research on obedience was limited to a sample of New Haven men. Could he generalize his findings to other men or to women? Would college students, who are considered to be independent thinkers, show more defiance? A replication of Milgram's study with a sample of Yale men yielded similar results. What about women, who are supposedly less aggressive than men? In subsequent research, women, too, administered shocks to the learners.

Jerry Burger (2009) recently replicated the experiments in northern California, and there were some differences from Milgram's studies. Burger included women, Latino and Latina Americans, and Asian Americans in his sample, whereas Milgram's original experiment was carried out mainly with European Americans and perhaps a few African Americans. Burger found that 65% of his sample were willing to go beyond the 150-volt level, just as found by Milgram, but that's where Burger stopped the study, to get the approval of his ethics review committee. He also believed there was little to be gained in seeing whether participants would use the highest-level shock. There were no gender differences in willingness to shock the learner, although women showed more distress than the men. All this took place in a nation that values independence and free will.

WHY DID PEOPLE IN THE MILGRAM STUDIES OBEY THE EXPERIMENTERS?

In any event, many people obey the commands of others even when they are required to perform immoral tasks. But *why*? Why did Germans “just follow orders” during the Holocaust? Why did “teachers” obey the experimenter in Milgram's study? We do not have all the answers, but we can offer a number of hypotheses:

1. *Socialization.* Despite the expressed American ideal of independence, we are socialized from early childhood to obey authority figures such as parents and teachers. Obedience to immoral demands may be the ugly sibling of socially desirable respect for authority figures (Blass, 2009; Twenge, 2009).
2. *Lack of social comparison.* In Milgram's experimental settings, experimenters displayed command of the situation. Teachers (participants), however, were in unfamiliar territory, so to speak. Moreover, the participants were very much on their own; they did not have the opportunity to compare their ideas and feelings with those of other people in the same situation. They therefore were less likely to have a clear impression of what to do.
3. *Perception of legitimate authority.* One phase of Milgram's research took place within the hallowed halls of Yale University. Participants might have been overpowered by the reputation and authority of the setting. An experimenter at Yale might have appeared to be a highly legitimate authority figure—as might a government official or a high-ranking officer in the military (Blass, 2009). Yet further research showed that the university setting contributed to compliance but was not fully responsible for it. The percentage of individuals who complied with the experimenter's demands dropped from 65% to 48% when Milgram (1974) replicated the study in a dingy storefront in a nearby town. At first glance, this finding might seem encouraging. But the main point of the Milgram studies is that most people are willing to engage in morally reprehensible acts at the behest of a legitimate-looking authority figure. Hitler and his henchmen were authority figures in Nazi Germany. “Science” and Yale University legitimized the authority of the experimenters in the Milgram studies.
4. *The foot-in-the-door technique.* The foot-in-the-door technique might also have contributed to the obedience of the teachers (Burger, 2009). Once they had begun to deliver shocks to learners, they might have found it progressively more difficult to extricate themselves from the situation. Soldiers, similarly, are first taught to obey orders unquestioningly in unimportant matters such as dress and drill. By the time they are ordered to risk their lives, they have been saluting smartly and following commands without question for a long time.

Group conformity scares the pants off me because it's so often a prelude to cruelty towards anyone who doesn't want to—or can't—join the Big Parade.

BETTE MIDLER

5. *Inaccessibility of values.* People are more likely to act in accordance with their attitudes when their attitudes are readily available, or accessible. Most people believe it is wrong to harm innocent people. But strong emotions interfere with clear thinking. As the teachers in the Milgram experiments became more emotionally involved, their attitudes might thus have become less “accessible.” As a result, it might have become progressively more difficult for them to behave according to these attitudes.
6. *Buffers between the perpetrator and the victim.* Several buffers decreased the effect of the learners’ pain on the teachers. For example, the “learners” (actually confederates of the experimenter) were in another room. When they were in the same room with the teachers, their compliance rate dropped from 65% to 40%. Moreover, when the teacher held the learner’s hand on the shock plate, the compliance rate dropped to 30%. In modern warfare, opposing military forces may be separated by great distances. They may be little more than a blip on a radar screen. It is one thing to press a button to launch a missile or aim a piece of artillery at a distant troop carrier or a faraway mountain ridge. It is another to hold a weapon to a victim’s throat.

Psychologists will continue to theorize about the Milgram experiments. As summed up by Jerry Burger, “The haunting images of participants administering electric shocks and the implications of the findings for understanding seemingly inexplicable events such as the Holocaust and Abu Ghraib have kept the research alive for more than four decades” (2009, p. 1).

Conformity: Do Many Make Right?

We are said to **conform** when we change our attitudes or behavior to adhere to social norms. **Social norms** are widely accepted expectations concerning social behavior. Explicit social norms are often made into rules and laws such as those that require us to whisper in libraries and to slow down when driving past a school. There are also unspoken or implicit social norms, such as those that cause us to face the front in an elevator or to be “fashionably late” for social gatherings. Can you think of some instances in which you have conformed to social pressure? (Would you wear blue jeans if everyone else wore slacks or skirts?)

The tendency to conform to social norms is often good. Many norms have evolved because they promote comfort and survival. However, group pressure can also promote maladaptive behavior, as when people engage in risky behavior because “everyone is doing it.” **Question 13: Why do so many people tend to follow the crowd?**

To answer this question, let’s look at a classic experiment on conformity conducted by Solomon Asch in the early 1950s. We then examine factors that promote conformity.



Conform To change one’s attitudes or overt behavior to adhere to social norms.

Social norms Explicit and implicit rules that reflect social expectations and influence the ways people behave in social situations.

— ■ —
*Conformity is the jailer of
freedom and the enemy
of growth.*

JOHN F. KENNEDY

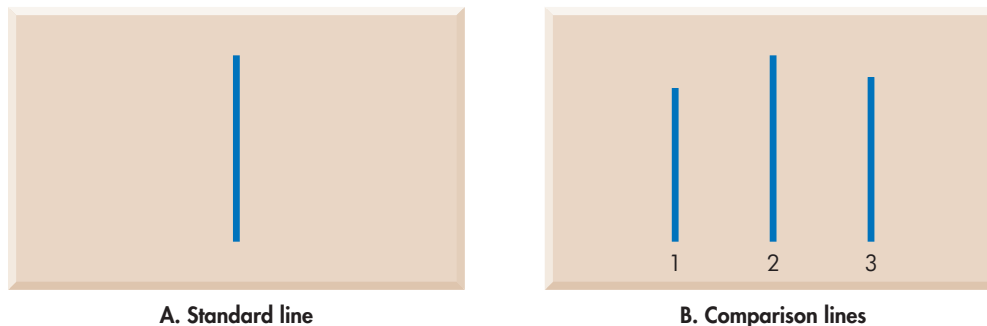
*Whenever you find yourself on
the side of the majority, it is time
to pause and reflect.*

MARK TWAIN

— ■ —

Conformity In the military, individuals are taught to conform until the group functions in machinelike fashion. What pressures to conform do you experience? Do you surrender to them? Why or why not?

Figure 17.2 ■ Cards Used in the Asch Study on Conformity Which line on card B—1, 2, or 3—is the same length as the line on card A? Line 2, right? But would you say “2” if you were a member of a group, and five people answering ahead of you all said “3”? Are you sure?



SIX LINE JUDGES CAN'T BE WRONG: THE ASCH STUDY

Can you believe what you see with your own eyes? Seeing is believing, isn't it? Not if you were a participant in Asch's (1952) study.

You entered a laboratory room with six other participants, supposedly taking part in an experiment on visual discrimination. At the front of the room stood a man holding cards with lines drawn on them.

The seven of you were seated in a series. You were given the sixth seat, a minor fact at the time. The man explained the task. There was a single line on the card on the left. Three lines were drawn on the card at the right (see Figure 17.2 ■). One line was the same length as the line on the other card. You and the other participants were to call out, one at a time, which of the three lines—1, 2, or 3—was the same length as the one on the card on the left. Simple.

The participants to your right spoke out in order: “3,” “3,” “3,” “3,” “3.” Now it was your turn. Line 3 was clearly the same length as the line on the first card, so you said “3.” The fellow after you then chimed in “3.” That's all there was to it. Then two other cards were set up at the front of the room. This time line 2 was clearly the same length as the line on the first card. The answers were “2,” “2,” “2,” “2,” “2.” Again, it was your turn. You said “2,” and perhaps your mind began to wander. Your stomach was gurgling a bit. The fellow after you said “2.”

Another pair of cards was held up. Line 3 was clearly the correct answer. Four people on your right spoke in turn: “1,” “1 . . .” Wait a second! “. . . 1,” “1.” You forgot about dinner and studied the lines briefly. No, line 1 was too short by a good half inch. But the next participant said “1,” and suddenly, it was your turn. Your hands had become sweaty, and there was a lump in your throat. You wanted to say “3,” but was it right? There was really no time, and you had already paused noticeably. You said “1,” and so did the last fellow.

Now your attention was riveted on the task. Much of the time you agreed with the other six judges, but sometimes you did not. And for some reason beyond your understanding, they were in perfect agreement even when they were wrong—assuming you could trust your eyes. The experiment was becoming an uncomfortable experience, and you began to doubt your judgment. **Truth or Fiction Revisited:** Therefore, seeing is not always believing—especially when the group sees things differently.

The discomfort in the Asch study was caused by the pressure to conform. Actually, the other six recruits were confederates of the experimenter. They prearranged a number of incorrect responses. The sole purpose of the study was to see whether you would conform to the erroneous group judgments.

How many people in Asch's study caved in? How many went along with the crowd rather than give what they thought was the right answer? Seventy-five percent. *Three of four agreed with the majority's wrong answer at least once.*

FACTORS THAT INFLUENCE CONFORMITY

Several factors increase the tendency to conform. They include the following:

- Belonging to a collectivist rather than an individualistic society (Fukushima et al., 2009).
- The desire to be liked by other members of the group (but valuing being right over being liked *decreases* the tendency to conform).

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- Low self-esteem.
- Social shyness (Wagstaff et al., 2009).
- Lack of familiarity with the task.

Other factors in conformity include group size and social support. The likelihood of conformity, even to incorrect group judgments, increases rapidly as group size grows to five members; it then rises more slowly as the group grows to about eight members. At about that point, the maximum chance of conformity is reached. Yet finding just one other person who supports your minority opinion apparently is enough to encourage you to stick to your guns (Mesoudi, 2009; W. N. Morris et al., 1977).

LearningConnections • SOCIAL INFLUENCE: ARE YOU AN INDIVIDUAL OR ONE OF THE CROWD?

ACTIVE REVIEW (17) Most people (do or do not?) comply with the demands of authority figures when those demands are immoral. (18) The following factors contribute to obedience: socialization, lack of _____ comparison, perception of experimenters as legitimate authority figures, the foot-in-the-door technique, and inaccessibility of values. (19) In Asch's studies of conformity, _____% of the participants agreed with an incorrect majority judgment at least once.

REFLECT AND RELATE There are many possible explanations for obedience, as found in the Milgram studies. Milgram's research has alerted us to a real danger—the tendency of many, if not most, people to obey the orders of

an authority figure even when they run counter to moral values. It has happened before. It is happening now. What will you do to stop it?

CRITICAL THINKING Critical thinkers do not overgeneralize. Most people would probably agree that it is good for children to be obedient. But is it always good for children—and for adults—to be obedient? As an individual, how can you determine whether it is good for *you* to be obedient? How do you define the limits?



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

GROUP BEHAVIOR: IS A CAMEL A HORSE MADE BY A COMMITTEE?

To be human is to belong to groups. Groups have much to offer us. They help us satisfy our needs for affection, attention, and belonging. They empower us to do things we could not manage by ourselves. But groups can also pressure us into doing things we might not do if we were acting alone, such as taking great risks or attacking other people.

This section considers ways in which people behave differently as group members than they would as individuals. We begin with social facilitation.

Social Facilitation: Monkey See, Monkey Do Faster?

When you are given a group assignment, do you work harder or less hard than you would alone? Why?

One effect of groups on individual behavior is **social facilitation**, or the process by which performance is enhanced when other members of a group engage in similar behavior. **Question 14: Do we run faster when we are in a group?** Apparently, we do. Runners and bicycle riders tend to move faster when they are members of a group. This effect is not limited to people. Dogs and cats eat more rapidly around others of their kind. Even roaches—yes, roaches—run more rapidly when other roaches are present (Zajonc, 1980). And fruit flies apparently do a better job of retrieving long-term memories—as shown by the display of conditioned responses—in the presence of other fruit flies that have undergone the same conditioning (Chabaud et al., 2009).

Research suggests that the presence of other people increases our level of arousal, or motivation (Platanina & Moran, 2001; Thomas et al., 2002). At high levels of arousal, our performance of simple tasks is facilitated. Our performance of complex responses may be impaired, however. For this reason, a well-rehearsed speech may be delivered more masterfully before a larger audience. An offhand speech or a question-and-answer session may be hampered by a large audience.

Social facilitation may be influenced by **evaluation apprehension** as well as arousal (Rosenberg, 2009; Thomas et al., 2002). Our performance before a group is affected not only by the presence of others but also by concern that they are evaluating us. When giving a speech, we may “lose our thread” if we are distracted by the audience and focus too much on its apparent reaction. If we believe that we have begun to flounder, evaluation apprehension may skyrocket. As a result, our performance may falter even more.

The presence of others can also impair performance—not when we are acting *before* a group but when we are anonymous members *of* a group (Guerin, 1999). Workers, for example, may “goof off” or engage in **social loafing** on humdrum jobs when they believe they will not be found out and held accountable. Under these conditions, there is no evaluation apprehension. There may also be **diffusion of responsibility** in groups. Each person may feel less obligation to help because others are present, especially if the others are perceived as capable of doing the job (Abele & Diehl, 2008; Maiden & Perry, 2010). Group members may also reduce their efforts if an apparently capable member makes no contribution but “rides free” on the efforts of others.

How would you perform in a tug of war? Would the presence of other people pulling motivate you to pull harder? (If so, we might attribute the result to social facilitation, unless you personally enjoy tugging; B. N. Smith et al., 2001.) Or would the fact that no one can tell how hard you are pulling encourage you to “loaf”? (If so, should we attribute the result to diffusion of responsibility?)

Social facilitation The process by which a person’s performance increases when other members of a group engage in similar behavior.

Evaluation apprehension Concern that others are evaluating our behavior.

Social loafing The process by which a person’s performance decreases when other members of a group engage in similar behavior, apparently because the person believes that strenuous effort is unnecessary.

Diffusion of responsibility The spreading or sharing of responsibility for a decision or behavior within a group.

Social decision schemes Rules for predicting the final outcome of group decision making.

Group Decision Making

Organizations use groups such as committees or juries to make decisions in the belief that group decisions are more accurate than individual decisions (Van Swol, 2008). **Question 15: How do groups make decisions?** Social psychologists have discovered a number of “rules,” or **social decision schemes**, that govern much of group decision making (Stasser, 1999). Here are some examples:

1. *The majority-wins scheme.* In this commonly used scheme, the group arrives at the decision that was initially supported by the majority. This scheme appears to guide decision making most often when there is no single objectively correct decision. An example would be a decision about which car models to build when their popularity has not been tested in the court of public opinion.



Social Facilitation Runners tend to move faster when they are members of a group. Does the presence of other people raise our level of arousal or produce evaluation apprehension?



How Will They Make Their Decision? Will the majority prevail? Will someone point to a significant piece of evidence that sways the day? Will the group follow the lead of the first person to change his or her mind? What other possibilities are there?

2. *The truth-wins scheme.* In this scheme, as more information is provided and opinions are discussed, the group comes to recognize that one approach is objectively correct. For example, a group deciding whether to use SAT scores in admitting students to college would profit from information about whether the scores do predict college success.
3. *The two-thirds majority scheme.* Juries tend to convict defendants when two-thirds of the jury initially favors conviction.
4. *The first-shift rule.* In this scheme, the group tends to adopt the decision that reflects the first shift in opinion expressed by any group member. If a car-manufacturing group is divided on whether to produce a convertible, it may opt to do so after one member of the group who initially was opposed to the idea changes her mind. Similarly, if a jury is deadlocked, the members may eventually follow the lead of the first juror to switch position.

Polarization and the “Risky Shift”

We might think that a group decision would be more conservative than an individual decision. After all, shouldn't there be an effort to compromise, to “split the difference”? We might also expect that a few mature individuals would be able to balance the opinions of daredevils. **Question 16: Are group decisions riskier or more conservative than those of individual group members?** If so, why?

Groups do not always appear to work as we might expect, however. Consider the **polarization** effect. As an individual, you might recommend that your company risk an investment of \$500,000 to develop or market a new product. Other company executives, polled individually, might risk similar amounts. If you were gathered together to make a group decision, however, you would probably recommend either an amount well above this figure or nothing at all (Kamalanabhan et al., 2000; Mordock, 1997). This group effect is called *polarization*, or the taking of an extreme position. If you had to gamble on which way the decision would go, however, you would do better to place your money on movement toward the higher sum—that is, to bet on a **risky shift**. Why?

One possibility is that one member of the group may reveal information that the others were not aware of. This information may clearly point in one direction or the other. With doubts removed, the group becomes polarized. It moves decisively in

Polarization In social psychology, taking an extreme position or attitude on an issue.

Risky shift The tendency to make riskier decisions as a member of a group than as an individual acting independently.

the appropriate direction. It is also possible that social facilitation occurs in the group setting and that the resulting greater motivation prompts more extreme decisions.

Why, however, do groups tend to take *greater* risks than those their members would take as individuals? One answer is diffusion of responsibility (A. S. Brown, 2007; Kamalanabhan et al., 2000). If the venture flops, the blame will not be placed on you alone. Remember the self-serving bias: You can always say (and think) that the failure was the result of a group decision. You thus protect your self-esteem (Fleming, 2008). If the venture pays off, however, you can attribute the outcome to your cool analysis and boast of your influence on the group. Note that all this behavior fits right in with what is known about the self-serving bias.

Groupthink: When Smart People Think as One, Bad Decisions May Follow

I will not wait on events, while dangers gather. I will not stand by, as peril draws closer and closer. The United States of America will not permit the world's most dangerous regimes to threaten us with the world's most destructive weapons.

—President George W. Bush, State of the Union Speech, 2002

President Bush delivered this speech just 4 months in the wake of the events of September 11. The attackers had been identified. The nation was looking for ways to prevent a repetition. Many wanted revenge. Some intelligence reports suggested that Saddam Hussein, the leader of Iraq, was preparing weapons of mass destruction (WMDs) for use against the United States. In 2003, the United States invaded Iraq, deposed Hussein,

and undertook what turned out to be a fruitless search for WMDs. Three years later, the United States was spending blood and treasure to fight an insurgency in Iraq, but a growing majority of Americans believed the invasion should not have occurred. Bob Woodward (2006)—who, along with Carl Bernstein, had uncovered the Nixon administration's involvement in the Watergate Affair—published a book titled *State of Denial*, in which he reported that the Bush administration had focused selectively on bad intelligence in arriving at the belief that Iraq possessed WMDs.

How did the invasion occur? Woodward and other observers (e.g., Fitzsimmons, 2008) point to the role of *groupthink*, a concept originated by social psychologist Irving Janis (1982). **Question 17: What is groupthink?** *Groupthink* is a problem that may arise in group decision making when group members are swayed more by group cohesiveness and a dynamic leader than by the realities of the situation (Esser & Lindoerfer, 2006; Packer, 2009). *Groupthink* grows more likely when the

group senses an external threat (Byrne & Senehi, 2008). Under stress, group members may not carefully weigh all their options, and flawed decisions may be made.

Groupthink has been connected with historic fiascos such as the botched Bay of Pigs invasion of Cuba, the Watergate scandal in which members of the Nixon administration believed they could cover up a theft, and NASA's decision to launch the *Challenger* space shuttle despite engineers' warnings about the dangers created by unusually cold weather (Brownstein, 2003; Esser & Lindoerfer, 2006). Janis (1982) and other researchers (Brownstein, 2003; Packer, 2009) note characteristics of *groupthink* that contribute to flawed decisions:

1. *Feelings of invulnerability.* In the Watergate Affair, the decision-making group might have believed they were beyond the reach of critics or the law because they were powerful people who were close to the president of the United States.
2. *The group's belief in its rightness.* These groups apparently believed in the rightness of what they were doing. In the case of the *Challenger* launch, NASA



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Groupthink? Did President George W. Bush (center) and his advisers (Secretary of Defense Donald Rumsfeld, left, and Vice President Dick Cheney, right) fall prey to groupthink in making the decision to invade Iraq?

Groupthink A process in which group members are influenced by cohesiveness and a dynamic leader to ignore external realities as they make decisions.

had a track record of successful launches. Members of the Bush administration believed they had the evidence of WMDs that they needed.

3. *Discrediting information contrary to the group's decision.* Members of the Bush administration discredited reports that raised doubt, such as a report from Mohamed El-Baradei, the director general of the International Atomic Energy Agency, and some of the United States' own intelligence reports.
4. *Pressures on group members to conform.* Striving for unanimity overrides the quest for realism, and authority can trump expertise. According to Woodward, members of the administration who sought to invade Iraq overrode dissenting voices. After the disastrous invasion of the Bay of Pigs in Cuba, President John F. Kennedy is reported to have said, "How could we have been so stupid?"
5. *Stereotyping members of the out-group.* In the cases of the invasions of the Bay of Pigs and Iraq, proinvasion group members stereotyped members of the out-group as being out of touch with reality.

The goal of the invasion of Iraq was to find and destroy WMDs. They were never found and apparently did not exist. But the United States had been attacked, and the desire to do *something* was running high in the country. Not only Republicans supported the invasion. Twenty-nine of fifty Democratic senators, including Hillary Clinton of New York and John Kerry of Massachusetts, voted to authorize the use of military force. Given that President Bush had an approval rating of nearly 90%, one may wonder whether many millions of Americans fell prey to the same groupthink that gripped politicians.

Groupthink can be averted if group leaders encourage members to remain skeptical about options and to feel free to ask probing questions and disagree with one another. At the time of the invasion of Iraq, the majority of Americans did not voice skepticism. Who wants to belong to the out-group?

Mob Behavior and Deindividuation: The "Beast with Many Heads"

Have you ever done something as a member of a group that you would not have done as an individual? What was it? What motivated you? How do you feel about it?

Frenchman Gustave Le Bon (1895/1960) branded mobs and crowds as irrational, resembling a "beast with many heads." Mob actions such as race riots and lynchings sometimes seem to operate on a psychology of their own. **Question 18: Why do mild-mannered people commit mayhem when they are part of a mob?** Do mobs "bring out the beast in us"? In seeking an answer, let's examine a lynching.

THE LYNCHING OF ARTHUR STEVENS

In their classic volume *Social Learning and Imitation*, Neal Miller and John Dollard (1941) vividly described a lynching that occurred in the South in the 1930s. Arthur Stevens, an African American, was accused of murdering his lover, a European American woman, when she wanted to break up with him. Stevens was arrested, and he confessed to the crime. Fearing violence, the sheriff moved Stevens to a town 200 miles away during the night. But his location was discovered. On the next day, a mob of a hundred people stormed the jail and returned Stevens to the scene of the crime.

Outrage spread from one member of the mob to another like a plague. Laborers, professionals, women, adolescents, and law-enforcement officers alike were infected. Stevens was tortured and murdered. His corpse was dragged through the streets. The mob then went on a rampage, chasing and assaulting other African Americans. The riot ended only when troops were sent in to restore law and order.

DEINDIVIDUATION

When people act as individuals, fear of consequences and self-evaluation tend to prevent them from engaging in antisocial behavior. But in a mob, they may experience

*How could we have
been so stupid?*

JOHN F. KENNEDY

An Angry Mob Is Contained by

Police French social thinker Gustave Le Bon branded mobs as irrational, like a “beast with many heads.” Police are taught that it’s useful to confront groups as early as possible and prevent them from becoming so highly aroused emotionally that they forget their values as individuals and focus on the emerging group norms.



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deindividuation, a state in which they are willing to follow a norm that emerges in a specific situation, even if it means ignoring their own values (Lan & Zuo, 2009; Postmes & Spears, 1998). Many factors lead to deindividuation. These include anonymity, diffusion of responsibility, arousal due to noise and crowding, and a focus on emerging group norms rather than on one’s own values (Postmes & Spears, 1998; S. L. Taylor et al., 2006). Under these circumstances, crowd members behave more aggressively than they would as individuals.

Police know that mob actions are best averted early by dispersing small groups that could gather into a crowd. On an individual level, perhaps we can resist deindividuation by instructing ourselves to stop and think whenever we begin to feel highly aroused in a group. If we dissociate ourselves from such groups when they are forming, we are more likely to remain critical and avoid behavior that we might later regret.

Altruism and the Bystander Effect: Some Watch While Others Die

Altruism—selfless concern for the welfare of others—is connected with some heroic and some very strange behavior throughout the animal kingdom (Zahavi, 2003). Humans have been known to sacrifice themselves to ensure the survival of their children or of comrades in battle. Nonhuman primates sometimes suicidally attack a leopard to give others the opportunity to escape.

These behaviors are heroic and apparently selfless, and among humans, self-sacrifice often earns status in the eyes of others (Willer, 2009). But consider the red spider’s strange ways (Begley & Check, 2000). After depositing its sperm into a female red spider, the male of the species will do a flip into her mouth and become her dinner! Clearly, the red spider does not make a decision to sacrifice itself. But evolutionary psychologists might argue that the self-sacrificing behavior of the male red spider is actually selfish from an evolutionary point of view. How, you might wonder, can individuals sacrifice themselves and at the same time be acting in their own self-interests? To answer the question, you should also know that female red spiders are promiscuous; they will mate with multiple suitors. However, eating a “lover” slows them down, increasing the probability that *his* sperm will fertilize her eggs and that *his* genes will survive and be transmitted to the next generation. We could thus say that the male red spider is altruistic in that he puts the welfare of future generations ahead of his own. Fatherhood ain’t easy.

Deindividuation The process by which group members may discontinue self-evaluation and adopt group norms and attitudes.

Altruism Unselfish concern for the welfare of others.

Red spiders, of course, do not think—at least, not in any humanly understandable sense of the concept of thinking. But people do. So how, one might ask, could the murder of 28-year-old Kitty Genovese have happened? It took place in New York City more than a generation ago. **Truth or Fiction Revisited:** Some 40 people stood by and did nothing while she was being stabbed to death. Murder was not unheard of in the Big Apple, but Kitty had screamed for help as her killer stalked her for more than half an hour and stabbed her in three separate attacks (Manning et al., 2007). At least 38 neighbors heard the commotion. Twice the assault was interrupted by their voices and bedroom lights. Each time, the attacker returned. Yet nobody came to the victim's aid. No one even called the police. Why? Some witnesses said matter-of-factly that they did not want to get involved. One said that he was tired. Still others said “I don't know.” As a nation, are we a callous bunch who would rather watch than help when others are in trouble?

THE BYSTANDER EFFECT

Question 19: Why do people sometimes sacrifice themselves for others and, at other times, ignore people who are in trouble? Why did 38 bystanders allow Kitty Genovese to die? Why did they—and Kitty!—fell prey to the **bystander effect**. That is, nobody came to Kitty's aid because they saw that other people were present or, because the murder took place in crowded New York City, they assumed that other people were also available to help.

WHEN DO WE DECIDE TO COME TO THE AID OF SOMEONE WHO IS IN TROUBLE?

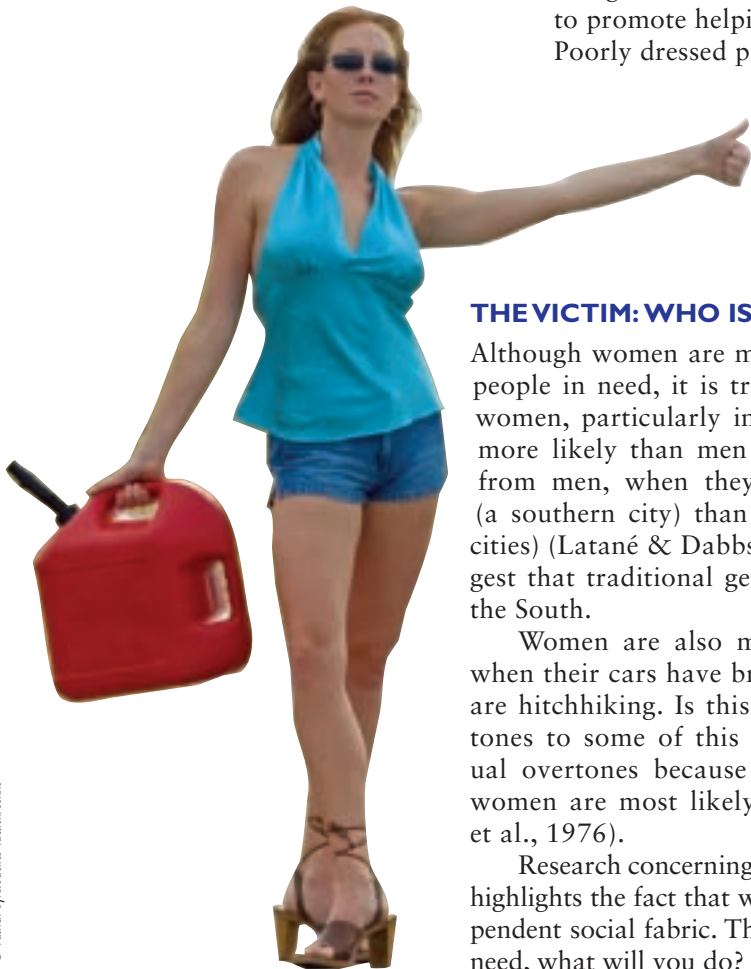
It turns out that many factors are involved in helping behavior. The following are among them:

1. Observers are more likely to help when they are in a good mood (Schnall et al., 2010). Perhaps good moods impart a sense of personal power—the feeling that we can handle the situation (Cunningham et al., 1990; Dulin & Hill, 2003).
2. People who are empathic are more likely to help people in need (Batson & Ahmad, 2009). Empathic people feel the distress of others, feel concern for them, and can imagine what it must be like to be in need. Women are more likely than men to be empathic and thus more likely to help people in need (Yamasue et al., 2008).
3. Bystanders may not help unless they believe that an emergency exists (Cocking et al., 2009). Perhaps some people who heard Kitty Genovese's calls for help were not certain about what was happening. (But remember that others admitted they did not want to get involved.)
4. Observers must assume the responsibility to act (Piliavin, 2009). It may seem logical that a group of people would be more likely to have come to the aid of Kitty Genovese than a lone person. After all, a group could more effectively have overpowered her attacker. Yet research by Darley and Latané (1968) suggests that a lone person may have been more likely to try to help her. In their classic experiment, male participants were performing meaningless tasks in cubicles when they heard a (convincing) recording of a person apparently having an epileptic seizure. When the men thought four other persons were immediately available, only 31% tried to help the victim. When they thought no one else was available, however, 85% of them tried to help. As in other areas of group behavior, it seems that *diffusion of responsibility* inhibits helping behavior in groups or crowds. When we are in a group, we are often willing to let George (or Georgette) do it. When George isn't around, we are more willing to help others ourselves. (Perhaps some who heard Kitty Genovese thought, “Why should I get involved? Other people can hear her, too.”)

Bystander effect The tendency to avoid helping other people in emergencies when other people are also present and apparently capable of helping.

So, Which One Would You Give a

Ride? Social psychologists note that we are more willing to help people who are similar to ourselves. On the other hand, women are more likely to be helped than men. Is it because women appear to pose less of a threat or to be more in need? Is it chivalry? Or is something else at work?



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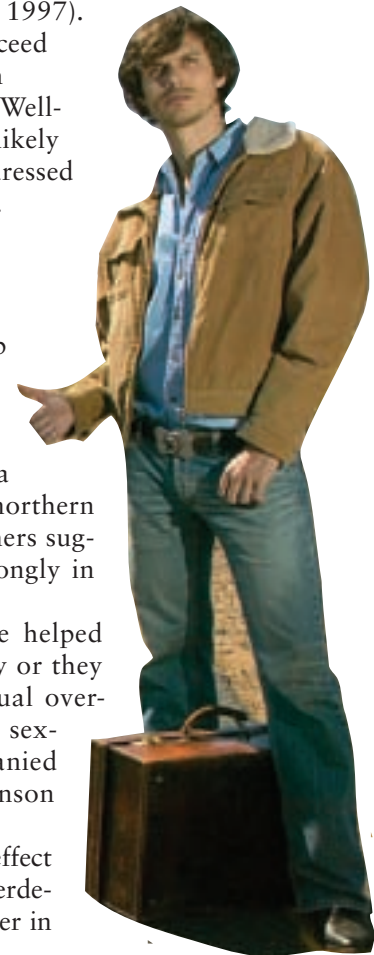
5. Observers must know what to do (Baron et al., 2009). We hear of cases in which people impulsively jump into the water to save a drowning child and then drown themselves. Most of the time, however, people do not try to help unless they know what to do. For example, nurses are more likely than people without medical training to try to help accident victims (Cramer et al., 1988). Observers who are not sure they can take charge of the situation may stay on the sidelines for fear of making a social blunder and being ridiculed. Or they may fear getting hurt themselves. (Perhaps some who heard Kitty Genovese thought, “If I try to intervene, I may get killed or make an idiot of myself.”)
6. Observers are more likely to help people they know (Rutkowski et al., 1983). Aren’t we also more likely to give to charity when asked directly by a coworker or supervisor in the socially exposed situation of the office compared with a form letter received in the privacy of our own homes? Evolutionary psychologists suggest that altruism is a natural aspect of human nature—even if not in the same way as in the case of the red spider! For example, self-sacrifice sometimes helps close relatives (such as our children) or others who are similar to us survive. Self-sacrifice is therefore “selfish” from a genetic or evolutionary point of view (Bruene & Ribbert, 2002; Waring, 2010). It helps us perpetuate a genetic code similar to our own. This view suggests that we are more likely to be altruistic with our relatives rather than strangers, however. The Kitty Genoveses of the world may remain out of luck unless they are surrounded by kinfolk or friends.
7. Observers are more likely to help people who are similar to themselves. Being able to identify with the person in need appears to promote helping behavior (Cialdini et al., 1997). Poorly dressed people are more likely to succeed in requests for a dime with poorly dressed strangers. Well-dressed people are more likely to get money from well-dressed strangers (Hensley, 1981).

THE VICTIM: WHO IS HELPED?

Although women are more likely than men to help people in need, it is traditional for men to help women, particularly in the South. Women were more likely than men to receive help, especially from men, when they dropped coins in Atlanta (a southern city) than in Seattle or Columbus (northern cities) (Latané & Dabbs, 1975). Why? The researchers suggest that traditional gender roles persist more strongly in the South.

Women are also more likely than men to be helped when their cars have broken down on the highway or they are hitchhiking. Is this gallantry or are there sexual overtones to some of this “altruism”? There may be sexual overtones because attractive and unaccompanied women are most likely to be helped by men (Benson et al., 1976).

Research concerning altruism and the bystander effect highlights the fact that we are members of a vast, interdependent social fabric. The next time you see a stranger in need, what will you do? Are you sure?



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As you complete this text, I hope that you will have decided to allow psychology to become a key part of your education. A professor of mine once remarked that the true measure of the success of a course is whether the student decides to take additional courses in the field. The choice is yours. *Enjoy.*

LearningConnections • GROUP BEHAVIOR: IS A CAMEL A HORSE MADE BY A COMMITTEE?

ACTIVE REVIEW (20) Social _____ refers to the enhancement of performance that results from the presence of others. (21) Social-_____ schemes seem to govern group decision making: the majority-wins scheme, the truth-wins scheme, the two-thirds majority scheme, and the first-shift rule. (22) Groups are (more or less?) likely than individuals to take extreme positions. (23) That is, people in a group are likely to experience a _____ shift. (24) Groupthink is usually (realistic or unrealistic?). (25) Members of a group may experience _____, which is a state of reduced self-awareness and lowered concern for social evaluation. (26) Self-sacrifice to help others is known as _____. (27) Kitty Genovese's death has been attributed to the _____ effect.

REFLECT AND RELATE Families, classes, religious groups, political parties, nations, circles of friends, bowling teams, sailing clubs, conversation groups, therapy groups—how many groups do you belong to? How does belonging to these groups influence your behavior? Do these groups sometimes push or pull you in different directions?

CRITICAL THINKING According to evolutionary theory, self-sacrifice can be “selfish.” How does the theory explain this view? Do you agree or disagree? Explain.



Go to Psychology CourseMate at www.cengagebrain.com for an interactive version of these questions.

Life Connections COMBATING PREJUDICE

Prejudice has been with us throughout history, and it is unlikely that a miracle cure is at hand. Yet we need not stand idly by when we witness prejudice. We can create millions of mini-miracles—changes in those of us who wish to end prejudice. Here are some things we can do to combat prejudice:

1. *Encourage intergroup contact and cooperation.* Prejudice encourages us to avoid other groups, which is unfortunate because intergroup contact is one way of breaking down prejudices (Baron et al., 2009). Intergroup contact heightens awareness of individual variation, and this knowledge can lead us to abandon stereotypical thinking. Intergroup contact is especially effective when people are striving to meet common goals, such as playing on the same team or working together on a yearbook.
2. *Present examples of admired individuals within groups that are often stigmatized.* Nilanjana Dasgupta and Anthony G. Greenwald (2001) found that they could modify negative attitudes toward African Americans by presenting photographs of admired African American individuals. Verbal reminders should work as well.
3. *Attack discriminatory behavior.* It is sometimes easier to change people's behavior than to alter their feelings. Yet cognitive-dissonance theory suggests that when we change people's behavior, their feelings may follow along (Guadagno & Cialdini, 2010; Heitland & Bohner, 2010). It is illegal to deny access to education, jobs, and housing on the basis of gender, religion, race, or disability. Seek legal remedies if you have been discriminated against.
4. *Hold discussion forums.* Many campuses conduct workshops and

discussion groups on gender, race, and diversity. Talk to your dean of students about holding such workshops.

5. *Examine your own beliefs.* Prejudice isn't "out there." It dwells within us. It is easy to focus on the prejudices of others, but what about our own? Have you examined your own attitudes and rejected stereotyping and prejudice?

Even if we do not personally harbor feelings of racial or religious enmity,

are we doing anything to counter such feelings in others? Do we confront people who make prejudiced remarks? Do we belong to organizations that deny access to members of other racial and religious groups? Do we strike up conversations with people from other groups or avoid them? College is meant to be a broadening experience, and we deny ourselves much of the education we could be receiving when we limit our encounters to people who share our own backgrounds.



Intergroup Contact Intergroup contact can reduce feelings of prejudice when people work together toward common goals.

Attitudes: “The Good, the Bad, and the Ugly”

1. What is social psychology?

Social psychology is the field of psychology that studies the nature and causes of behavior and mental processes in social situations.

2. What are attitudes?

Attitudes are behavioral and cognitive tendencies expressed by evaluating particular people, places, or things with favor or disfavor.

3. Do people do as they think?

When we are free to act as we wish, our behavior is often consistent with our beliefs and feelings. But as indicated by the term *A–B problem*, the links between attitudes (A) and behaviors (B) are often weak to moderate. The following strengthen the A–B connection: specificity of attitudes, strength of attitudes, whether people have a vested interest in the outcome of their behavior, and the accessibility of the attitudes.

4. Where do attitudes come from?

Attitudes can be learned means of conditioning or observation. However, people also appraise and evaluate situations and often form their own judgments.

5. Can you really change people?—their attitudes and behavior, that is?

According to the elaboration likelihood model, persuasion occurs through both central and peripheral routes. Change occurs through the central route by means of consideration of arguments and evidence. Peripheral routes involve associating the objects of attitudes with positive or negative cues, such as attractive or unattractive communicators. Repeated messages generally “sell” better than messages delivered only once. People tend to show greater response to fear appeals than to purely factual presentations. Persuasive communicators tend to show expertise, trustworthiness, attractiveness, or similarity to the audience. The context of the message and the audience receiving it also affect whether people will be persuaded by it.

6. What is cognitive-dissonance theory?

Cognitive-dissonance theory hypothesizes that people are discomforted by situations in which their attitudes and behavior are inconsistent. Such situations induce cognitive dissonance, which people can reduce by changing their attitudes. People engage in effort justification; for example, they tend to justify boring or fruitless behavior to themselves by concluding that their efforts are worthwhile, even when they go unrewarded.

Prejudice: A Particularly Troublesome Attitude

7. What are prejudice and discrimination?

Prejudice is an attitude toward a group that leads people to evaluate members of that group negatively—even

though they have never met them. Discrimination is behavior that is hostile toward groups toward whom one is prejudiced.

8. What are the sources of prejudice?

The sources of prejudice include dissimilarity to groups against whom one is prejudiced, social conflict, social learning, information processing (prejudices act like cognitive filters through which we view the world), and social categorization (the tendency to divide the social world into us and them).

Social Perception: Looking Out, Looking Within

9. What are the primacy and recency effects?

First impressions can last because we tend to label or describe people in terms of the behavior we see initially (the primacy effect). The recency effect occurs when the freshest information is recalled and acted upon.

10. What is attribution theory?

Attribution theory involves the inference of the motives and traits of others through observation of their behavior. Dispositional attributions attribute people’s behavior to internal factors such as their personality traits and decisions. Situational attributions attribute people’s behavior to external forces such as their circumstances. The actor–observer effect suggests we attribute other people’s behavior to internal, dispositional factors but our own behavior to external, situational factors. The fundamental attribution error is the tendency to attribute too much of other people’s behavior to dispositional factors. The self-serving bias is the tendency to attribute our successes to internal, stable factors and our failures to external, unstable factors. The attribution of behavior to internal or external causes is influenced by consensus, consistency, and distinctiveness.

11. What is body language?

Body language refers to the information about people’s thoughts and feelings that is provided by postures and gestures. For example, people who feel positively toward one another position themselves closer together and are more likely to touch. Touching results in a negative reaction when it suggests more intimacy than is desired. Gazing into another’s eyes can be a sign of love, but a hard stare is an aversive challenge.

Social Influence: Are You an Individual or One of the Crowd?

12. Why will so many people commit crimes against humanity if they are ordered to do so?

The majority of participants in the Milgram studies complied with the demands of authority figures, even when the demands required that they hurt innocent people by means

of electric shock. Factors contributing to obedience include socialization, lack of social comparison, perception of legitimate authority figures, the foot-in-the-door technique, inaccessibility of values, and buffers between the perpetrator and the victim.

13. Why do so many people tend to follow the crowd?

Asch's research in which participants judged the lengths of lines suggests that the majority of people will follow the crowd, even when the crowd is wrong. Personal factors such as desire to be liked by group members, low self-esteem, lack of familiarity with the task, and social shyness contribute to conformity. Belonging to a collectivist society and being in a larger group also contribute to conformity.

Group Behavior: Is a Camel a Horse Made by a Committee?

14. Do we run faster when we are in a group?

The quick answer is yes. The concept of social facilitation refers to the effects on performance that result from the presence of other people, perhaps because of increased arousal and evaluation apprehension. However, when we are anonymous group members, we may experience diffusion of responsibility and task performance may fall off. This phenomenon is termed *social loafing*.

15. How do groups make decisions?

Social psychologists have identified several decision-making schemes, including the majority-wins scheme, the truth-wins scheme, the two-thirds majority scheme, and the first-shift rule.

16. Are group decisions riskier or more conservative than those of individual group members?

Group decisions tend to be more polarized and riskier than individual decisions, largely because groups diffuse responsibility.

17. What is groupthink?

Groupthink is an unrealistic kind of decision making that is fueled by the perception of external threats to the group or to those whom the group wishes to protect. It is facilitated by a dynamic group leader, feelings of invulnerability, the group's belief in its rightness, discrediting information that contradicts the group's decision, conformity, and stereotyping members of the out-group.

18. Why do mild-mannered people commit mayhem when they are part of a mob?

Highly emotional crowds may induce attitude-discrepant behavior through the process of *deindividuation*, which is a state of reduced self-awareness and lowered concern for social evaluation. The high emotions are connected with arousal that makes it more difficult to access one's own values.

19. Why do people sometimes sacrifice themselves for others and, at other times, ignore people who are in trouble?

A number of factors contribute to altruism (the tendency to help others). Among them are empathy, being in a good mood, feelings of responsibility, knowledge of how to help, and acquaintance with—and similarity to—the person in need of help. According to the bystander effect, we are less likely to aid people in distress when other people are present.

KEY TERMS

A–B problem (p. 617)	Discrimination (p. 624)	Recency effect (p. 627)
Actor–observer effect (p. 629)	Dispositional attribution (p. 627)	Risky shift (p. 641)
Altruism (p. 644)	Effort justification (p. 622)	Selective avoidance (p. 620)
Attitude (p. 616)	Elaboration likelihood model (p. 619)	Selective exposure (p. 620)
Attitude-discrepant behavior (p. 622)	Evaluation apprehension (p. 640)	Self-serving bias (p. 629)
Attribution (p. 627)	Fear appeal (p. 620)	Situational attribution (p. 627)
Attribution process (p. 627)	Foot-in-the-door technique (p. 622)	Social decision schemes (p. 640)
Bystander effect (p. 645)	Fundamental attribution error (p. 627)	Social facilitation (p. 640)
Central route (p. 619)	Groupthink (p. 642)	Social influence (p. 632)
Cognitive-dissonance theory (p. 622)	Peripheral route (p. 619)	Social loafing (p. 640)
Conform (p. 637)	Polarization (p. 641)	Social norms (p. 637)
Consensus (p. 630)	Prejudice (p. 623)	Social perception (p. 626)
Deindividuation (p. 644)	Primacy effect (p. 626)	Social psychology (p. 616)
Diffusion of responsibility (p. 640)		Stereotype (p. 617)

ACTIVE LEARNING RESOURCES



CourseMate www.cengagebrain.com
To access additional course materials, including CourseMate, please visit www.cengagebrain.com. At the CengageBrain.com home page, search for the ISBN for your title (from the back cover of your book) using the search box at the top of the page. This will take you to the product page where these resources can be found.



CENGAGENOW www.cengagebrain.com
Need help studying? This site is your one-stop study shop. Take a Pre-Test and CengageNOW will generate a Personalized Study Plan based on your test results. The Study Plan will identify the topics you need to review and direct you to online resources to help you master those topics. You can then take a Post-Test to determine the concepts you have mastered and what you still need to work on.

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Answer Keys to Self-Assessments and Active Reviews

Answer Keys to Self-Assessments

Scoring Key for the “Social-Desirability Scale” (Chapter 2, p. 36)

Place a check mark on the appropriate line of the scoring key each time your answer agrees with the one listed. Add the check marks and record the total number of check marks below.

- | | | | |
|------------|-------------|-------------|-------------|
| 1. T _____ | 10. F _____ | 19. F _____ | 28. F _____ |
| 2. T _____ | 11. F _____ | 20. T _____ | 29. T _____ |
| 3. F _____ | 12. F _____ | 21. T _____ | 30. F _____ |
| 4. T _____ | 13. T _____ | 22. F _____ | 31. T _____ |
| 5. F _____ | 14. F _____ | 23. F _____ | 32. F _____ |
| 6. F _____ | 15. F _____ | 24. T _____ | 33. T _____ |
| 7. T _____ | 16. T _____ | 25. T _____ | |
| 8. T _____ | 17. T _____ | 26. T _____ | |
| 9. F _____ | 18. T _____ | 27. T _____ | |

Interpreting Your Score

Low Scorers (0–8). About one respondent in six earns a score between 0 and 8. Such respondents answered in a socially *undesirable* direction much of the time. Perhaps they are more willing than most people to respond to tests truthfully, even when their answers might meet with social disapproval.

Average Scorers (9–19). About two respondents in three earn a score from 9 through 19. They tend to show an average degree of concern for the social desirability of their responses,

and possibly, their general behavior represents an average degree of conformity to social rules and conventions.

High Scorers (20–33). About one respondent in six earns a score between 20 and 33. These respondents may be highly concerned about social approval and respond to test items in such a way as to avoid the disapproval of people who may read their responses. Their general behavior may show high conformity to social rules and conventions.

Scoring Key for “Do You Have a Problem with Alcohol?” (Chapter 5, p. 172)

As noted in Chapter 5, just one “yes” answer suggests a possible alcohol problem. Two or more “yeses” make it highly likely that a problem exists. In either case, it is advisable to discuss your answers with your doctor or another health-care provider.

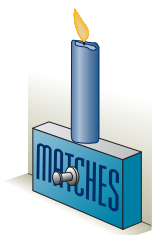
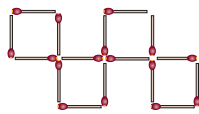
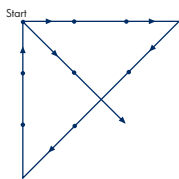
Scoring Key for “Sleep Quiz: Are You Getting Your Z’s?” (Chapter 5, p. 182)

Psychologist James Maas, the author of *Power Sleep* (HarperCollins, 1999), writes that an answer of “true” to two or more of the statements in the questionnaire may be a sign of a sleep problem.

Scoring Key for “Five Challenges to Your Memory” (Chapter 7, p. 224)

Answers to these challenges are discussed through Chapter 7.

Answer Key for Puzzles, Problems, and Just Plain Fun (Chapter 8, p. 267) and to the Duncker Candle Problem



Scoring Key for the “Remote Associates Test” (Chapter 8, p. 287)

- | | | |
|------------|------------|-----------|
| 1. Dog | 4. Club | 7. Black |
| 2. Cold | 5. Boat | 8. Pit |
| 3. Glasses | 6. Defense | 9. Writer |

Scoring Key for the “Sensation-Seeking Scale” (Chapter 9, p. 309)

Because this is a shortened version of a questionnaire, no norms are available. However, answers in agreement with the following key point in the direction of sensation-seeking:

- | | | |
|------|-------|-------|
| 1. A | 6. B | 11. A |
| 2. A | 7. A | 12. A |
| 3. A | 8. A | 13. B |
| 4. B | 9. B | |
| 5. A | 10. A | |

Scoring Key for the “Eating Disorders Quiz” (Chapter 9, p. 317)

The quiz addresses only some of the signs and symptoms of an eating disorder. If you answered “yes” to any of the questions, there is a possibility that you have an eating disorder, and you may want to seek assistance. If you answered “yes” to five or more items, you should seriously consider seeking professional advice.

Scoring Key for the “Expectancy for Success Scale” (Chapter 12, p. 439)

To calculate your total score for the “Expectancy for Success Scale,” first reverse the scores for the following items: 1, 2, 4, 6, 7, 8, 14, 15, 17, 18, 24, 27, and 28. That is, change a 1 to a 5; change a 2 to a 4; leave a 3 alone; change a 4 to a 2; and change a 5 to a 1. Then add the scores.

The range of total scores can vary from 30 to 150. The higher your score, the greater your expectancy for success in the future—and according to social-cognitive theory, the more motivated you will be to apply yourself in facing difficult challenges.

Fibell and Hale administered their test to undergraduates taking psychology courses and found that women’s scores ranged from 65 to 143 and men’s from 81 to 138. The average score for each gender was 112 (112.32 for women and 112.15 for men).

Scoring Key for “Do You Strive to Be All That You Can Be?” (Chapter 12, p. 442)

There are no numbers here. No comparison with anyone else. Just be honest with yourself and consider the meanings of your “yes” and “no” answers.

For problem 1c, note that each of the letters is the first letter of the numbers one through eight. Therefore, the two missing letters are NT, for nine and ten. The solutions to problems 2 and 3 and to the Duncker candle problem are shown in this illustration. To solve the Duncker candle problem, use the thumbtack to pin the matchbox to the wall. Then set the candle on top of the box. Functional fixedness prevents many people from conceptualizing the matchbox as anything more than a device to hold matches. Commonly given wrong answers include trying to affix the bottom of the candle to the wall with melted wax or trying to tack the candle to the wall.

And what of the coined stamped with the date 544 BCE? BCE stands for “before the common era,” that is, before the birth of Jesus. Prior to the birth of Jesus, people did not know He was going to be born.

Key for Sternberg’s “Triangular Love Scale” (Chapter 13, p. 481)

First add your scores for the items on each of the three components—intimacy, passion, and decision/commitment—and divide each total by 15. This procedure will yield an average rating for each subscale. An average rating of 5 on a particular subscale indicates a moderate level of the component represented by the subscale. A higher rating indicates a greater level. A lower rating indicates a lower level.

Examining your ratings on these components will give you an idea of the degree to which you perceive your love relationship to be characterized by these three components of love. For example, you might find that passion is stronger than decision/commitment, a pattern that is common in the early stages of an intense romantic relationship. You might find it interesting to complete the questionnaire a few months or perhaps a year or so from now to see how your feelings about your relationship change over time. You might also ask your partner to complete the scale so that the two of you can compare your respective scores. Comparing your ratings for each component with those of your partner will give you an idea of the degree to which you and your partner see your relationship in a similar way.

Answer Key for “Cultural Myths That Create a Climate That Supports Rape” Questionnaire (Chapter 13, p. 490)

Actually, each item, with the exception of number 2, represents a cultural myth that supports rape. These myths tend to view sex as an adversarial game, stereotype women as flirtatious and deceitful, and blame the victim.

Answer Key for the “Are You Type A or Type B?” Questionnaire (Chapter 14, p. 509)

Type A people are ambitious, hard driving, and chronically discontented with their current achievements. Type B’s, by contrast, are more relaxed and more involved with the quality of life.

“Yeses” suggest the Type A behavior pattern, which is marked by a sense of time urgency and constant struggle. In

appraising your “type,” you need not be overly concerned with the precise number of “yes” answers; we have no normative data for you. But as Friedman and Rosenman (1974, p. 85) note, you should have little trouble spotting yourself as “hard core” or “moderately afflicted”—that is, if you are honest with yourself.

Answer Key for the “Locus of Control Scale” (Chapter 14, p. 512)

Place a check mark in the blank space in the following scoring key each time your answer agrees with the answer in the key. The number of check marks is your total score.

Scoring Key

- | | | | |
|-------------|-------------|-------------|-------------|
| 1. Yes ___ | 11. Yes ___ | 21. Yes ___ | 31. Yes ___ |
| 2. No ___ | 12. Yes ___ | 22. No ___ | 32. No ___ |
| 3. Yes ___ | 13. No ___ | 23. Yes ___ | 33. Yes ___ |
| 4. No ___ | 14. Yes ___ | 24. Yes ___ | 34. No ___ |
| 5. Yes ___ | 15. No ___ | 25. No ___ | 35. Yes ___ |
| 6. No ___ | 16. Yes ___ | 26. No ___ | 36. Yes ___ |
| 7. Yes ___ | 17. Yes ___ | 27. Yes ___ | 37. Yes ___ |
| 8. Yes ___ | 18. Yes ___ | 28. No ___ | 38. No ___ |
| 9. No ___ | 19. Yes ___ | 29. Yes ___ | 39. Yes ___ |
| 10. Yes ___ | 20. No ___ | 30. No ___ | 40. No ___ |

TOTAL SCORE _____

Interpreting Your Score

Low Scorers (0–8). About one respondent in three earns a score from 0 to 8. Such respondents tend to have an internal locus of control. They see themselves as responsible for the reinforcements they attain (and fail to attain) in life.

Average Scorers (9–16). Most respondents earn from 9 to 16 points. Average scorers may see themselves as partially in control of their lives. Perhaps they see themselves as in control at work but not in their social lives—or vice versa.

High Scorers (17–40). About 15 percent of respondents attain scores of 17 or above. High scorers tend largely to see life as a game of chance and view success as a matter of luck or the generosity of others.

Scoring Key for “Are You Depressed?” (Chapter 15, p. 550)

Rating your responses: If you agree with at least five of the statements, including either item 1 or 2, and if you have had these complaints for at least 2 weeks, professional help is strongly recommended. If you answered “yes” to statement 3, seek consultation with a professional immediately. If you don’t know whom to turn to, contact your col-

lege counseling center, neighborhood mental health center, or health provider.

Scoring Key for the “Assertiveness Schedule” (Chapter 16, p. 609)

Tabulate your score as follows: For those items followed by an asterisk (*), change the signs (plus to minus; minus to plus). For example, if the response to an asterisked item was 2, place a minus sign (–) before the 2. If the response to an asterisked item was –3, change the minus sign to a plus sign (+) by adding a vertical stroke. Then add up the scores of the 30 items.

Scores on the assertiveness schedule can vary from +90 to –90. Table A.1 will show you how your score compares to those of 764 college women and 637 men from 35 campuses across the United States. For example, if you are a woman and your score was 26, it exceeded that of 80% of the women in the sample. A score of 15 for a male exceeds that of 55% to 60% of the men in the sample.

Table A.1 ■ Percentiles for Scores on The Assertiveness Schedule

Women’s Scores	Percentile	Men’s Scores
55	99	65
48	97	54
45	95	48
37	90	40
31	85	33
26	80	30
23	75	26
19	70	24
17	65	19
14	60	17
11	55	15
8	50	11
6	45	8
2	40	6
–1	35	3
–4	30	1
–8	25	–3
–13	20	–7
–17	15	–11
–24	10	–15
–34	5	–24
–39	3	–30
–48	1	–41

Source: Nevid, J. S., & Rathus, S. A. (1978). Multivariate and normative data pertaining to the RAS with the college population. *Behavior Therapy*, 9, 675.

Answer Keys to Active Reviews

Chapter 1 What Is Psychology?

- | | | | |
|------------------|-------------------|--------------------|-----------------------------|
| 1. Behavior | 9. Educational | 17. Functionalism | 25. Social |
| 2. Predict | 10. Developmental | 18. John B. Watson | 26. Sociocultural |
| 3. Theories | 11. Social | 19. Gestalt | 27. Mary Whiton Calkins |
| 4. Pure | 12. Experimental | 20. Sigmund Freud | 28. Christine Ladd-Franklin |
| 5. Applied | 13. Industrial | 21. Evolutionary | 29. Clark |
| 6. Psychotherapy | 14. Aristotle | 22. Biologically | |
| 7. Counseling | 15. Socrates | 23. Cognitive | |
| 8. School | 16. Wilhelm Wundt | 24. Existential | |

Chapter 2 Sorting Truth and Fiction in Psychology

- | | | | |
|-----------------|------------------|-------------------------|--------------------------------|
| 1. Skepticism | 9. Correlational | 17. Mean | 25. Ethical |
| 2. Conclusions | 10. Cause | 18. Median | 26. Informed |
| 3. Hypothesis | 11. Experiment | 19. Mode | 27. Debriefed |
| 4. Populations | 12. Independent | 20. Lowest | 28. Animals (nonhuman animals) |
| 5. Random | 13. Control | 21. Normal, bell-shaped | |
| 6. Case | 14. Blind | 22. Inferential | |
| 7. Survey | 15. Descriptive | 23. 20 | |
| 8. Naturalistic | 16. Variability | 24. Standard | |

Chapter 3 Biology and Psychology

- | | | | |
|----------------------------|----------------------------|---------------------------|------------------|
| 1. Selection | 10. Down | 19. Schizophrenia | 28. Left |
| 2. Survival | 11. Identical, monozygotic | 20. Serotonin | 29. More |
| 3. Random | 12. Neurotransmitters | 21. Autonomic | 30. Epilepsy |
| 4. Fitted, adapted, suited | 13. Axon | 22. Electroencephalograph | 31. Hypothalamus |
| 5. Evolutionary | 14. Myelin | 23. Resonance | 32. Prolactin |
| 6. Instincts | 15. Efferent | 24. Cerebellum | 33. Thyroxin |
| 7. Behavioral | 16. Firing | 25. Hypothalamus | 34. Medulla |
| 8. Genes | 17. Synapse | 26. Callosum | |
| 9. Chromosomes | 18. Hippocampus | 27. Frontal, prefrontal | |

Chapter 4 Sensation and Perception

- | | | | |
|--------------------|------------------|--------------------|-----------------------------|
| 1. Sensation | 11. Rods, cones | 21. Pitch | 31. Two-point |
| 2. Perception | 12. Optic | 22. Decibels | 32. More |
| 3. Absolute | 13. Color | 23. Anvil | 33. Position |
| 4. Difference | 14. Whole | 24. Basilar | 34. Muscles |
| 5. Signal | 15. Figure | 25. Organ of Corti | 35. Upright |
| 6. Electromagnetic | 16. Top-down | 26. Auditory | 36. Semicircular canals |
| 7. Wavelength | 17. Retina | 27. Odor | 37. Extrasensory perception |
| 8. Cornea | 18. Stroboscopic | 28. Olfactory | 38. Telepathy |
| 9. Iris | 19. Compress | 29. Bitter | 39. File-drawer |
| 10. Lens | 20. 20,000 | 30. Taste | |

Chapter 5 Consciousness

- | | | | |
|----------------|------------------|--------------------|--------------------|
| 1. Behavior | 8. Activation | 15. Heart | 22. Cocaine |
| 2. Awareness | 9. Deep | 16. Abuse | 23. Nicotine |
| 3. Freud | 10. Magnetism | 17. Abstinence | 24. Hallucinogenic |
| 4. Brain | 11. Hypermnnesia | 18. More | 25. Marijuana |
| 5. Paradoxical | 12. Response | 19. Pain | |
| 6. Five | 13. Mantra | 20. Blood pressure | |
| 7. REM | 14. Blood | 21. Attention | |

Chapter 6 Learning

- | | | | |
|--------------------|-------------------------|---|------------------|
| 1. Behavior | 11. Higher | 21. Negative | 30. Biofeedback |
| 2. Represent | 12. Albert | 22. Primary | 31. Modification |
| 3. Stimulus | 13. Counterconditioning | 23. Secondary, learned, conditioned, acquired | 32. Programmed |
| 4. Unconditioned | 14. Flooding | 24. Extinction | 33. Cognitive |
| 5. Conditioned | 15. Desensitization | 25. Punishments | 34. Latent |
| 6. Only one | 16. Bell, buzzer | 26. Discriminative | 35. Is not |
| 7. Extinguish | 17. Effect | 27. Fixed-interval | 36. Mirror |
| 8. Spontaneous | 18. Rewards | 28. Variable-ratio | 37. Contingency |
| 9. Generalization | 19. Reinforcement | 29. Successive | |
| 10. Discrimination | 20. Positive | | |

Chapter 7 Memory: Remembrance of Things Past—and Future

- | | | | |
|-----------------------------------|------------------|-----------------|---------------|
| 1. Explicit | 8. Icons | 16. Nonsense | 24. Serotonin |
| 2. Episodic, autobiographical | 9. Eidetic | 17. Sharply | 25. New |
| 3. Semantic | 10. Serial | 18. Retroactive | 26. Thalamus |
| 4. Encoding | 11. Interference | 19. Proactive | |
| 5. Maintenance | 12. Reconstruct | 20. Hippocampus | |
| 6. Elaborative | 13. Flashbulb | 21. Anterograde | |
| 7. Sensory, short-term, long-term | 14. Tip | 22. Retrograde | |
| | 15. Context | 23. Synapses | |

Chapter 8 Thinking, Language, and Intelligence

- | | | | |
|--------------|-----------------------|------------------------|---------------------------|
| 1. Concepts | 8. Insight | 15. Overregularization | 22. Creativity |
| 2. Prototype | 9. Representativeness | 16. Psycholinguistic | 23. Divergent |
| 3. Exemplars | 10. Have | 17. Acquisition | 24. Intelligence quotient |
| 4. Algorithm | 11. Grammar | 18. Grammar | 25. Wechsler |
| 5. Heuristic | 12. Linguistic | 19. g | 26. 50 |
| 6. Analogy | 13. In all languages | 20. Multiple | 27. 40% to 60% |
| 7. Mental | 14. Holophrases | 21. Practical | |

Chapter 9 Motivation and Emotion

- | | | | |
|------------------------------|--------------------------------|--|---------------|
| 1. Motives | 10. Blood | 18. Testosterone | 26. Universal |
| 2. Deprivation | 11. Eating | 19. Appraise, interpret | 27. Do |
| 3. Incentive | 12. Anorexia | 20. Deindividuation, diffusion of responsibility | 28. Action |
| 4. Evolutionary, ethological | 13. European, White, Caucasian | 21. High | 29. Cognitive |
| 5. Homeostasis | 14. Bulimia | 22. Apperception | 30. Pressure |
| 6. Deprivation | 15. Child, sexual | 23. Performance | |
| 7. Self-actualization | 16. Do | 24. Learning | |
| 8. Stomach | 17. Hypothalamus | 25. Emotion | |
| 9. Ventromedial | | | |

Chapter 10 The Voyage Through the Life Span: Childhood

- | | | | |
|--------------------|-----------------------------|------------------|------------------------------------|
| 1. Longitudinal | 10. Fetal | 19. 12 | 28. Psychosocial |
| 2. Cross-sectional | 11. Oxygen | 20. Synapses | 29. Initial-attachment |
| 3. Cohort | 12. Slow | 21. Invariant | 30. Contact |
| 4. Ovulation | 13. Reflexes | 22. Complex | 31. Instinct, fixed action pattern |
| 5. Zygote | 14. Nearsighted | 23. Assimilation | 32. Authoritative |
| 6. Uterus | 15. Smiles, licking motions | 24. Sensorimotor | |
| 7. Embryonic | 16. 16 | 25. Concrete | |
| 8. Placenta | 17. Double, triple | 26. Zone | |
| 9. Umbilical cord | 18. Myelination | 27. Three | |

Chapter 11 The Voyage Through the Life Span: Adolescence and Adulthood

- | | | | |
|-----------------|----------------|------------------|--------------------|
| 1. Secondary | 9. 25 | 17. Crystallized | 25. Is not |
| 2. Testosterone | 10. Yes and no | 18. Fluid | 26. Integrity |
| 3. Formal | 11. Moratorium | 19. Generativity | 27. Compensate |
| 4. Imaginary | 12. Early | 20. Do not | 28. Denial |
| 5. Universal | 13. More | 21. Sandwich | 29. Terminally |
| 6. Stress | 14. Less | 22. Programmed | 30. Shock-numbness |
| 7. Diffusion | 15. Intimacy | 23. Wear | |
| 8. Affluent | 16. Higher | 24. Increases | |

Chapter 12 Personality: Theory and Measurement

- | | | | |
|-------------|----------------------------|--------------------|---------------|
| 1. Conflict | 9. Collective | 17. Competencies | 25. Highest |
| 2. Id | 10. Inferiority | 18. Are | 26. Behavior |
| 3. Ego | 11. Horney | 19. Actualization | 27. Objective |
| 4. Defense | 12. Traits | 20. Self | 28. True |
| 5. Superego | 13. Stability, instability | 21. Reference | 29. Ambiguous |
| 6. Anal | 14. Conscientiousness | 22. Sociocultural | 30. Rorschach |
| 7. Fixation | 15. Social | 23. Individualists | |
| 8. Other | 16. Situational | 24. Collectivists | |

Chapter 13 Gender and Sexuality

- | | | | |
|-----------------|-----------------------------|---------------------------|--|
| 1. Stereotypes | 10. Observational | 19. Pheromones | 27. Excitement, plateau,
orgasm, and resolution |
| 2. Gender | 11. Gender | 20. Is | 28. Liberal |
| 3. Different | 12. Esteem | 21. High | 29. Liberating |
| 4. Women | 13. Testosterone | 22. Attraction-similarity | 30. Arousal |
| 5. Girls | 14. Organizing, directional | 23. Reciprocity | 31. Erectile |
| 6. Boys | 15. Orientation | 24. Passion | 32. Performance |
| 7. Men | 16. Learning | 25. Romantic | 33. Acquaintances |
| 8. Evolutionary | 17. Do | 26. Myotonia | 34. Power |
| 9. Right | 18. Do | | |

Chapter 14 Stress, Health, and Coping

- | | | | |
|---------------------------|-------------------------------|-----------------------------|-----------------|
| 1. Hassles | 6. Commitment | 11. Befriend | 16. Migraine |
| 2. Adjustment, adaptation | 7. Decreases | 12. Adrenaline, epinephrine | 17. Cholesterol |
| 3. Conflict | 8. Alarm | 13. White | 18. More |
| 4. Ellis | 9. Fight-or-flight | 14. Immune | 19. Play |
| 5. Higher | 10. Corticosteroids, steroids | 15. Muscle-tension | |

Chapter 15 Psychological Disorders

- | | | | |
|--------------------|----------------|------------------|-----------------|
| 1. Possession | 8. Do | 15. Elation | 22. Catatonic |
| 2. Medical | 9. Amnesia | 16. Flight | 23. Does |
| 3. Perception | 10. Identity | 17. Helplessness | 24. Fewer |
| 4. Biopsychosocial | 11. Abuse | 18. Internal | 25. Dopamine |
| 5. Phobia | 12. Somatoform | 19. Do | 26. Personality |
| 6. Panic | 13. Conversion | 20. Serotonin | 27. Lower |
| 7. Compulsive | 14. Major | 21. Delusions | |

Chapter 16 Methods of Therapy

- | | | | |
|--------------------------|---|---------------------|--|
| 1. Psychological | 10. Directive | 18. Absolutist | 27. Major |
| 2. Decreased | 11. Learning | 19. Irrational | 28. Dopamine |
| 3. Unconscious | 12. Desensitization | 20. More | 29. Selective serotonin-
reuptake inhibitors
(SSRIs) |
| 4. Catharsis, abreaction | 13. Aversive | 21. Systems | 30. Serotonin |
| 5. Free | 14. Operant | 22. About as | 31. Depression |
| 6. Dreams | 15. Functional | 23. Meta | 32. Prefrontal |
| 7. Humanistic | 16. Consequences | 24. Is | |
| 8. Nondirective | 17. Cognitive, cognitive-
behavioral | 25. Interdependence | |
| 9. Unconditional | | 26. Minor | |

Chapter 17 Social Psychology

- | | | | |
|----------------|--------------------|------------------|---------------------|
| 1. Social | 8. Dissonance | 15. Positive | 22. More |
| 2. Attitude | 9. Cognitive | 16. Stare | 23. Risky |
| 3. Is | 10. Discrimination | 17. Do | 24. Unrealistic |
| 4. Cognitive | 11. Categorization | 18. Social | 25. Deindividuation |
| 5. Cognitive | 12. Perception | 19. 75 | 26. Altruism |
| 6. Elaboration | 13. Primacy | 20. Facilitation | 27. Bystander |
| 7. Foot | 14. Attribution | 21. Decision | |

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A

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Glossary

A

A–B problem The issue of how well we can predict behavior on the basis of attitudes.

Absolute threshold The minimal amount of energy that can produce a sensation.

Abstinence syndrome A characteristic cluster of symptoms that results from a sudden decrease in an addictive drug's level of usage.

Accommodation According to Piaget, the modification of schemas so that information inconsistent with existing schemas can be integrated or understood.

Acculturation The process of adaptation in which immigrants and native groups identify with a new, dominant culture by learning about that culture and making behavioral and attitudinal changes.

Acetylcholine (ACh) A neurotransmitter that controls muscle contractions.

Acoustic code Mental representation of information as a sequence of sounds.

Acquired drives Drives acquired through experience or that are learned.

Acrophobia Fear of high places.

Action potential The electrical impulse that provides the basis for the conduction of a neural impulse along an axon of a neuron.

Activating effect The arousal-producing effects of sex hormones that increase the likelihood of sexual behavior.

Activation–synthesis model The view that dreams reflect activation of cognitive activity by the reticular activating system and synthesis of this activity into a pattern.

Actor–observer effect The tendency to attribute our own behavior to situational factors but to attribute the behavior of others to dispositional factors.

Acute stress disorder A disorder, like PTSD, that is characterized by feelings of anxiety and helplessness and caused by a traumatic event. Acute stress disorder occurs within a month of the event and lasts from 2 days to 4 weeks.

Adolescence The period of life bounded by puberty and the assumption of adult responsibilities.

Adulthood The achievement of “grown-up” status as marked by factors such as being of “legal” age, psychological separation from one’s family of origin, and financial independence.

Affective shift hypothesis The view that men and women tend to experience different shifts in the emotions following initiation of sexual activity, such that women feel more love and commitment, and many men experience less love and commitment.

Afferent neurons Neurons that transmit messages from sensory receptors to the spinal cord and brain; also called *sensory neurons*.

Afterimage The lingering visual impression made by a stimulus that has been removed.

Age-30 transition Levinson’s term for the ages from 28 to 33, which are characterized by reassessment of the goals and values of the 20s.

Agoraphobia Fear of open, crowded places.

Alarm reaction The first stage of the GAS, which is triggered by the impact of a stressor and characterized by sympathetic activity.

Algorithm A systematic procedure for solving a problem that works invariably when it is correctly applied.

All-or-none principle The fact that a neuron fires an impulse of the same strength whenever its action potential is triggered.

Alpha-fetoprotein (AFP) assay A blood test that detects the presence of spina bifida and related abnormalities in the fetus.

Alpha waves Rapid low-amplitude brain waves that have been linked to feelings of relaxation.

Altruism Unselfish concern for the welfare of others.

Alzheimer’s disease A progressive form of mental deterioration characterized by loss of memory, language, problem solving, and other cognitive functions.

Ambiguous Having two or more possible meanings.

Amniocentesis A procedure for drawing off and examining fetal cells in the amniotic fluid to determine the presence of various disorders in the fetus.

Amniotic sac A sac within the uterus that contains the embryo or fetus.

Amphetamines Stimulants derived from *alpha-methyl-beta-phenyl-ethyl-amine*.

Amygdala A part of the limbic system that apparently facilitates stereotypical aggressive responses.

Anal stage The second stage of psychosexual development, when gratification is attained through anal activities.

Analytical psychology Jung’s psychodynamic theory, which emphasizes the collective unconscious and archetypes.

Anchoring and adjustment heuristic A decision-making heuristic in which a presumption or first estimate serves as a cognitive anchor. As we receive additional information, we make adjustments but tend to remain in the proximity of the anchor.

Androgens Male sex hormones.

Animism The belief that inanimate objects move because of will or spirit.

Anorexia nervosa A life-threatening eating disorder characterized by dramatic weight loss and a distorted body image.

Anterograde amnesia Failure to remember events that occurred after physical trauma because of the effects of the trauma.

Antibodies Substances formed by white blood cells that recognize and destroy antigens.

Antidepressant Acting to relieve depression.

Antidiuretic hormone (ADH) A pituitary hormone that conserves body fluids by increasing reabsorption of urine and is connected with paternal behavior in some mammals; also called *vasopressin*.

Antigen A substance that stimulates the body to mount an immune system response to it. (The contraction for *anti-body generator*.)

Antisocial personality disorder The diagnosis given a person who is in frequent conflict with society, yet who is undeterred by punishment and experiences little or no guilt and anxiety.

Anxiety disorders Disorders characterized by excessive worrying, fear of losing control, nervousness, and inability to relax.

Aphagic Characterized by undereating.

Aphasia A disruption in the ability to understand or produce language.

Applied research Research conducted in an effort to find solutions to particular problems.

Approach–approach conflict A type of conflict in which the goals that produce opposing motives are positive and within reach.

Approach–avoidance conflict A type of conflict in which the same goal produces approach and avoidance motives.

Aptitude A natural ability or talent.

Archetypes Basic, primitive images or concepts hypothesized by Jung to reside in the collective unconscious.

Artificialism The belief that natural objects have been created by human beings.

Assimilation According to Piaget, the inclusion of a new event into an existing schema.

Asylum An institution for the care of the mentally ill.

Attachment The enduring affectional tie that binds one person to another.

Attachment-in-the-making phase The second phase in forming bonds of attachment, characterized by preference for familiar figures.

Attention-deficit/hyperactivity disorder A disorder that begins in childhood and is characterized by a persistent pattern of lack of attention with or without hyperactivity and impulsive behavior.

Attitude An enduring mental representation of a person, place, or thing that typically evokes an emotional response and related behavior.

Attitude-discrepant behavior Behavior inconsistent with an attitude that may have the effect of modifying an attitude.

Attraction In social psychology, an attitude of liking or disliking (negative attraction).

Attraction-similarity hypothesis The view that people tend to choose persons similar to themselves in attractiveness and attitudes in the formation of interpersonal relationships.

Attribution A belief concerning why people behave in a certain way.

Attribution process The process by which people draw inferences about the motives and traits of others.

Attributional style The tendency to attribute one's behavior to internal or external factors, stable or unstable factors, and global or specific factors.

Auditory Having to do with hearing.

Auditory nerve The axon bundle that transmits neural impulses from the organ of Corti to the brain.

Authoritarian parents Parents who are rigid in their rules and who demand obedience for the sake of obedience.

Authoritative parents Parents who are strict and warm. Authoritative parents demand mature behavior but use reason rather than force in discipline.

Autokinetic effect The tendency to perceive a stationary point of light in a dark room as moving.

Autonomic nervous system (ANS) The division of the peripheral nervous system that regulates glands and activities such as heartbeat, respiration, digestion, and dilation of the pupils.

Autonomy versus shame and doubt Erikson's second stage, during which children seek to develop control over physical functions and achieve a sense of independence.

Availability heuristic A decision-making heuristic in which our estimates of frequency or probability of events are based on how easy it is to find examples.

Avatar In video games and virtual environments, a persona that a person uses to play or otherwise interact with the environment.

Average The central tendency of a group of measures, expressed either as the mean, median, or mode of a distribution.

Aversive conditioning A behavior-therapy technique in which undesired responses are inhibited by pairing repugnant or offensive stimuli with them.

Avoidance–avoidance conflict A type of conflict in which the goals are negative, but avoidance of one requires approaching the other.

Avoidant personality disorder A personality disorder in which the person is unwilling to enter relationships without assurance of acceptance because of fears of rejection and criticism.

Axon A long, thin part of a neuron that transmits impulses to other neurons, an organ, or muscle from branching structures called *terminal buttons*.

B

Barbiturate An addictive depressant used to relieve anxiety or pain and to treat epilepsy, high blood pressure, and insomnia.

Basilar membrane A membrane that lies coiled within the cochlea.

Behavior modification Therapy techniques based on principles of learning that teach adaptive behavior and extinguish or discourage maladaptive behavior.

Behavior-rating scale A systematic means for recording the frequency with which target behaviors occur.

Behavior therapy Systematic application of the principles of learning to the direct modification of a client's problem behaviors.

Behavioral genetics The area of biology and psychology that focuses on the transmission of traits that give rise to behavior.

Behaviorism The school of psychology that defines psychology as the study of observable behavior and studies relationships between stimuli and responses.

Bereavement The state of deprivation brought about by the death of a family member or close friend.

Bimodal Having two modes.

Binocular cues Stimuli suggestive of depth that involve simultaneous perception by both eyes.

Biofeedback training (BFT) The systematic feeding back to an organism information about a bodily function so that the organism can gain control of that function.

Biological perspective The approach to psychology that seeks to understand the nature of the links between biological processes and structures such as the functioning of the brain, the endocrine system, and heredity, on the one hand, and behavior and mental processes, on the other.

Biological preparedness Readiness to acquire a certain kind of conditioned response due to the biological makeup of the organism.

Biopsychosocial perspective The view that psychological disorders can be explained by a combination of (a) possible biological vulnerabilities; (b) psychological factors such as stress and self-defeating thoughts; and (c) sociocultural factors such as family relationships and cultural beliefs and expectations.

Bipolar cells Neurons that conduct neural impulses from rods and cones to ganglion cells.

Bipolar disorder A disorder in which the mood alternates between two extreme poles (elation and depression); also referred to as *manic–depression*.

Blind In experimental terminology, being unaware of whether one has received a treatment or not.

Blind spot The area of the retina where axons from ganglion cells meet to form the optic nerve.

Borderline personality disorder A personality disorder characterized by instability in relationships, self-image, mood, and lack of impulse control.

Bottom-up processing The organization of the parts of a pattern to recognize, or form an image of, the pattern they compose.

Brightness constancy The tendency to perceive an object as being just as bright even though lighting conditions change its intensity.

Broca's aphasia A language disorder characterized by slow, laborious speech.

Bulimia nervosa An eating disorder characterized by repeated cycles of binge eating and purging.

Bystander effect The tendency to avoid helping other people in emergencies when other people are also present and apparently capable of helping.

C

Cannon-Bard theory of emotion The view that emotions *accompany* bodily responses but are not caused by them.

Case study A carefully drawn biography that may be obtained through interviews, questionnaires, and psychological tests.

Cataract A condition characterized by clouding of the lens of the eye.

Catastrophize To interpret negative events as being disastrous; to “blow out of proportion.”

Catatonic schizophrenia A type of schizophrenia characterized by striking motor impairment.

Catharsis In psychoanalysis, the expression of repressed feelings and impulses to allow the release of the psychic energy associated with them.

Center According to Piaget, to focus one's attention.

Central nervous system The brain and spinal cord.

Central route In persuasive arguments, providing substantive information about the issues involved.

Cerebellum A part of the hindbrain involved in muscle coordination and balance.

Cerebral cortex The wrinkled surface area (gray matter) of the cerebrum.

Cerebrum The large mass of the forebrain, which consists of two hemispheres.

Chorionic villus sampling (CVS) A procedure for detecting disorders in the fetus based on the obtaining and examining of placental tissue.

Chromosome A microscopic rod-shaped body in the cell nucleus carrying genes that transmit hereditary traits from generation to generation.

Chunk A stimulus or group of stimuli that is perceived as a discrete piece of information.

Circadian rhythm Referring to cycles that are connected with the 24-hour period of the Earth's rotation. (From the Latin *circa*, meaning “about,” and *dia*, meaning “day.”)

Cirrhosis of the liver A disease caused by protein deficiency in which connective fibers replace active liver cells, impeding circulation of the blood. Alcohol does not contain protein; therefore, persons who drink excessively may be prone to this disease.

Classical conditioning A simple form of learning in which an organism comes to associate or anticipate events. A neutral stimulus comes to evoke the response usually evoked by another stimulus by being paired repeatedly with the other stimulus. (Cognitive theorists view classical conditioning as the learning of relationships among events so as to allow an organism to represent its environment.) Also referred to as *respondent conditioning* or *Pavlovian conditioning*.

Claustrophobia Fear of tight, small places.

Clear-cut-attachment phase The third phase in forming bonds of attachment, characterized by intensified dependence on the primary caregiver.

Client-centered therapy Carl Rogers's method of psychotherapy, which emphasizes the creation of a warm, therapeutic atmosphere that frees clients to engage in self-exploration and self-expression.

Clinical scales Groups of test items that measure the presence of various abnormal behavior patterns.

Clitoris The female sex organ that is most sensitive to sexual sensation; a smooth, round knob of tissue that is situated above the urethral opening.

Closure The tendency to perceive a broken figure as being complete or whole.

Cochlea The inner ear; the bony tube that contains the basilar membrane and the organ of Corti.

Cognition Mental activity involved in understanding, processing, and communicating information; the use of mental processes to perceive and mentally represent the world, think, and engage in problem solving and decision making.

Cognitive-dissonance theory The view that we are motivated to make our cognitions or beliefs consistent with each other and with our behavior.

Cognitive map A mental representation of the layout of one's environment.

Cognitive perspective The approach to psychology that focuses on the nature of consciousness and on mental processes such as sensation and perception, memory, problem solving, decision making, judgment, language, and intelligence.

Cognitive therapy A form of therapy that focuses on how clients' cognitions (expectations, attitudes, beliefs, etc.) lead to distress and may be modified to relieve distress and promote adaptive behavior.

Cohort effect Similarities in behavior among peers that stem from the fact that group members are approximately the same age.

Collective unconscious Jung's hypothesized store of vague racial memories.

Collectivist A person who defines herself or himself in terms of relationships to other people and groups and gives priority to group goals.

Color constancy The tendency to perceive an object as being the same color even though lighting conditions change its appearance.

Commitment (a) A pledge or obligation. (b) In Marcia's system, a stable investment in one's goals, values, or beliefs.

Common fate The tendency to perceive elements that move together as belonging together.

Competencies Knowledge and skills.

Complementary Descriptive of colors of the spectrum that when combined produce white or nearly white light.

Concept A mental category that is used to class together objects, relations, events, abstractions, ideas, or qualities that have common properties.

Concordance Agreement.

Concrete-operational stage Piaget's third stage, characterized by logical thought concerning tangible objects, conservation, and subjective morality.

Conditional positive regard Judgment of another person's value on the basis of the acceptability of that person's behaviors.

Conditioned reinforcer Another term for a secondary reinforcer.

Conditioned response (CR) A learned response to a conditioned stimulus.

Conditioned stimulus (CS) A previously neutral stimulus that elicits a conditioned response because it has been paired repeatedly with a stimulus that already elicited that response.

Conditions of worth Standards by which the value of a person is judged.

Conductive deafness The forms of deafness in which there is loss of conduction of sound through the middle ear.

Cones Cone-shaped photoreceptors that transmit sensations of color.

Confident power Feelings of self-confidence, self-efficacy.

Conflict Being torn in different directions by opposing motives. Feelings produced by being in conflict.

Conform To change one's attitudes or overt behavior to adhere to social norms.

Congenital Present at birth; resulting from the prenatal environment.

Conscious Self-aware.

Consciousness A concept with many meanings, including sensory awareness of the world outside, direct inner awareness of one's thoughts and feelings, personal unity, and the waking state.

Consensus General agreement.

Conservation According to Piaget, recognition that basic properties of substances such as weight and mass remain the same when superficial features change.

Consummate love The ideal form of love within Sternberg's model, which combines passion, intimacy, and commitment.

Contact comfort A hypothesized primary drive to seek physical comfort through contact with another.

Context-dependent memory Information that is better retrieved in the context in which it was encoded and stored, or learned.

Contingency theory The view that learning occurs when stimuli provide information about the likelihood of the occurrence of other stimuli.

Continuity The tendency to perceive a series of points or lines as having unity.

Continuous reinforcement A schedule of reinforcement in which every correct response is reinforced.

Control groups In experiments, groups whose members do not obtain the treatment, while other conditions are held constant.

Conventional level According to Kohlberg, a period during which moral judgments largely reflect social conventions; a "law and order" approach to morality.

Convergence A binocular cue for depth based on the inward movement of the eyes as they attempt to focus on an object that is drawing nearer.

Convergent thinking A thought process that narrows in on the single best solution to a problem.

Conversion disorder A disorder in which anxiety or unconscious conflicts are "converted" into physical symptoms that often have the effect of helping the person cope with anxiety or conflict.

Cornea Transparent tissue forming the outer surface of the eyeball.

Corpus callosum A thick fiber bundle that connects the hemispheres of the cortex.

Correlation An association or relationship among variables, as we might find between height and weight or between study habits and school grades.

Correlation coefficient A number between +1.00 and -1.00 that expresses the strength and direction (positive or negative) of the relationship between two variables.

Correlational method A mathematical method of determining whether one variable increases or decreases as another variable increases or decreases. For example, there is a correlation between intelligence test scores and grades in school.

Corticosteroids Steroids produced by the adrenal cortex that regulate carbohydrate metabolism and increase resistance to stress by fighting inflammation and allergic reactions; also called *cortical steroids*.

Counterconditioning A fear-reduction technique in which pleasant stimuli are associated with fear-evoking stimuli so that the fear-evoking stimuli lose their aversive qualities.

Couple therapy A form of therapy in which a couple is treated as the client and helped to improve communication skills and manage conflict.

Creative self According to Adler, the self-aware aspect of personality that strives to achieve its full potential.

Creativity The ability to generate novel and useful solutions to problems.

Critical period (a) In prenatal development, a period during which an embryo is particularly vulnerable to a certain teratogen. **(b)** In the development of attachment, a period of time when an instinctive response can be elicited by a particular stimulus.

Critical thinking An approach to the examination of arguments based on skepticism, logical analysis, and insistence upon the importance of empirical evidence.

Cross-sectional research The study of developmental processes by taking measures of people of different age groups at the same time.

Crystallized intelligence One's lifetime of intellectual achievement as shown largely through vocabulary and knowledge of world affairs.

Cultural bias A factor that provides an advantage for test takers from certain cultural backgrounds, such as using test items that are based on middle-class culture in the United States.

Culture-bound Determined by the experiences of being reared within a certain cultural setting.

Cumulative recorder An instrument that records the frequency of an organism's operants (or "correct" responses) as a function of the passage of time.

D

Daily hassles Notable daily conditions and experiences that are threatening or harmful to a person's well-being.

Dark adaptation The process of adjusting to conditions of lower lighting by increasing the sensitivity of rods and cones.

Debrief To elicit information about a completed procedure.

Decentration Simultaneous focusing on more than one dimension of a problem so that flexible, reversible thought becomes possible.

Decibel (dB) A unit expressing the loudness of a sound.

Defense mechanism In psychodynamic theory, an unconscious function of the ego that protects it from anxiety-evoking material by preventing accurate recognition of this material.

Deindividuation The process by which group members may discontinue self-evaluation and adopt group norms and attitudes.

Delirium tremens A condition characterized by sweating, restlessness, disorientation, and hallucinations. The DTs occur in some chronic alcohol users when there is a sudden decrease in usage.

Delta waves Strong, slow brain waves usually emitted during stage 3 and 4 sleep.

Delusions False, persistent beliefs that are unsubstantiated by sensory or objective evidence.

Dementia A condition characterized by deterioration of cognitive functioning.

Dendrites Rootlike structures, attached to the cell body of a neuron, that receive impulses from other neurons.

Dependent variable A measure of an assumed effect of an independent variable.

Depolarize To reduce the resting potential of a cell membrane from about -70 millivolts toward zero.

Depressant A drug that lowers the rate of activity of the nervous system.

DES Abbreviation for diethylstilbestrol, an estrogen that has been linked to cancer in the reproductive organs of children of women who used it when pregnant.

Descriptive statistics The branch of statistics concerned with providing descriptive information about a distribution of scores.

Desensitization The type of sensory adaptation in which we become less sensitive to constant stimuli; also called *negative adaptation*.

Diathesis–stress model The view that psychological disorders can be explained in terms of an underlying vulnerability (diathesis) and problems that create pressure or tension (stress).

Dichromat A person who is sensitive to black–white and either red–green or blue–yellow and hence partially color-blind.

Difference threshold The minimal difference in intensity required between two sources of energy so that they will be perceived as different.

Diffusion of responsibility The spreading or sharing of responsibility for a decision or behavior within a group.

Direct inner awareness Knowledge of one’s own thoughts, feelings, and memories without the use of sensory organs.

Discrimination (a) In conditioning, the tendency for an organism to distinguish between a conditioned stimulus and similar stimuli that do not forecast an unconditioned stimulus. (b) Hostile behavior that is directed against groups toward whom one is prejudiced.

Discriminative stimulus In operant conditioning, a stimulus that indicates that reinforcement is available.

Disorganized schizophrenia A type of schizophrenia characterized by disorganized delusions and vivid hallucinations.

Displace In memory theory, to cause information to be lost from short-term memory by adding new information.

Displaced Transferred.

Displacement The quality of language that permits one to communicate information about objects and events in another time and place.

Dispositional attribution An assumption that a person’s behavior is determined by internal causes such as personal traits.

Dissociative amnesia A dissociative disorder marked by loss of memory or self-identity; skills and general knowledge are usually retained. Thought to stem from psychological conflict or trauma.

Dissociative disorders Disorders in which there are sudden, temporary changes in consciousness or self-identity.

Dissociative fugue A dissociative disorder in which one experiences amnesia and then flees to a new location.

Dissociative identity disorder A disorder in which a person appears to have two or more distinct identities or personalities that may alternately emerge.

Divergent thinking A thought process that attempts to generate multiple solutions to problems.

Dizygotic (DZ) twins Twins that develop from two fertilized ova and who are thus as closely related as brothers and sisters in general; also called *fraternal twins*.

DNA Abbreviation for deoxyribonucleic acid, the substance that forms the basic material of chromosomes. It takes the form of a double helix and contains the genetic code.

Dopamine A neurotransmitter that is involved in Parkinson’s disease and that appears to play a role in schizophrenia.

Double-blind study A study in which neither the participants nor the observers know who has received the treatment.

Down syndrome A condition caused by an extra chromosome on the 21st pair and characterized by mental deficiency, a broad face, and slanting eyes.

Drive A condition of arousal in an organism that is associated with a need.

Drive for superiority Adler’s term for the desire to compensate for feelings of inferiority.

Drive-reduction theory The view that organisms learn to engage in behaviors that have the effect of reducing drives.

Dyspareunia A sexual dysfunction characterized by persistent or recurrent pain during sexual intercourse. (From roots meaning “badly paired.”)

E

Eardrum A thin membrane that vibrates in response to sound waves, transmitting the waves to the middle and inner ears.

Eating disorders A group of disorders marked by persistent, gross disturbances in eating patterns.

Echo A mental representation of an auditory stimulus (sound) that is held briefly in sensory memory.

Echoic memory The sensory register that briefly holds mental representations of auditory stimuli.

Efferent neurons Neurons that transmit messages from the brain or spinal cord to muscles and glands; also called *motor neurons*.

Effort justification In cognitive-dissonance theory, the tendency to seek justification (acceptable reasons) for strenuous efforts.

Ego The second psychic structure to develop, characterized by self-awareness, planning, and delay of gratification.

Ego analyst A psychodynamically oriented therapist who focuses on the conscious, coping behavior of the ego instead of the hypothesized, unconscious functioning of the id.

Ego identity A firm sense of who one is and what one stands for.

Ego identity versus role diffusion Erikson’s fifth stage of psychosocial development, in which the life crisis involves the development of a firm sense of who one is and what one stands for (ego identity) or lack of clarity in one’s life roles (role diffusion).

Ego integrity versus despair Erikson’s term for the crisis of late adulthood, characterized by the task of maintaining one’s sense of identity despite physical deterioration.

Egocentrism According to Piaget, the assumption that others view the world as one does oneself.

Eidetic imagery The maintenance of detailed visual memories over several minutes.

Ejaculation The process of propelling seminal fluid (semen) from the penis.

Elaboration likelihood model The view that persuasive messages are evaluated (elaborated) on the basis of central and peripheral cues.

Elaborative rehearsal The kind of coding in which new information is related to information that is already known.

Electra complex A conflict of the phallic stage in which the girl longs for her father and resents her mother.

Electroconvulsive therapy (ECT) Treatment of disorders like major depression by passing an electric current (that causes a convulsion) through the head.

Electromyograph (EMG) An instrument that measures muscle tension.

Embryonic stage The baby from the 3rd through the 8th weeks following conception, during which time the major organ systems undergo rapid differentiation.

Emerging adulthood A theoretical period of development, spanning the ages of about 18 to 25, in which young people in developed nations engage in extended role exploration or preparation.

Emotion A state of feeling that has cognitive, physiological, and behavioral components.

Empathic understanding In client-centered therapy, the ability to perceive a client’s feelings from the client’s frame of reference. A quality of the good client-centered therapist.

Empirical science A science that obtains evidence by experience or experimentation.

Empty-nest syndrome A sense of depression and loss of purpose felt by some parents when the youngest child leaves home.

Encode Symbolize or represent.

Encoding Modifying information so that it can be placed in memory; the first stage of information processing.

Endocrine system The body's system of ductless glands that secrete hormones and release them directly into the bloodstream.

Endorphins Neurotransmitters that are composed of amino acids and that are functionally similar to morphine.

Engram An assumed electrical circuit in the brain that corresponded to a memory trace.

Epigenesis The fact that children's development reflects continuing bidirectional exchanges between their genetic heritage and the environments in which they find themselves or place themselves.

Epilepsy Temporary disturbances of brain functions that involve sudden neural discharges.

Epinephrine A hormone produced by the adrenal medulla that stimulates sympathetic ANS activity; also called *adrenaline*.

Episodic memory Memories of events experienced by a person or that take place in the person's presence.

Erogenous zone An area of the body that is sensitive to sexual sensations.

Eros In psychodynamic theory, the basic instinct to preserve and perpetuate life.

Estrogen A generic term for several female sex hormones that promote growth of female sex characteristics and regulate the menstrual cycle.

Estrus The periodic sexual excitement of many female mammals as governed by levels of sex hormones.

Ethical Moral; referring to one's system of deriving standards for determining what is moral.

Ethnic group A group characterized by common features such as cultural heritage, history, race, and language.

Ethologist A scientist who studies the characteristic behavior patterns of species of animals.

Eustress (YOU-stress). Stress that is healthful.

Evaluation apprehension Concern that others are evaluating our behavior.

Evidence-based practices Method of therapy that has been shown effective in experiments in which participants are assigned at random to the treatment under investigation or to another treatment or placebo and in which the methods being tested are clearly outlined.

Evolutionary perspective The view that our behavior and mental processes have been shaped, at least in part, by natural selection as our ancestors strived to meet our prehistoric and historic challenges.

Evolutionary psychology The branch of psychology that studies the ways adaptation and natural selection are connected with mental processes and behavior.

Excitement phase The first phase of the sexual response cycle, which is characterized by muscle tension, increases in the heart rate, and erection in the male and vaginal lubrication in the female.

Exemplar A specific example.

Exhaustion stage The third stage of the GAS, characterized by weakened resistance and possible deterioration.

Existentialism The view that people are completely free and responsible for their own behavior.

Expectancies Personal predictions about the outcomes of potential behaviors.

Experiment A scientific method that seeks to confirm cause-and-effect relationships by introducing independent variables and observing their effects on dependent variables.

Experimental groups In experiments, groups whose members obtain the treatment.

Experimenter bias A condition in which a researcher expects or desires a certain outcome in a research study, possibly affecting the outcome.

Explicit memory Memory that clearly and distinctly expresses (explicates) specific information; also referred to as *declarative memory*.

Exploration In Marcia's system, active questioning and searching among alternatives in the quest to establish goals, values, or beliefs.

Externals People who perceive the ability to attain reinforcements as largely outside themselves.

Extinction The process by which stimuli lose their ability to evoke learned responses because the events that had followed the stimuli no longer occur. (The learned responses are said to be *extinguished*.)

Extraversion A trait characterized by tendencies to be socially outgoing and to express feelings and impulses freely.

Extrinsic rewards The rewards associated with performance goals, such as a good salary, health care, and retirement benefits.

F

Facial-feedback hypothesis The view that stereotypical facial expressions can contribute to stereotypical emotions.

Factor analysis A statistical technique that allows researchers to determine the relationships among large number of items, such as test items.

Family therapy A form of therapy in which the family unit is treated as the client.

Fear appeal A type of persuasive communication that influences behavior on the basis of arousing fear instead of rational analysis of the issues.

Feature detectors Neurons in the sensory cortex that fire in response to specific features of sensory information such as lines or edges of objects.

Feeling-of-knowing experience Same as *tip-of-the-tongue phenomenon*.

Female sexual arousal disorder A sexual dysfunction in which females fail to become adequately aroused sexually to engage in sexual intercourse.

Fetal alcohol syndrome (FAS) A cluster of symptoms caused by maternal drinking, in which the child shows developmental lags and characteristic facial features such as an underdeveloped upper jaw, flattened nose, and widely spaced eyes.

Fetal stage The baby from the 3rd month following conception through childbirth, during which time there is maturation of organ systems and dramatic gains in length and weight.

Fight-or-flight reaction A possibly innate adaptive response to the perception of danger.

Fixation In psychodynamic theory, arrested development; attachment to objects of an earlier stage.

Fixation time The amount of time spent looking at a visual stimulus.

Fixed-interval schedule A schedule in which a fixed amount of time must elapse between the previous and subsequent times that reinforcement is available.

Fixed-ratio schedule A schedule in which reinforcement is provided after a fixed number of correct responses.

Flashbacks Distorted perceptions or hallucinations that occur days or weeks after LSD usage but mimic the LSD experience.

Flashbulb memory A memory that is highly detailed and strongly emotionally elaborated because of its great and unusual significance.

Flavor A complex quality of food and other substances that is based on their odor, texture, and temperature as well as their taste.

Flooding A behavioral fear-reduction technique based on principles of classical conditioning. Fear-evoking stimuli (CSs) are presented continuously in the absence of actual harm so that fear responses (CRs) are extinguished.

Fluid intelligence Mental flexibility as shown in learning rapidly to solve new kinds of problems.

Foot-in-the-door technique A method for inducing compliance in which a small request is followed by a larger request.

Forced-choice format A method of presenting test questions that requires a respondent to select one of a number of possible answers.

Foreclosure In Marcia's system, the automatic adoption of a point of view held by authority figures in one's life.

Formal-operational stage Piaget's fourth stage, characterized by abstract logical thought; deduction from principles.

Fovea An area near the center of the retina that is dense with cones and where vision is consequently most acute.

Frame of reference In client-centered therapy, one's unique patterning of perceptions and attitudes according to which one evaluates events.

Framing effect The influence of wording, or the context in which information is presented, on decision making.

Free association In psychoanalysis, the uncensored uttering of all thoughts that come to mind.

Frequency theory The theory that the pitch of a sound is reflected in the frequency of the neural impulses that are generated in response to the sound.

Frontal lobe The lobe of the cerebral cortex that lies in front of the central fissure.

Functional analysis A systematic study of behavior in which one identifies the stimuli that trigger problem behavior and the reinforcers that maintain it.

Functional fixedness The tendency to view an object in terms of its name or familiar usage.

Functionalism The school of psychology that emphasizes the uses or functions of the mind and behavior rather than just the elements of experience.

Fundamental attribution error The assumption that others act predominantly on the basis of their dispositions, even when there is evidence suggesting the importance of their circumstances.

G

g Spearman's symbol for general intelligence, which he believed underlay more specific abilities.

Gamma-aminobutyric acid (GABA) An inhibitory neurotransmitter that apparently helps calm anxiety.

Ganglion cells Neurons whose axons form the optic nerve.

Gender The culturally defined concepts of masculinity and femininity; the psychological state of being male or female.

Gender role A cluster of behaviors that characterizes traditional female or male behaviors within a cultural setting.

Gender-schema A concept of the distribution of behavior patterns into feminine and masculine roles that motivate and guide the gender-typing of the child.

Gender-typing The process by which people acquire a sense of being female or male and acquire the traits considered typical of females or males within a cultural setting.

Gene A basic unit of heredity, which is found at a specific point on a chromosome.

General adaptation syndrome (GAS) Selye's term for a hypothesized three-stage response to stress.

Generalization In conditioning, the tendency for a conditioned response to be evoked by stimuli that are similar to the stimulus to which the response was conditioned.

Generalize To extend from the particular to the general; to apply observations based on a sample to a population.

Generalized anxiety disorder Feelings of dread and foreboding and sympathetic arousal of at least 6 months' duration.

Generativity versus stagnation Erikson's term for the crisis of middle adulthood, characterized by the task of being productive and contributing to younger generations.

Genetic-environmental correlation The tendency for parents to place children in environments that are consistent with their own preferences or of children to place themselves in such environments.

Genetics The area of biology that focuses on heredity.

Genital stage The mature stage of psychosexual development, characterized by preferred expression of libido through intercourse with an adult of the other gender.

Genotype One's genetic makeup based on the sequencing of the nucleotides we term A, C, G, and T.

Genuineness In client-centered therapy, openness and honesty in responding to the client.

Germinal stage The first stage of prenatal development, during which the dividing mass of cells has not become implanted in the uterine wall.

Gestalt psychology The school of psychology that emphasizes the tendency to organize perceptions into wholes and to integrate separate stimuli into meaningful patterns.

Gestalt therapy Fritz Perls's form of psychotherapy, which attempts to integrate conflicting parts of the personality through directive methods designed to help clients perceive their whole selves.

Gland An organ that secretes one or more chemical substances such as hormones, saliva, or milk.

Glaucoma A condition characterized by abnormally high fluid pressure in the eye.

Glia Cells that nourish neurons, remove waste products from the nervous system, and help synchronize the messages sent by neurons.

Gray matter In the spinal cord, the grayish neurons and neural segments that are involved in spinal reflexes.

Grief Emotional suffering resulting from a death.

Groupthink A process in which group members are influenced by cohesiveness and a dynamic leader to ignore external realities as they make decisions.

Growth hormone A pituitary hormone that regulates growth.

H

Hallucination A perception in the absence of sensory stimulation that is confused with reality.

Hallucinogenic Giving rise to hallucinations.

Hashish A drug derived from the resin of *Cannabis sativa*; often called "hash."

Health psychology The field of psychology that studies the relationships between psychological factors (e.g., attitudes, beliefs, situational influences, and behavior patterns) and the prevention and treatment of physical illness.

Heredity The transmission of traits from parent to offspring by means of genes.

Heritability The degree to which the variations in a trait from one person to another can be attributed to, or explained by, genetic factors.

Hertz (Hz) A unit expressing the frequency of sound waves. One hertz equals one cycle per second.

Heuristics Rules of thumb that help us simplify and solve problems.

Hierarchy of needs Maslow's ordering of needs from most basic (physiological needs such as hunger and thirst) to most elaborate and sophisticated (self-actualization).

Higher order conditioning (a) According to behaviorists, a classical conditioning procedure in which a previously neutral stimulus comes to elicit the response brought forth by a *conditioned* stimulus by being paired repeatedly with that conditioned stimulus. (b) According to cognitive psychologists, the learning of relationships among events, none of which evokes an unlearned response.

Hippocampus A structure in the limbic system that plays an important role in the formation of new memories.

HIV Human immunodeficiency virus, the virus that cripples the body's immune system and leads to the development of AIDS.

Holophrase A single word used to express complex meanings.

Homeostasis The tendency of the body to maintain a steady state.

Homosexual Referring to people who are sexually aroused by, and interested in forming romantic relationships with, people of the same gender. (Derived from the Greek *homos*, meaning "same," not from the Latin *homo*, meaning "man.")

Hormone A substance secreted by an endocrine gland that regulates various body functions.

Hue The color of light as determined by its wavelength.

Humanism The philosophy and school of psychology that asserts that people are conscious, self-aware, and capable of free choice, self-fulfillment, and ethical behavior.

Humanistic therapy A form of psychotherapy that focuses on the client's subjective, conscious experience in the "here and now."

Hydrocarbons Chemical compounds consisting of hydrogen and carbon.

Hyperphagic Characterized by excessive eating.

Hypertension High blood pressure.

Hypnagogic state The drowsy interval between waking and sleeping characterized by brief, hallucinatory, dreamlike experiences.

Hypnosis An altered state of consciousness in which people appear to be highly suggestible and behave as though they are in a trance.

Hypoactive sexual desire disorder A sexual dysfunction in which people lack sexual desire.

Hypochondriasis Persistent belief that one is ill despite lack of medical findings.

Hypothalamus A bundle of nuclei below the thalamus involved in body temperature, motivation, and emotion.

Hypothesis Within the science of psychology, a specific statement about behavior or mental processes that is testable through research.

I

Icon A mental representation of a visual stimulus that is held briefly in sensory memory.

Iconic memory The sensory register that briefly holds mental representations of visual stimuli.

Id The psychic structure, present at birth, that represents physiological drives and is fully unconscious.

Ideas of persecution Erroneous beliefs that one is being victimized or persecuted.

Identification In psychodynamic theory, the unconscious adoption of another person's behavior.

Identity achievement In Marcia's system, an identity status that characterizes those who have explored alternatives and have developed commitments.

Identity certainty A strong and clear sense of who one is and what one stands for.

Identity diffusion In Marcia's system, lack of a sense of who one is or what one stands for, with no active exploration.

Illusions Sensations that give rise to misperceptions.

Imaginary audience An aspect of adolescent egocentrism; the belief that other people are as concerned with our thoughts and behaviors as we are.

Immune system The system of the body that recognizes and destroys foreign agents (antigens) that invade the body.

Implicit memory Memory that is suggested (implied) but not plainly expressed,

as illustrated in the things that people *do* but do not state clearly; also referred to as *nondeclarative memory*.

Imprinting A process occurring during a critical period in the development of an organism, in which that organism responds to a stimulus in a manner that will afterward be difficult to modify.

Incentive An object, person, or situation perceived as capable of satisfying a need or as desirable for its own sake.

Incest taboo The cultural prohibition against marrying or having sexual relations with a close blood relative.

Incubation In problem solving, a process that may sometimes occur when we stand back from a frustrating problem for a while and the solution "suddenly" appears.

Independent variable A condition in a scientific study that is manipulated so that its effects may be observed.

Indiscriminate attachment Showing attachment behaviors toward any person.

Individual psychology Adler's psychodynamic theory, which emphasizes feelings of inferiority and the creative self.

Individualist A person who defines herself or himself in terms of personal traits and gives priority to her or his own goals.

Industry versus inferiority The fourth stage in Erikson's theory, in which children confront new academic and social challenges in the school setting, leading successful children to develop a sense of competence, and children who fall short to develop feelings of inferiority.

Infantile amnesia Inability to recall events that occurred prior to the age of 3 or so; also termed *childhood amnesia*.

Infer To go to the general from the particular; to draw a conclusion.

Inferential statistics The branch of statistics concerned with the confidence with which conclusions drawn about samples can be extended to the populations from which the samples were drawn.

Inferiority complex Feelings of inferiority hypothesized by Adler to serve as a central motivating force.

Infinite creativity The capacity to combine words into original sentences.

Inflammation Increased blood flow to an injured area of the body, resulting in redness, warmth, and an increased supply of white blood cells.

Informed consent A participant's agreement to participate in research after

receiving information about the purposes of the study and the nature of the treatments.

Initial-preattachment phase The first phase in forming bonds of attachment, characterized by indiscriminate attachment.

Initiative versus guilt Erikson's third stage, during which children begin to assert control over the environment and obtain a sense of purpose. Children who try to exert too much power may run afoul of caregivers and develop feelings of guilt.

Insanity A legal term descriptive of a person judged to be incapable of recognizing right from wrong or of conforming his or her behavior to the law.

Insight In Gestalt psychology, the sudden reorganization of perceptions, allowing the sudden solution of a problem.

Instinct (a) A stereotyped pattern of behavior triggered by a particular stimulus and nearly identical among members of a species, even when reared in isolation. (b) An inherited disposition to activate specific behavior patterns that are designed to reach certain goals.

Instinctive An inborn pattern of behavior that is triggered by a particular stimulus.

Instrumental competence Ability to manipulate one's environment to achieve one's goals.

Intelligence A general mental capability that involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly, and learn from experience.

Intelligence quotient (IQ) (a) Originally, a ratio obtained by dividing a child's score (or mental age) on an intelligence test by chronological age. (b) Generally, a score on an intelligence test.

Interference theory The view that we may forget stored material because other learning interferes with it.

Internals People who perceive the ability to attain reinforcements as largely within themselves.

Interneuron A neuron that transmits a neural impulse from a sensory neuron to a motor neuron.

Interposition A monocular cue for depth based on the fact that a nearby object obscures a more distant object behind it.

Interpretation In psychoanalysis, an explanation of a client's utterance according to psychoanalytic theory.

Intimacy Close acquaintance and familiarity; a characteristic of a relationship

in which partners share their inmost feelings.

Intimacy versus isolation Erikson's life crisis of early adulthood, which is characterized by the task of developing abiding intimate relationships.

Intrinsic rewards The rewards associated with learning goals, such as self-esteem and increased understanding and insight.

Introspection Deliberate looking into one's own cognitive processes to examine one's thoughts and feelings and to gain self-knowledge.

Introversion A trait characterized by tendencies to direct one's interests inward and to inhibit impulses.

Iris A muscular membrane whose dilation regulates the amount of light that enters the eye.

J
James-Lange theory of emotion The view that certain external stimuli instinctively trigger specific patterns of arousal and action, such as fighting or fleeing. We experience the emotion as a consequence of our physiological and behavioral responses.

Just noticeable difference (jnd) The minimal amount by which a source of energy must be increased or decreased so that a difference in intensity will be perceived.

K
Kinesthesia The sense that informs us about the positions and motion of parts of our bodies.

L
La belle indifférence A French term descriptive of the lack of concern sometimes shown by people with conversion disorders.

Language The communication of information by means of symbols arranged according to rules of grammar.

Language acquisition device (LAD) In psycholinguistic theory, neural "prewiring" that facilitates the child's learning of grammar.

Latency A phase of psychosexual development characterized by repression of sexual impulses.

Latent content In psychodynamic theory, the symbolized or underlying content of dreams.

Latent learning Learning that is hidden or concealed.

Lateral hypothalamus An area at the side of the hypothalamus that appears to function as a start-eating center.

Law of effect Thorndike's view that pleasant events stamp in responses, and unpleasant events stamp them out.

Learned helplessness A model for the acquisition of depressive behavior based on findings that organisms in unchangeable aversive situations may learn to do nothing.

Learning (a) According to behaviorists, a relatively permanent change in behavior that results from experience. (b) According to cognitive theorists, the process by which organisms make relatively permanent changes in the way they represent the environment because of experience. These changes influence the organism's behavior but do not fully determine it.

Lens A transparent body behind the iris that focuses an image on the retina.

Lesion An injury that results in impaired behavior or loss of a function.

Leukocytes White blood cells. (Derived from the Greek words *leukos*, meaning "white," and *kytos*, literally meaning "a hollow" but used to refer to cells.)

Libido (a) In psychodynamic theory, the energy of eros; the sexual instinct. (b) Generally, sexual interest or drive.

Life expectancy The amount of time a person can be expected to live in a given setting.

Life span (longevity) The maximum amount of time a person can live under optimal conditions.

Limbic system A group of structures involved in memory, motivation, and emotion that forms a fringe along the inner edge of the cerebrum.

Linguistic-relativity hypothesis The view that language structures the way we view the world.

Locus of control The place (locus) to which an individual attributes control over the receiving of reinforcers—either inside or outside the self.

Long-term memory The type or stage of memory capable of relatively permanent storage.

Long-term potentiation (LTP) Enhanced efficiency in synaptic transmission that follows brief, rapid stimulation.

Longitudinal research The study of developmental processes by taking repeated measures of the same group of people at various stages of development.

LSD Lysergic acid diethylamide. A hallucinogenic drug.

M

Maintenance rehearsal Mental repetition of information to keep it in memory.

Major depressive disorder A serious to severe depressive disorder in which the person may show loss of appetite, psychomotor retardation, and in extreme cases, delusions of worthlessness.

Male erectile disorder A sexual dysfunction in which males fail to obtain erections that are adequate for sexual intercourse.

Manic Elated; showing excessive excitement.

Manifest content In psychodynamic theory, the reported content of dreams.

Marijuana The dried vegetable matter of the *Cannabis sativa* plant.

Maturation The process of development as guided by the unfolding of the genetic code.

Mean A type of average that is calculated by adding all the scores in a distribution and then dividing the sum by the number of scores.

Means–end analysis A heuristic device in which we try to solve a problem by evaluating the difference between the current situation and the goal.

Median The central score in a frequency distribution; the score beneath which 50% of the cases fall.

Medulla An oblong area of the hindbrain involved in regulation of heartbeat and respiration.

Melatonin A pineal hormone that helps regulate the sleep–wake cycle and may affect the onset of puberty.

Memory The processes by which information is encoded, stored, and retrieved.

Memory trace An assumed change in the nervous system that reflects the impression made by a stimulus. Memory traces are said to be “held” in sensory registers.

Menarche The beginning of menstruation.

Menopause The cessation of menstruation.

Mental age (MA) The accumulated months of credit that a person earns on the Stanford–Binet Intelligence Scale.

Mental image An internal image or visual representation that is used in thinking and memory.

Mental set The tendency to respond to a new problem with an approach that was successfully used with similar problems.

Mescaline A hallucinogenic drug derived from the mescal (peyote) cactus.

Meta-analysis A method for combining and averaging the results of individual research studies.

Metamemory Self-awareness of the ways memory functions, allowing the person to encode, store, and retrieve information effectively.

Method of savings A measure of retention in which the difference between the number of repetitions originally required to learn a list and the number of repetitions required to relearn the list after a certain amount of time has elapsed is calculated.

Midlife crisis A crisis experienced by many people during the midlife transition when they realize that life may be more than halfway over and reassess their achievements in terms of their dreams.

Midlife transition Levinson’s term for the ages from 40 to 45, which are characterized by a shift in psychological perspective from viewing ourselves in terms of years lived to viewing ourselves in terms of the years we have left.

Migraine headaches Throbbing headaches that are connected with changes in the supply of blood to the head.

Mirror neurons Neurons that fire both when an animal acts and when the animal observes the same action performed by another.

Misinformation effect The shaping of bogus or slanted memories by providing inaccurate information as, for example, in the form of “leading questions.”

Mode The most frequently occurring number or score in a distribution.

Model An organism that engages in a response that is then imitated by another organism.

Modeling (a) In social-cognitive theory, exhibiting behaviors that others will imitate or acquire through observational learning. (b) A behavior-therapy technique in which a client observes and imitates a person who approaches and copes with feared objects or situations.

Monochromat A person who is sensitive to black and white only and hence color-blind.

Monocular cues Stimuli suggestive of depth that can be perceived with only one eye.

Monozygotic (MZ) twins Twins that develop from a single fertilized ovum that divides in two early in prenatal development. MZ twins thus share the same genetic code; also called *identical twins*.

Mood disorder A disturbance in expressed emotions, generally involving excessive or inappropriate sadness or elation.

Moral principle The governing principle of the superego, which sets moral standards and enforces adherence to them.

Moratorium In Marcia’s system, an identity status that characterizes those who are actively exploring alternatives in an attempt to form an identity.

Motion parallax A monocular cue for depth based on the perception that nearby objects appear to move more rapidly in relation to our own motion.

Motivation The state in which an organism experiences an inducement or incentive to do something.

Motive A hypothetical state within an organism that propels the organism toward a goal. (From the Latin *movere*, meaning “to move.”)

Motor cortex The section of cortex that lies in the frontal lobe, just across the central fissure from the sensory cortex. Neural impulses in the motor cortex are linked to muscular responses throughout the body.

Mourning A customary method of expressing grief.

Multifactorial theory The view that hypnotized people engage in *strategic role enactment* to behave in the way that they imagine a good hypnotized person will behave.

Multiple approach–avoidance conflict A type of conflict in which each of a number of goals produces approach and avoidance motives.

Multiple personality disorder The previous term for *dissociative identity disorder*.

Mutation A sudden variation in an inheritable characteristic as distinguished from a variation that results from generations of gradual selection.

Mutism Refusal to talk.

Myelin A fatty substance that encases and insulates axons, facilitating transmission of neural impulses.

Myotonia Muscle tension.

N

Narcolepsy A “sleep attack” in which a person falls asleep suddenly and irresistibly.

Narcotics Drugs used to relieve pain and induce sleep. The term is usually reserved for opiates.

Natural selection A core concept of the theory of evolution that holds that adaptive genetic variations among members of a species enable individuals with those variations to survive and reproduce. As a result, such variations tend to be preserved, whereas nonadaptive variations tend to drop out.

Naturalistic observation A scientific method in which organisms are observed in their natural environments.

Nature The inborn, innate character of an organism.

Need A state of deprivation.

Negative correlation A relationship between two variables in which one variable increases as the other decreases.

Negative reinforcer A reinforcer that when *removed* increases the frequency of an operant.

Negative symptoms Those symptoms of schizophrenia that reflect the absence of appropriate behavior, such as blank faces, monotonic voices, and motionless bodies.

Neodissociation theory A theory of hypnotic events as the splitting of consciousness.

Neonate A newborn child, especially during the first month.

Nerve A bundle of axons from many neurons.

Neural impulse The electrochemical discharge of a nerve cell, or neuron.

Neuron A specialized cell of the nervous system that transmits messages.

Neuroticism A personality trait characterized largely by persistent anxiety; Eysenck's term for emotional instability.

Neurotransmitters Chemical substances involved in the transmission of neural impulses from one neuron to another.

Niche-picking Choosing environments that allow individuals to develop inherited potentials or preferences.

Nonconscious Descriptive of bodily processes, such as growing hair, of which we cannot become conscious. We may "recognize" that our hair is growing but cannot directly experience the biological process.

Non-rapid-eye-movement (NREM) sleep The first four stages of sleep.

Nonsense syllables Meaningless sets of two consonants, with a vowel sandwiched between, that are used to study memory.

Norepinephrine A neurotransmitter whose action is similar to that of the hormone epinephrine and that may play a role in depression.

Normal distribution A symmetrical distribution that is assumed to reflect chance fluctuations, giving rise to a normal curve or bell-shaped curve.

Nurture The sum total of the environmental factors that affect an organism from conception onward. (In another usage, *nurture* refers to the act of nourishing and

otherwise promoting the development of youngsters.)

Object permanence Recognition that objects removed from sight still exist, as demonstrated in young children by continued pursuit.

Objective responsibility According to Piaget, the assignment of blame according to the amount of damage done rather than the motives of the actor.

Objective tests Tests whose items must be answered in a specified, limited manner; tests whose items have concrete answers that are considered correct.

Obsessive-compulsive disorder (OCD) An anxiety disorder defined by recurrent, anxiety-provoking thoughts or images that seem irrational and beyond control (obsessions) and seemingly irresistible urges to engage in thoughts or behaviors that tend to reduce the anxiety (compulsions).

Occipital lobe The lobe that lies behind and below the parietal lobe and behind the temporal lobe.

Oedipus complex A conflict of the phallic stage in which the boy wishes to possess his mother sexually and perceives his father as a rival in love.

Olfactory Having to do with the sense of smell.

Olfactory nerve The nerve that transmits information concerning odors from olfactory receptors to the brain.

Operant The same as an operant behavior.

Operant behavior Behavior that operates on, or manipulates, the environment.

Operant conditioning A simple form of learning in which an organism learns to engage in certain behavior because it is reinforced.

Opiates A group of narcotics derived from the opium poppy that provide a euphoric rush and depress the nervous system.

Opioids Chemicals that act on opiate receptors but are not derived from the opium poppy.

Opponent-process theory The theory that color vision is made possible by three types of cones, some of which respond to red or green light, some to blue or yellow, and some only to the intensity of light.

Optic nerve The nerve that transmits sensory information from the eye to the brain.

Oral stage The first stage of psychosexual development, during which gratification

is hypothesized to be attained primarily through oral activities.

Organ of Corti The receptor for hearing that lies on the basilar membrane in the cochlea.

Organizing effect The directional effect of sex hormones—for example, along typical male or female patterns of mating.

Orgasm The height or climax of sexual excitement, involving involuntary muscle contractions, release of sexual tensions, and usually, subjective feelings of pleasure.

Orgasmic disorder A sexual dysfunction in which people have persistent or recurrent problems in reaching orgasm.

Orienting response An unlearned response in which an organism attends to a stimulus.

Osteoporosis A disorder in which the bones become more porous, brittle, and subject to fracture due to loss of calcium and other minerals.

Overregularization The application of regular grammatical rules for forming inflections (e.g., past tense and plurals) to irregular verbs and nouns.

Oxytocin A pituitary hormone that stimulates labor and lactation.

Paired associates Nonsense syllables presented in pairs in experiments that measure recall.

Panic disorder The recurrent experiencing of attacks of extreme anxiety in the absence of external stimuli that usually elicit anxiety.

Paranoid personality disorder A personality disorder characterized by persistent suspiciousness but not involving the disorganization of paranoid schizophrenia.

Paranoid schizophrenia A type of schizophrenia characterized primarily by delusions—commonly of persecution—and by vivid hallucinations.

Parasympathetic The branch of the ANS that is most active during processes such as digestion that restore the body's reserves of energy.

Parasympathetic nervous system The branch of the autonomic nervous system that is most active during processes that restore reserves of energy to the body, such as relaxing and eating. When people relax, the parasympathetic nervous system decelerates the heart rate, normalizes blood pressure, relaxes muscles, and so on. The parasympathetic division also stimulates digestion.

Parietal lobe The lobe that lies just behind the central fissure.

Partial reinforcement One of several reinforcement schedules in which not every correct response is reinforced.

Passion Strong romantic and sexual feelings.

Passive smoking Inhaling smoke from the tobacco products and exhalations of other people; also called *secondhand smoking*.

Perception The process by which sensations are organized into an inner representation of the world.

Perceptual organization The tendency to integrate perceptual elements into meaningful patterns.

Performance anxiety Anxiety concerning one's ability to perform, especially when performance may be evaluated by other people.

Period of the ovum Another term for the *germinal stage*.

Peripheral nervous system The part of the nervous system consisting of the somatic nervous system and the autonomic nervous system.

Peripheral route In persuasive arguments, associating viewpoints with tangential issues, such as who endorses a product rather than the qualities of the product itself.

Permissive parents Parents who impose few, if any, rules and who do not supervise their children closely.

Person variables Factors within the person, such as expectancies and competencies, that influence behavior.

Personal fable Another aspect of adolescent egocentrism; the belief that our feelings and ideas are special and unique and that we are invulnerable.

Personality The reasonably stable patterns of emotions, motives, and behavior that distinguish one person from another.

Personality disorders Enduring patterns of maladaptive behavior that are sources of distress to the individual or others.

Perspective A monocular cue for depth based on the convergence (coming together) of parallel lines as they recede into the distance.

Phallic stage The third stage of psychosexual development, characterized by a shift of libido to the phallic region. (From the Greek *phallos*, referring to an image of the penis. However, Freud used the term *phallic* to refer both to boys and girls.)

Phallic symbol A sign that represents the penis.

Phencyclidine (PCP) Another hallucinogenic drug whose name is an acronym for its chemical structure.

Phenotype One's actual development and appearance based on one's genotype and environmental influences.

Pheromone A chemical secretion detected by other members of the same species that stimulates a certain kind of behavior.

Phi phenomenon The perception of movement as a result of sequential presentation of visual stimuli.

Photoreceptors Cells that respond to light.

Pitch The highness or lowness of a sound as determined by the frequency of the sound waves.

Pituitary gland The gland that secretes growth hormone, prolactin, antidiuretic hormone, and other hormones.

Place theory The theory that the pitch of a sound is determined by the section of the basilar membrane that vibrates in response to the sound.

Placebo A bogus treatment that has the appearance of being genuine.

Placenta A membrane that permits the exchange of nutrients and waste products between the mother and her developing child but does not allow the maternal and fetal bloodstreams to mix.

Plateau phase The second phase of the sexual response cycle, which is characterized by increases in vasocongestion, muscle tension, heart rate, and blood pressure in preparation for orgasm.

Pleasure principle The governing principle of the id—the seeking of immediate gratification of instinctive needs.

Polarization In social psychology, taking an extreme position or attitude on an issue.

Polarize To ready a neuron for firing by creating an internal negative charge in relation to the body fluid outside the cell membrane.

Polygenic Referring to traits that are influenced by combinations of genes.

Pons A structure of the hindbrain involved in breathing, attention, sleep, and dreams.

Population A complete group of organisms or events.

Positive correlation A relationship between variables in which one variable increases as the other also increases.

Positive psychology The field of psychology that is about personal well-being and satisfaction; joy, sensual pleasure, and happiness; and optimism and hope for the future.

Positive reinforcer A reinforcer that when *presented* increases the frequency of an operant.

Positive symptoms Those symptoms of schizophrenia that indicate the presence of inappropriate behavior, such as hallucinations, delusions, agitation, and inappropriate giggling.

Postconventional level According to Kohlberg, a period during which moral judgments are derived from moral principles and people look to themselves to set moral standards.

Postformal stage A proposed stage of cognitive development in which the individual has achieved knowledge that judgments of people and behavior are made within certain value systems, has begun to narrow infinite possibilities into practical choices, and has overcome the egocentrism of adolescence.

Posttraumatic stress disorder (PTSD) A disorder that follows a distressing event outside the range of normal human experience and that is characterized by features such as intense fear, avoidance of stimuli associated with the event, and reliving of the event.

Practicum A college or university course, typically in a specialized field of study, that provides students with supervised practical application of previously studied theory.

Preconscious In psychodynamic theory, descriptive of material that is not in awareness but can be brought into awareness by focusing one's attention.

Preconventional level According to Kohlberg, a period during which moral judgments are based largely on expectation of rewards or punishments.

Predictive validity The extent to which a diagnosis permits one to predict the course of a disorder and the type of treatment that may be of help.

Prefrontal lobotomy The severing or destruction of a section of the frontal lobe of the brain.

Prejudice An attitude toward a group that leads people to evaluate members of that group negatively.

Premature Born before the end of the full term of gestation; also referred to as *preterm*.

Premature ejaculation Ejaculation that occurs before the couple are satisfied with the length of sexual relations.

Preoperational stage The second of Piaget's stages, characterized by illogical use of words and symbols, spotty logic, and egocentrism.

Presbycusis Loss of sharpness of hearing due to age-related degenerative changes in the ear.

Presbyopia A condition characterized by brittleness of the lens.

Primacy effect (a) The tendency to recall the initial items in a series of items. (b) The tendency to evaluate others in terms of first impressions.

Primary drives Unlearned, or physiological, drives.

Primary mental abilities According to Thurstone, the basic abilities that make up intelligence.

Primary reinforcer A reinforcer whose effectiveness is based on the biological makeup of the organism and not on learning.

Priming The activation of specific associations in memory, often as a result of repetition and without making a conscious effort to access the memory.

Proactive interference The interference of old learning with the ability to retrieve material learned recently.

Progesterone A female sex hormone that promotes growth of the sex organs and helps maintain pregnancy.

Progestin A hormone used to maintain pregnancy that can cause masculinization of the fetus.

Programmed learning A method of teaching that breaks down tasks into small steps, each of which is reinforced and then combined to form the correct behavioral chain.

Projective test A psychological test that presents ambiguous stimuli onto which the test-taker projects his or her own personality in making a response.

Prolactin A pituitary hormone that regulates production of milk and, in lower animals, maternal behavior.

Prospective memory Memory to perform an act in the future, as at a certain time or when a certain event occurs.

Prototype A concept of a category of objects or events that serves as a good example of the category.

Proximity Nearness. The perceptual tendency to group together objects that are near one another.

Psychedelic Causing hallucinations, delusions, or heightened perceptions.

Psychic structure In psychodynamic theory, a hypothesized mental structure that helps explain different aspects of behavior.

Psychoactive substances Drugs that have psychological effects such as stimulation or distortion of perceptions.

Psychoanalysis Freud's method of exploring human personality; the school of psychology that asserts that much of our behavior and mental processes are governed by unconscious ideas and impulses that have their origins in childhood conflicts.

Psychodynamic theory Sigmund Freud's perspective, which emphasizes the importance of unconscious motives and conflicts as forces that determine behavior. *Dynamic* refers to the concept of (psychological) forces in motion.

Psychodynamic therapy A type of psychotherapy that is based on Freud's thinking and that assumes that psychological problems reflect early childhood experiences and internal conflicts.

Psycholinguistic theory The view that language learning involves an interaction between environmental factors and an inborn tendency to acquire language.

Psychological disorders Patterns of behavior or mental processes that are connected with emotional distress or significant impairment in functioning.

Psychological hardiness A cluster of traits that buffer stress and are characterized by commitment, challenge, and control.

Psychology The science that studies behavior and mental processes.

Psychomotor retardation Slowness in motor activity and (apparently) in thought.

Psychoneuroimmunology (sigh-coe-new-row-im-you-NOLL-oh-gee). The field that studies the relationships between psychological factors (e.g., attitudes and overt behavior patterns) and the functioning of the immune system.

Psychophysicist A person who studies the relationships between physical stimuli (such as light or sound) and their perception.

Psychosexual development In psychodynamic theory, the process by which libidinal energy is expressed through different erogenous zones during different stages of development.

Psychosocial development Erikson's theory of personality and development, which emphasizes social relationships and eight stages of growth.

Psychosurgery Surgery intended to promote psychological changes or to relieve disordered behavior.

Psychotherapy A systematic interaction between a therapist and a client that brings psychological principles to bear on influencing the client's thoughts, feelings, and/

or behavior to help that client overcome psychological disorders, adjust to problems in living, or develop as an individual.

Puberty The period of physical development during which sexual reproduction first becomes possible.

Punishment An unpleasant stimulus that suppresses the behavior it follows.

Pupil The apparently black opening in the center of the iris through which light enters the eye.

Pure research Research conducted without concern for immediate applications.

R

Random sample A sample drawn so that each member of a population has an equal chance of being selected to participate.

Range A measure of variability defined as the high score in a distribution minus the low score.

Rapid-eye-movement (REM) sleep A stage of sleep characterized by rapid eye movements, which have been linked to dreaming.

Rapid flight of ideas Rapid speech and topic changes, characteristic of manic behavior.

Rational-emotive behavior therapy (REBT) Albert Ellis's form of therapy that encourages clients to challenge and correct irrational beliefs and maladaptive behaviors.

Reality principle Consideration of what is practical and possible in gratifying needs; the governing principle of the ego.

Reality testing The capacity to perceive one's environment and oneself according to accurate sensory impressions.

Rebound anxiety Anxiety that can occur when one discontinues use of a tranquilizer.

Recall Retrieval or reconstruction of learned material.

Recency effect (a) The tendency to recall the last items in a series of items. (b) The tendency to evaluate others in terms of the most recent impression.

Receptor site A location on a dendrite of a receiving neuron tailored to receive a neurotransmitter.

Reciprocal determinism Bandura's term for the social-cognitive view that people influence their environment just as their environment influences them.

Reciprocity In interpersonal attraction, the tendency to return feelings and attitudes that are expressed about us.

Recognition In information processing, the easiest memory task, involving identification of objects or events encountered before.

Reflex A simple inborn response to a stimulus.

Refractory period (a) A phase following firing during which a neuron is less sensitive to messages from other neurons and will not fire. (b) In the sexual response cycle, a period of time following orgasm during which an individual is not responsive to sexual stimulation.

Reinforce To follow a response with a stimulus that increases the frequency of the response.

Reinforcement A stimulus that follows a response and increases the frequency of the response.

Relearning A measure of retention. Material is usually relearned more quickly than it is learned initially.

Reliability The consistency of a method of measurements, as, for example, shown by obtaining similar scores on different testing occasions.

Replicate Repeat, reproduce, copy.

Representativeness heuristic A decision-making heuristic in which people make judgments about samples according to the populations they appear to represent.

Repression A defense mechanism that protects the person from anxiety by ejecting anxiety-evoking ideas and impulses from awareness; in Freud's psychodynamic theory, the automatic (unconscious) ejection of anxiety-evoking ideas, impulses, or images from awareness.

Resistance The tendency to block the free expression of impulses and primitive ideas—a reflection of the defense mechanism of repression.

Resistance stage The second stage of the GAS, characterized by prolonged sympathetic activity in an effort to restore lost energy and repair damage; also called the *adaptation stage*.

Resolution phase The fourth phase of the sexual response cycle, during which the body gradually returns to its pre-aroused state.

Response set A tendency to answer test items according to a bias—for instance, to make oneself seem perfect or bizarre.

Response set theory The view that response expectancies play a key role in the production of the experiences suggested by the hypnotist.

Resting potential The electrical potential across the neural membrane when it is not responding to other neurons.

Reticular activating system (RAS) A part of the brain involved in attention, sleep, and arousal.

Retina The area of the inner surface of the eye that contains rods and cones.

Retinal disparity A binocular cue for depth based on the difference in the image cast by an object on the retinas of the eyes as the object moves closer or farther away.

Retrieval The location of stored information and its return to consciousness; the third stage of information processing.

Retrieval cue A clue or prompt that can be used to enable or trigger the recovery of a memory in storage.

Retroactive interference The interference of new learning with the ability to retrieve material learned previously.

Retrograde amnesia Failure to remember events that occurred prior to physical trauma because of the effects of the trauma.

Retrospective memory Memory for past events, activities, and learning experiences, as shown by explicit (episodic and semantic) and implicit memories.

Reversibility According to Piaget, recognition that processes can be undone, and things can be made as they were.

Reward A pleasant stimulus that increases the frequency of the behavior it follows.

Rh incompatibility A condition in which antibodies produced by the mother are transmitted to the child, possibly causing brain damage or death.

Risky shift The tendency to make riskier decisions as a member of a group than as an individual acting independently.

Rods Rod-shaped photoreceptors that are sensitive only to the intensity of light.

Role theory A theory that explains hypnotic events in terms of the person's ability to act *as though* he or she were hypnotized. Role theory differs from faking in that subjects cooperate and focus on hypnotic suggestions instead of pretending to be hypnotized.

Romantic love An intense, positive emotion that involves sexual attraction, feelings of caring, and the belief that one is in love.

Rooting The turning of an infant's head toward a touch, such as by the mother's nipple.

Rote Mechanical associative learning that is based on repetition.

Rubella A viral infection that can cause retardation and heart disease in the embryo; also called *German measles*.

S

s Spearman's symbol for *specific* factors, or *s factors*, which he believed accounted for individual abilities.

Saccadic eye movement The rapid jumps made by a person's eyes as they fixate on different points.

Sample Part of a population.

Sandwich generation People in middle adulthood who are responsible for meeting the needs of their children yet also burdened by the needs of aging parents.

Satiety The state of being satisfied; fullness.

Savings The difference between the number of repetitions originally required to learn a list and the number of repetitions required to relearn the list after a certain amount of time has elapsed.

Scaffolding Vygotsky's term for temporary cognitive structures or methods of solving problems that help the child as he or she learns to function independently.

Schema A way of mentally representing the world, such as a belief or an expectation, that can influence perception of persons, objects, and situations; according to Piaget, a hypothetical mental structure that permits the classification and organization of new information.

Schizoid personality disorder A personality disorder characterized by social withdrawal.

Schizophrenia A psychotic disorder characterized by loss of control of thought processes and inappropriate emotional responses.

Schizotypal personality disorder A personality disorder characterized by oddities of thought and behavior but not involving bizarre psychotic behaviors.

Scientific method An approach to acquiring or confirming knowledge that is based on gathering measurable evidence through observation and experimentation. Evidence is often obtained to test hypotheses.

Secondary reinforcer A stimulus that gains reinforcement value through association with established reinforcers.

Secondary sex characteristics Characteristics that distinguish the genders, such as distribution of body hair and depth of voice, but that are not directly involved in reproduction.

Sedative A drug that relieves nervousness or agitation or puts one to sleep.

Selection factor A source of bias that may occur in research findings when participants are allowed to choose for themselves a certain treatment in a scientific study.

Selective attention The focus of one's consciousness on a particular stimulus.

Selective avoidance Diverting one's attention from information that is inconsistent with one's attitudes.

Selective exposure Deliberately seeking and attending to information that is consistent with one's attitudes.

Selective optimization with compensation Reshaping of one's life to concentrate on what one considers important and meaningful in the face of physical decline and possible cognitive impairment.

Selective serotonin-reuptake inhibitors (SSRIs) Antidepressant drugs that work by blocking the reuptake of serotonin by presynaptic neurons.

Self-actualization According to Maslow and other humanistic psychologists, self-initiated striving to become what one is capable of being. The motive for reaching one's full potential, for expressing one's unique capabilities.

Self-efficacy expectations Our beliefs that we can bring about desired changes through our own efforts; that one can handle a task.

Self-ideal A mental image of what we believe we ought to be.

Self-serving bias The tendency to view one's successes as stemming from internal factors and one's failures as stemming from external factors.

Semantic Having to do with the meanings of words and symbols.

Semantic code Mental representation of information according to its meaning.

Semantic memory General knowledge, as opposed to episodic memory.

Semanticity Meaning. The quality of language in which words are used as symbols for objects, events, or ideas.

Semicircular canals Structures of the inner ear that monitor body movement and position.

Sensation The stimulation of sensory receptors and the transmission of sensory information to the central nervous system.

Sensitization The type of sensory adaptation in which we become more sensitive to stimuli that are low in magnitude; also called *positive adaptation*.

Sensorimotor stage The first of Piaget's stages of cognitive development,

characterized by coordination of sensory information and motor activity, early exploration of the environment, and lack of language.

Sensorineural deafness The forms of deafness that result from damage to hair cells or the auditory nerve.

Sensory adaptation The processes by which organisms become more sensitive to stimuli that are low in magnitude and less sensitive to stimuli that are constant or ongoing in magnitude.

Sensory memory The type or stage of memory first encountered by a stimulus. Sensory memory holds impressions briefly, but long enough so that series of perceptions are psychologically continuous.

Sensory register A system of memory that holds information briefly, but long enough so that it can be processed further. There may be a sensory register for every sense.

Serial-position effect The tendency to recall more accurately the first and last items in a series.

Serotonin A neurotransmitter, deficiencies of which have been linked to affective disorders, anxiety, and insomnia.

Serum cholesterol Cholesterol in the blood.

Set point A weight range that one's body is programmed to maintain such that the body will increase or decrease its metabolic rate according to the amount of calories one consumes.

Sex chromosomes The 23rd pair of chromosomes, whose genetic material determines the sex of the individual.

Sex therapy A collective term for short-term cognitive-behavioral models for treatment of sexual dysfunctions.

Sexual dysfunction A persistent or recurrent problem in becoming sexually aroused or reaching orgasm.

Sexual orientation The directionality of one's sexual and romantic interests; that is, whether one is sexually attracted to, and desires to form a romantic relationship with, members of the other gender or of one's own gender.

Sexual response cycle Masters and Johnson's model of sexual response, which consists of four stages or phases: excitement, plateau, orgasm, and resolution.

Shadowing A monocular cue for depth based on the fact that opaque objects block light and produce shadows.

Shape constancy The tendency to perceive an object as being as the same shape

although the retinal image varies in shape as it rotates.

Shaping A procedure for teaching complex behaviors that at first reinforces approximations of the target behavior.

Short-term memory The type or stage of memory that can hold information for up to a minute or so after the trace of the stimulus decays; also called *working memory*.

Signal-detection theory The view that the perception of sensory stimuli involves the interaction of physical, biological, and psychological factors.

Similarity The perceptual tendency to group together objects that are similar in appearance.

Situational attribution An assumption that a person's behavior is determined by external circumstances such as the social pressure found in a situation.

Size constancy The tendency to perceive an object as being the same size even as the size of its retinal image changes according to the object's distance.

Sleep apnea Temporary absence or cessation of breathing while asleep. (From Greek and Latin roots meaning "without" and "breathing.")

Sleep terrors Frightening dreamlike experiences that occur during the deepest stage of NREM sleep. Nightmares, in contrast, occur during REM sleep.

Social-cognitive theory A cognitively oriented learning theory in which observational learning and person variables such as values and expectancies play major roles in individual differences; includes cognitive factors in the explanation and prediction of behavior; formerly termed social-learning theory.

Social decision schemes Rules for predicting the final outcome of group decision making.

Social facilitation The process by which a person's performance increases when other members of a group engage in similar behavior.

Social influence The area of social psychology that studies the ways in which people influence the thoughts, feelings, and behavior of others.

Social loafing The process by which a person's performance decreases when other members of a group engage in similar behavior, apparently because the person believes that strenuous effort is unnecessary.

Social norms Explicit and implicit rules that reflect social expectations and influence the ways people behave in social situations.

Social perception A subfield of social psychology that studies the ways in which we form and modify impressions of others.

Social phobia An irrational, excessive fear of public scrutiny.

Social psychology The field of psychology that studies the nature and causes of behavior and mental processes in social situations.

Social skills training A behavior-therapy method for helping people in their interpersonal relations that uses self-monitoring, behavior rehearsal, and feedback.

Sociocultural perspective The view that focuses on the roles of ethnicity, gender, culture, and socioeconomic status in personality formation, behavior, and mental processes.

Socioeconomic status (SES) One's social and financial level, as indicated by measures such as income, level of education, and occupational status.

Somatic nervous system The division of the peripheral nervous system that connects the central nervous system with sensory receptors, skeletal muscles, and the surface of the body.

Somatoform disorders Disorders in which people complain of physical (somatic) problems even though no physical abnormality can be found.

Somatosensory cortex The section of cortex in which sensory stimulation is projected. It lies just behind the central fissure in the parietal lobe.

Species A category of biological classification consisting of related organisms that are capable of interbreeding. *Homo sapiens*—humans—make up one species.

Specific phobia Persistent fear of a specific object or situation.

Spinal cord A column of nerves within the spine that transmits messages from sensory receptors to the brain and from the brain to muscles and glands.

Spinal reflex A simple, unlearned response to a stimulus that may involve only two neurons.

Spontaneous recovery The recurrence of an extinguished response as a function of the passage of time.

Standard deviation A measure of the variability of a distribution, obtained by the formula

$$\text{S.D.} = \sqrt{\frac{\text{Sum of } d^2}{N}}$$

Standardized test A test that is given to a large number of respondents so that data concerning the typical responses can be accumulated and analyzed.

State-dependent memory Information that is better retrieved in the physiological or emotional state in which it was encoded and stored, or learned.

Statistically significant difference A difference between groups that is large enough so that it is unlikely to be due to chance fluctuation.

Statistics Numerical facts assembled in such a manner that they provide useful information about measures or scores (from the Latin *status*, meaning “standing” or “position”).

Stereotype A fixed, conventional idea about a group.

Stillbirth The birth of a dead fetus.

Stimulant A drug that increases activity of the nervous system.

Stimulus An environmental condition that elicits a response.

Stimulus motive A state within an organism that propels it toward increasing the amount of stimulation it obtains.

Storage The maintenance of information over time; the second stage of information processing.

Stratified sample A sample drawn so that identified subgroups in the population are represented proportionately in the sample.

Stress The demand that is made on an organism to adapt, cope, or adjust.

Stressor An event that gives rise to feelings of stress.

Stroboscopic motion A visual illusion in which the perception of motion is generated by a series of stationary images that are presented in rapid succession.

Structuralism The school of psychology that argues the mind consists of three basic elements—sensations, feelings, and images—that combine to form experience.

Stupor A condition in which the senses, thought, and movement are dulled.

Subjective moral judgment According to Piaget, moral judgment that is based on the motives of the perpetrator.

Subjective value The desirability of an object or event.

Subliminal stimulation Sensory stimulation that is below a person's absolute threshold for conscious perception.

Substance abuse Repeated use of a substance despite the fact that it is causing or compounding social, occupational, psychological, or physical problems.

Successive approximations In operant conditioning, a series of behaviors that

gradually become more similar to a target behavior.

Superego The third psychic structure, which functions as a moral guardian and sets forth high standards for behavior.

Suppression The deliberate, or conscious, placing of certain ideas, impulses, or images out of awareness.

Survey A method of scientific investigation in which a large sample of people answer questions about their attitudes or behavior.

Sympathetic The branch of the ANS that is most active during emotional responses, such as fear and anxiety, that spend the body's reserves of energy.

Sympathetic nervous system The branch of the autonomic nervous system that is most active during processes that spend body energy from stored reserves, such as in a fight-or-flight reaction to a predator or when you are anxious about a big test. When people experience fear, the sympathetic nervous system accelerates the heart rate, raises blood pressure, tenses muscles, and so on.

Synapse A junction between the axon terminals of one neuron and the dendrites or cell body of another neuron.

Syntax The rules for forming grammatical phrases and sentences in a language.

Syphilis A sexually transmitted bacterial infection that can attack major organ systems.

Systematic desensitization Wolpe's behavioral fear-reduction technique in which a hierarchy of fear-evoking stimuli is presented while the person remains relaxed.

Systematic random search An algorithm for solving problems in which each possible solution is tested according to a particular set of rules.

T

Taste buds The sensory organs for taste. They contain taste cells and are located on the tongue.

Taste cells Receptor cells that are sensitive to taste.

Temporal lobe The lobe that lies below the lateral fissure, near the temples of the head.

Teratogens Environmental influences or agents that can damage the embryo or fetus.

Testosterone A male sex hormone produced by the testes that promotes growth of male sexual characteristics and sperm.

Texture gradient A monocular cue for depth based on the perception that closer objects appear to have rougher (more detailed) surfaces.

Thalamus An area near the center of the brain involved in the relay of sensory information to the cortex and in the functions of sleep and attention.

Thalidomide A sedative linked to birth defects, especially deformed or absent limbs.

The Dream Levinson's term for the overriding drive of youth to become someone important, to leave one's mark on history.

Theory A formulation of relationships underlying observed events.

Theory of multiple intelligences Gardner's view that there are several intelligences, not just one.

Theta waves Slow brain waves sometimes accompanied by a hypnagogic state.

Thinking Paying attention to information, mentally representing it, reasoning about it, and making decisions about it.

Thyroxin The thyroid hormone that increases metabolic rate.

Time out Removal of an organism from a situation in which reinforcement is available when unwanted behavior is shown.

Tip-of-the-tongue (TOT) phenomenon The feeling that information is stored in memory although it cannot be readily retrieved; also called the *feeling-of-knowing experience*.

Token economy A controlled environment in which people are reinforced for desired behaviors with tokens (such as poker chips) that may be exchanged for privileges.

Tolerance Habituation to a drug, with the result that increasingly higher doses of the drug are needed to achieve similar effects.

Top-down processing The use of contextual information or knowledge of a pattern to organize parts of the pattern.

Toxemia A life-threatening disease characterized by high blood pressure that can afflict pregnant women.

Trait A relatively stable aspect of personality that is inferred from behavior and assumed to give rise to consistent behavior.

Transcendental meditation (TM) The simplified form of meditation brought to the United States by the Maharishi Mahesh Yogi and used as a method for coping with stress.

Transference Responding to one person (such as a spouse or the psychoanalyst) in a way that is similar to the way one responded to another person (such as a parent) in childhood.

Treatment In experiments, a condition received by participants so that its effects may be observed.

Triangular model of love Sternberg's view that love involves combinations of three components: intimacy, passion, and commitment.

Triarchic theory of intelligence Sternberg's theory that intelligence has three prongs, consisting of analytical, creative, and practical intelligence ("street smarts").

Trichromat A person with normal color vision.

Trichromatic theory The theory that color vision is made possible by three types of cones, some of which respond to red light, some to green, and some to blue. (From the Greek roots *treis*, meaning "three," and *chroma*, meaning "color.")

Trust versus mistrust Erikson's first stage of psychosexual development, during which children do—or do not—come to trust that primary caregivers and the environment will meet their needs.

Two-point threshold The least distance by which two rods touching the skin must be separated before the person will report that there are two rods, not one, on 50% of occasions.

Type A behavior Behavior characterized by hostility, competitiveness and feelings of time urgency, competition, and hostility.

U

Ultrasound A method for generating an image of internal organs or a fetus by "bouncing" sound waves too high in pitch to hear off the organs or fetus.

Umbilical cord A tube between the mother and her developing child through which nutrients and waste products are conducted.

Unconditional positive regard (a) An enduring expression of esteem for the essential value of a person. (b) In client-centered therapy, the acceptance of the value of another person, although not necessarily acceptance of everything the person does.

Unconditioned response (UCR) An unlearned response to an unconditioned stimulus.

Unconditioned stimulus (UCS) A stimulus that elicits a response from an organism prior to conditioning.

Unconscious In psychodynamic theory, descriptive of ideas and feelings that are not available to awareness.

Uninvolved parents Parents who generally leave their children to themselves.

Uplifts Notable pleasant daily conditions and experiences.

Uterus The pear-shaped organ in which the embryo and fetus develop.

V

Vaginismus A sexual dysfunction characterized by involuntary contraction of the muscles surrounding the vagina, preventing entry by the penis or making entry painful.

Validity The extent to which a method of measurement measures what it is supposed to measure, as, for example, shown by the extent to which test scores predict or are related to an external standard. In the case of intelligence tests, the external standard might involve academic performance.

Validity scales Groups of test items that indicate whether a person's responses accurately reflect that individual's traits.

Variable-interval schedule A schedule in which a variable amount of time must elapse between the previous and subsequent times that reinforcement is available.

Variable-ratio schedule A schedule in which reinforcement is provided after a variable number of correct responses.

Vasocongestion Engorgement of blood vessels with blood, which swells the genitals and breasts during sexual arousal.

Ventromedial nucleus (VMN) A central area on the underside of the hypothalamus that appears to function as a stop-eating center.

Vestibular sense The sense of equilibrium that informs us about our bodies' positions relative to gravity.

Visible light The part of the electromagnetic spectrum that stimulates the eye and produces visual sensations.

Visual acuity Sharpness of vision.

Visual code Mental representation of information as a picture.

Volunteer bias A source of bias or error in research reflecting the prospect that people who offer to participate in research studies differ systematically from people who do not.

W

Waxy flexibility A feature of catatonic schizophrenia in which people can be molded into postures that they maintain for quite some time.

Weber's constant The fraction of the intensity by which a source of physical energy must be increased or decreased so that a difference in intensity will be perceived.

Wernicke-Korsakoff syndrome A cluster of symptoms associated with chronic alcohol abuse and characterized by confusion, memory impairment, and filling in

gaps in memory with false information (confabulation).

Wernicke's aphasia A language disorder characterized by difficulty comprehending the meaning of spoken language.

White matter In the spinal cord, axon bundles that carry messages from and to the brain.

Wisdom Knowledge or what is right and important, coupled with good judgment.

Wish fulfillment In dreams, the acting out of ideas and impulses that are repressed when one is conscious.

Working memory Same as *short-term memory*.

Z

Zone of proximal development (ZPD) Vygotsky's term for the situation in which a child carries out tasks with the help of someone who is more skilled, frequently an adult who represents the culture in which the child develops.

Zygote A fertilized ovum (egg cell).

Author Index

A

- Abbey, A., 630
Abele, S., 640
Ablon, J. S., 594–596
Aboa-Eboulé, C., 522
Acevedo, A., 413
Ackard, D. M., 314
Adams, A. L., 254
Adams, H., 395, 474
Agnew, C. R., 480
Agnoli, F., 462
Agras, W. S., 596
Agrawal, A., 170
Ahmad, N. Y., 645
Ahs, F., 88
Aich, P., 517
Ainsworth, M., 359, 373
Ajdacic-Gross, V., 416
Akerstedt, T., 156
Akman, Y., 395
Alarcón, A., 18
Albert, A., 389
Alexander, C. N., 166
Alexander, G. M., 464, 466, 469
Alford, B. A., 630
Alipuria, L. L., 395
Allaire, B. T., 334
Allen, J. P., 392
Allen, R. F., 412
Allport, G. W., 432
Alm, R., 295
Almeida, D. M., 404
Altgassen, M., 228
Altman, S. E., 316
Altran, S., 628
Ambach, W., 332
Ambrosia, U., 71
Amodio, D. M., 479
Amstadter, A. B., 588
Ances, B. M., 347
Anchin, J. C., 596
Andersen, A. E., 314
Andersen, B. L., 524–525
Andersen, M. L., 407
Anderson, C. A., 216
Anderson, J. A., 40
Anderson, P., 361
Andreano, J. M., 294, 474
Andrews, B., 551
Andrews, J. A., 414
Ansell, E. B., 316
Antoni, M. H., 523–524
Antonishak, J., 392
Antonuccio, D., 603
Apovian, C. M., 334–336
Aquilino, W. S., 405
Archer, J., 319–320, 451, 463
Archer, S. L., 394
Ardelt, M., 416
Ardrey, R., 318–319, 322
Arias, E., 521
Arnett, J., 391
Arnett, J. J., 395, 398
Aronson, J., 292
Arterberry, M. E., 356
Artigas, F., 553
Asar, B., 625
Asbury, K., 68
Ash, D., 369
Ashtari, M., 179
Ashworth, D. C. H., 182
Atkins, M. S., 205
Atkinson, R., 231
Atkinson, R. C., 248
Attanucci, J., 390
Auger, A. P., 475
Auyeung, B., 464
Aveizer, O., 378
Ayllon, A. N., 584
- ## B
- Babb, B., 377
Babyak, M., 606
Back, S. E., 501
Baddeley, A., 245, 252
Bae, S., 293
Baer, H., 492
Bagehi, D., 524
Bahrack, H. P., 247
Bajor, J. K., 414
Baker, J. H., 316
Baker, L. A., 297
Baker, M. C., 282
Baker, S. L., 501
Bakst, S., 567
Baldwin, S. A., 595
Balsam, K. F., 212
Baltes, M. M., 414
Baltes, P. B., 413–414
Banaji, M. R., 619, 621
Bandelow, B., 540
Bandura, A., 83, 213, 216, 437–440, 444, 510, 544, 583
Banrick, H., 227
Barber, C. E., 413
Barber, J. G., 164, 254, 566
Barbey, L. K., 242
Barbosa, P., 474
Barch, D. M., 555
Bard, P., 330
Barelli, C., 478
Barnes, M. J., 480
Barnett, J. E., 409
Barnett, S., 294
Baron, R. A., 144, 629, 646, 648
Baron-Cohen, S., 91
Barr, R. G., 359
Barsalou, L. W., 242
Bartell, R., 176
Bartels, M., 299
Bartone, P. T., 511
Bartoshuk, L. M., 136
Basch, M. F., 577
Batchat, L., 358
Bates, D. D., 474
Batson, C. D., 479, 645
Batty, M., 631
Baucom, D. H., 596
Baumrind, D., 206, 376
Baynes, K., 93
Bear, R. E., 602
Beauchamp, M. R., 8
Beck, A., 589
Beck, A. T., 38, 630
Beck, D. R. M., 536
Beck, H. P., 196
Beer, J., 551
Begley, S., 644
Behar, E., 541
Bell, D., 394–395
Bell, M. A., 361
Bell, S., 359
Belmonte, M. K., 91
Belsky, J., 33, 37–379, 536
Bem, D. J., 143, 473
Bem, S. L., 459, 467
Ben-Ari, A., 502
Benbow, C. P., 283
Benke, K., 519
Benson, H., 166, 646
Ben-Zur, H., 508
Berkowitz, L., 320
Berlin, H. A., 547
Bermudez, P., 387
Bernardin, H. J., 433
Bernstein, C., 642
Bernstein, D. M., 30, 37, 238
Bernstein, I., 525
Berscheid, E., 480
Berstein, I. L., 356–357
Berten, H., 387
Berzonsky, M. D., 394–395
Best, D., 460
Bevan, W., 443
Bexton, W. H., 308
Bialystock, E., 242
Bidell, M. P., 626
Bienvenu, O. J., 544
Bierman, K. L., 298
Bigelow, B. J., 370
Bigger, S., 56
Binder, A., 144
Binder, E. B., 544
Bishop, D. V. M., 559
Bjorklund, D. F., 368
Blackwell, D. L., 419
Blake, P., 502–503, 508
Blass, E. M., 357
Blass, T., 635–636
Blechert, J., 540
Block, N., 84
Bloom, L., 242
Blum, K., 68
Bodamer, M. D., 276
Bodenhausen, G. V., 625
Boerner, K., 416
Bogle, K., 418
Bohner, G., 648
Bolinsky, K. P., 558
Bonanno, G. A., 416
Bongar, B., 567
Bonn-Miller, M. O., 179
Boora, K., 553
Borgids, E., 332
Born, J., 254
Bouchard, C., 334
Bouchard, T. J., 460–461
Bourin, M., 600
Bouton, M. E., 192
Bowen, R., 389
Bower, G. H., 246
Bowlby, J., 374–375, 416
Boyatzis, R. E., 43
Boyd-Franklin, N., 22
Braarud, H. C., 279
Bradley, R. H., 298
Bramlett, M. D., 419
Brand, J., 136, 470
Brandtjen, H., 378
Bransford, J. D., 242
Braun, B. G., 546
Bravender, T., 315
Breitner, J. C. S., 413
Bresdo, K., 544
Brewer, M. B., 446
Brewin, C. R., 425
Bridges, J. S., 404
Bright, J. A., 587
Briñol, P., 621
Briones, T. L., 361
Brody, G. H., 395
Brody, J. E., 550
Bronstein, P., 376
Brook, R., 279
Brooks, K. D., 474
Brooks, M. V., 524
Brotto, K. A., 487
Brotto, L. A., 487

Brough, P., 502
Brown, A. S., 245, 347,
559, 642
Brown, D. S., 334
Brown, G. R., 489
Brown, J., 100–101, 361
Brown, R., 244
Brown, R. J., 548
Brown, S. L., 419
Brownstein, A. L., 642
Bruce, T. J., 596
Bruene, M., 646
Brugger, P., 466
Brun, C. C., 294
Bryant, J., 542, 620
Brydon, L., 504
Buchanan, C. M., 391
Buchanan, T. W., 504, 507
Büchler, M. W., 529
Buck, R. W., 631
Buckley, P. F., 556
Budney, A. J., 179
Bunting, L., 397
Burger, J. M., 477, 622,
636–637
Burghardt, G. M., 307
Buschmann, M. B., 631
Bushman, B. J., 216–217, 321
Buss, D., 465, 489
Buss, D. M., 66, 319, 476,
480–481, 630
Buston, K., 396
Butler, A. C., 587, 596
Buyukyazi, G., 528

C

Cahill, L., 294, 474
Calcagni, E., 517
Caldwell, H. K., 254
Callahan, J. J., 406
Callan, D. E., 241–242
Calzo, J. P., 474
Camp, C. A., 357
Campbell, R. A., 178, 630
Campbell, T., 555
Campolongo, P., 179
Campos, J., 362
Campos, Joseph, 326
Cañal-Bruland, R., 214
Cannon, W., 330, 514
Cannon, W. B., 311
Cantaluplo, C., 275
Caprara, G. V., 445
Carey, B., 378, 602
Carlsmith, J. M., 622
Carlsson, K., 90
Carlyon, R. D., 134
Carmichael, L. L., 238
Carney, C. E., 182
Carpusor, Adrian, 624
Carré, J. M., 319
Carroll, D., 92
Carroll, J. S., 398

Carroll, M. J., 488
Carstensen, L., 414
Cartreine, J. A., 588
Carver, C. S., 325
Carver, L. J., 224
Castelli, L., 294, 392
Castillo-Richmond, A., 166
Caston, D., 204
Catheart, S., 520
Cattaneo, L. G., 91
Cattell, R. B., 293
Catts, S. V., 181
Catts, V. S., 181
Cavallaro, F. I., 165
Ceci, S. J., 240, 250, 294, 461
Cellar, D. F., 433
Cellard, C., 554
Cernoch, R. H., 357
Cervilla, J. A., 173
Chabaud, M., 640
Chadwick, P. D. J., 603
Chafee, M. V., 255
Chai, X. J., 294
Chaiken, S., 616
Chambless, D. L., 591
Champagne, F. A., 97
Chan, R. C. K., 558
Chance, W. T., 312
Chang, H. Y., 477
Chang, T., 293
Chao, A., 144
Chao, M. M., 627, 629
Chapleau, K. M., 489–490
Chaplin, W. F., 433, 627
Chapman, G. B., 273
Chard, K. M., 542
Check, E., 644
Chen, J., 597
Chen, Y. R., 446
Cheng, Y., 91, 214
Cherniak, C., 281
Cheung, C. K., 327
Chida, Y., 521
Chiew, N., 269
Chisholm, J., 474
Chiu, C., 627, 629
Chivers, M. L., 486
Chomsky, N., 281
Christ, S. E., 255
Christiansen, D. M., 491
Chumlea, W. M. C., 342
Cialdini, R., 646, 648
Cifani, C., 315
Cinncione, C., 560
Cireli, C., 156
Clark, A., 281
Clark, E. V., 280
Clark, M. D., 488
Clark, S. E., 30
Clark, T. T., 170
Clarke, P. A., 536
Clayton, E. C., 249
Cluver, A., 224
Cnattingius, S., 348–349

Cobb, C., 179
Cobb, K., 314
Cocking, C., 645
Cohen, A., 177
Cohen, D., 600
Cohen, K. M., 473
Cohen, L. L., 524
Cohen, L. S., 354
Cohen, R., 209, 218
Cohen, S., 513
Cohen-Bendahan, C. C. C., 466
Colas, E., 541
Collaer, M. L., 294
Collins, R. L., 171
Collins, W. A., 392
Colom, R., 282–283
Coltraine, S., 625
Commons, M. L., 401
Compton, J. S., 566
Comtois, K. A., 354
Condon, J., 397
Conduit, R., 159
Confer, J. C., 307, 319, 463,
465, 480–481
Conger, R. D., 377
Conley, C. S., 550
Connor, P. D., 348
Constantinidis, C., 90
Cook, E. H., 71
Cooke, B., 309
Cooper, M., 309, 315
Cooper, M. L., 171
Cooper, Z., 591
Coovadia, H., 347
Corballis, M. C., 93
Cornoldi, C., 282
Cosby, M., 477
Cosgrove, K., 84
Coskun, D., 518
Costa, P. T. Jr., 433
Costigan, C. L., 391–392
Coté, N., 269–270
Cotton, S. M., 162
Cowen, P. J., 551
Cox, L. C., 133
Cox, W. M., 295
Crabbe, J., 70
Craig, K. J., 544
Craighero, L., 91
Craik, F., 241–242
Craik, F. I. M., 242
Cramer, P., 431, 646
Crano, W. D., 617, 620
Crawford, M., 19
Crighton, D. A., 8
Crinella, F., 414
Crits-Christoph, P., 596
Crittenden, P. M., 315
Crocetti, E., 394
Crofoot, M. C., 463
Crusco, A. H., 631
Csikszentmihalyi, M., 71,
326, 414
Cuijpers, P., 588, 596, 603

Cummins, R. A., 326
Cunningham, G. B., 625, 645
Cunningham, M. G., 80
Cutler, B. L., 240
Cutler, W. B., 471

D

Dabbs, J. M., 294, 319, 461,
646
Dagyte, G., 599
Dahlquist, L. M., 145
Dai, S. R., 434
Daley, A., 101
Dallos, R., 315
D'Ambrosio, B. S., 370
Dana, R. H., 597
Dang-Vu, T. T., 358
Danhauer, J. L., 133
Daniels, D., 73
Darley, J. M., 645
Dart, A. M., 19, 322
Darwin, F., 64
Dasgupta, N., 648
Daud, M. K., 133
David, D., 250–251, 504,
506–507, 587, 595
David, E. J. R., 447
Davidoff, J., 264
Davidson, Z., 444
Davies, J., 620
Davies, M. F., 508, 526
Davis, H. P., 403, 411
Davis, J., 328
Dawood, K., 473, 475
Deacon, B. J., 583
DeAngelis, T., 8, 196, 257
De Berardis, D., 100
DeCasper, A. J., 256
De Dios, M. J., 370
Deep, A. L., 315
De Guerrero, M. C. M., 370
Dehaene-Lambertz, G., 356
De Hoog, N., 620
DeHouwer, J., 618
Delaney-Black, V., 348
Delgado, J. M. R., 90
Del Giudice, M. J., 451
Dell, P. F., 165
DeMarree, K. G., 617
Demeyer, M., 233
De Michele, P. E., 630
Demir, M., 327
Denmark, F. L., 18
Dennis, J., 513
Depp, C. A., 414
Derkits, E. J., 559
De Rooij, S. R., 471
DeRubeis, R. J., 596
De Schipper, J. C., 378
De Sousa, A., 173
Devilly, G. J., 601
Devine, P. G., 624
De Vos, H. M., 164

- Dhand, R., 70
 Dick, D. M., 170
 Dickerson, B. C., 224–225
 Dickerson, F., 585
 Diehl, M., 640
 Dienese, Z., 164
 Difede, J., 571
 DiGiorgio, J., 489
 DiGiuseppe, R. A., 507–508
 Dindo, L., 562
 Dodge, K. A., 320, 562
 Dollard, J., 195, 643
 Dominguez, M. H., 276
 Donaldson, Z. R., 97
 Donovan, J. E., 171
 Doob, A. N., 321
 Dorfberger, S., 360
 Dorfman, D., 619
 Dotson, V. M., 293
 Doucet, E., 335
 Dovidio, J. F., 624
 Downey, J. I., 470, 473
 Driessen, E., 595
 Driscoll, C. A., 435
 Drossel, C., 586
 Drury, L. J., 574
 Dryden, W., 590
 Dube, S. R., 178
 Dubiela, F. P., 156–157
 Dubow, E. F., 216–217
 Duckworth, A. L., 41
 Dufresne, A., 163
 Duke, N. N., 566
 Dulin, P. L., 645
 Dummett, N., 145
 Dunkley, D. M., 553
 Dunn, J. R., 557
 Dunning, C., 409
 Durán, M., 490
 Durante, K. M., 478
 Durbin, D. L., 377
 Duval, T. S., 629
 Dweck, C., 323–324, 462
 Dwivedi, Y., 566
 Dworzynski, K., 71
 Dzieweczynski, T. L., 67
- E**
- Eagle, M., 251
 Eagly, A. H., 516, 616, 623
 Ebben, M. R., 182–183
 Ebeling, M., 134
 Eberhart, N. K., 536
 Ebstein, R., 68
 Edmundson, M., 430
 Egawa, T., 79
 Egerton, A., 179
 Ehrlich, P., 299
 Eich, E., 246
 Eichenbaum, H., 224–225, 255
 Einat, H., 553
 Eisend, M., 620
- Ekman, P., 325–326, 328–329, 332
 Elenkov, I., 517
 Elkind, D., 389
 Elkins, D. N., 17
 Elklit, A., 491
 Ellickson, P. L., 621
 Elliot, A. J., 478, 505
 Ellis, A., 320–321, 506–508, 526, 590
 Ellison, N. B., 393
 Ellsworth, P., 631
 Elms, A. C., 635–636
 Else-Quest, N., 462
 Elshout, J. J., 369
 Elzinga, B. M., 547
 Embry, D., 174
 Emmons, R., 506
 Engelhard, I. M., 601
 Engelhardt, H., 228
 Epp, J., 252
 Erikson, C. J. P., 43
 Erikson, E., 133–134, 399, 401, 403
 Erikson, E. H., 39–394
 Eron, L. D., 216, 218
 Escorial, S., 403
 Esser, J. K., 642
 Etaugh, C. A., 404
 Everall, R. D., 593
 Ewedemi, F., 504
 Exner, J., 309
 Eysenck, H. J., 432
 Eysenck, M. W., 432
 Ezzati, M., 408
- F**
- Fagan, J. F., 293
 Fallin, M., 519
 Fantz, R. L., 362
 Farah, M. J., 123
 Farber, B. A., 580
 Farrer, L. A., 170
 Farzan, F., 558
 Fasmer, O., 94
 Fatemi, S. H., 559
 Faye, C., 196
 Fechner, G. T., 19
 Feder, A., 504
 Fehr, B., 479
 Felmlee, D., 479
 Felsted, J. A., 334
 Fenton, B. W., 139
 Fernandez, N. C., 622–623
 Fernandez-Twinn, D. S., 346
 Ferrer, E., 361
 Ferry, B., 254, 640
 Festinger, L., 305, 622
 Fetissov, S. O., 311
 Fibel, B., 439
 Ficca, G., 357
 Fiehler, K., 113
 Fife, R. S., 100
- Filosa, A., 74
 Finch, E., 627
 Fineberg, N. A., 544
 Finkelstein, F. A., 334
 Fischer, M., 198
 Fischer, P., 320
 Fisher, B. S., 347, 490, 513
 Fisher, C. B., 56
 Fiske, S. T., 332
 Fitzsimmons, D., 642
 Flack, W. F., 630
 Flavell, J. H., 368–369, 387–388
 Flegal, K. M., 334
 Fleming, A. S., 642
 Flett, G. L., 552
 Fligor, B. J., 133
 Flood, M., 489–490
 Flouri, E. A., 392
 Förster, J., 619
 Folkman, S., 513
 Follingstad, D., 55
 Folsom, T. D., 559
 Foote, B., 547
 Forcehimes, A. A., 593
 Fortin, N., 255
 Foster, J. D., 136
 Fowles, D. C., 562
 Fox, N. A., 361
 Franceschini, M. A., 360
 Franco, D. L., 537
 Franco, K., 315
 Franklin, T. R., 177
 Fraser, S. C., 622
 Frasure-Smith, N., 519
 Freedman, J. L., 622
 Freeman, D., 554
 Freeman, M. S., 356
 Freeman, W. H., 558
 Freitas, A. L., 506
 Freund, A. M., 414
 Freund, M., 265
 Friedman, L. J., 430
 Friedman, R. A., 168, 173
 Friedman, R. C., 473
 Friedman, S. R., 494
 Friedrich, C. K., 226
 Friese, M., 171
 Frisch, R., 384
 Fritsch, G., 90
 Froeliger, B., 177
 Fry, R., 503, 508
 Fuentes, R., 79
 Fukushima, M., 638–639
 Furnham, A., 335, 476–477
 Fuson, K., 369
- G**
- Gadalla, T. M., 490
 Gagnon, J. H., 485–486
 Galand, P., 395
 Galdo-Alvarez, 244
 Gallagher-Thompson, D., 606
- Gallese, V., 90, 213
 Gans, D., 406
 Gao, Y., 434
 Garb, H. N., 451
 Garcia, J., 192
 Garcia-Falgueras, A., 475
 Garcia-Moreno, C., 494
 Gardini, G. G., 314
 Gardner, H., 283–284
 Gardner, R. A., 276
 Garrett, R. K., 620
 Garza, Y., 598
 Gatchel, R. J., 139, 145
 Gavin, N. I., 354, 396–397
 Gaynor, J., 144
 Gazzaniga, M. S., 93
 Gerdes, A. B. M., 197, 544
 Gershoff, E., 205
 Getzels, J. W., 287
 Geurin, B., 640
 Gibbons, C. J., 591
 Gibson, E. J., 362
 Giedd, J. N., 387
 Gigerenzer, G., 272
 Gilbert, D., 536
 Gilbert, S. L., 41
 Gilligan, C., 390
 Ginsburg, G., 376
 Glantz, L. A., 558
 Glaser, R., 518
 Glass, D. C., 509
 Glass, G., 595
 Glasser, C. L., 477
 Glenn, S. S., 202
 Glynn, R., 521
 Godden, D. R., 245
 Goddyn, H., 254
 Goetz, H., 94
 Goggin, K., 474
 Goghari, V. M., 17
 Gold, P. E., 79
 Goldman, J. S., 413
 Goldman-Rakic, P. S., 234, 255
 Goldschmidt, L., 348
 Goldston, D. B., 566
 Goleman, D., 285
 Golombok, S., 466–467
 González, H. M., 597
 González, Y. S., 392, 400
 Goodall, J., 38
 Goodenough, F., 293
 Goodman, W., 602
 Goodman-Delahunty, J., 624
 Goodwin, P. J., 525
 Gopnik, A., 368
 Gordon, G. R. J., 74
 Gorodetsky, M., 270
 Gosling, S. D., 56
 Gotlib, I. H., 501
 Gottesman, I. I., 558
 Gottfredson, G. D., 436, 453
 Gottfredson, L. S., 282, 286
 Gottlieb, G., 72, 398–399

Gottman, J. M., 621
Gottschalk, L. J., 390
Goyette, K., 293
Grace, D. M., 467
Grant, R., 179
Gray, S. L., 413
Greenberg, B. D., 602
Greenberger, E., 551
Greene, B., 474, 597
Greene, J., 207
Greenhalgh, J., 167
Greenough, W. T., 361
Greenwald, A. G., 648
Greenwood, P. M., 177
Gregory, V. L., 603
Gregory-Roberts, E. m., 600
Greidanus, E., 593
Grey, J. A., 394
Griffin, A. M., 624
Griffin, C., 391
Grillon, M. L., 225
Gronau, N., 332
Groneberg, D., 176–177
Gross, A. L., 524
Grosser, B. I., 471
Grossman, M. I., 311
Grundy, E., 406
Grusec, J. E., 376
Grussani, D. A., 346
Guadagno, R. E., 648
Guarnaccia, P. J. J., 534
Guerrini, I., 346, 348
Gulledge, A. T., 254
Gump, B. B., 502
Gunter, C., 70
Gurba, E., 401
Guzzetti, B. J., 460

H

Haaf, R. A., 362
Haandrikman, K., 419
Hadamitzky, M., 174
Haenen, J., 369
Hagler, D. J., Jr., 113
Haier, R. J., 466
Hale, L., 160
Hale, W. D., 439
Hall, G., 332
Hall, G. C. N., 391, 489
Hall, J. A., 631
Halpern, D. F., 30, 294, 444, 460, 462
Halpern, R., 391
Hamill-Ruth, R. J., 173
Hammen, C. L., 536
Hancock, J., 332
Hankin, B. L., 373
Harker, L., 328, 477
Harkness, K. L., 504
Harlow, H. F., 374–375
Harmon-Jones, D. M., 622
Harmon-Jones, E., 325, 622
Harper, S., 522

Harris, J. L., 335
Hart, A. J., 88
Harter, S., 383
Hartup, W. W., 392
Hasin, D. S., 549
Hassett, J. M., 466
Hatzimouratidis, K., 487–488
Hauge, A. W., 521
Haughton, C. E., 584
Haustein, K. O., 176–177
Haworth, C. M. A., 68, 70–71, 296–297, 460
Hearne, K., 158
Heath, J., 474
Heber, D., 334–336
Heindel, J. I., 349
Heiphetz, L., 619
Heitland, K., 648
Helms, J. E., 292
Helson, R., 404–405
Helton, W. S., 435
Hen, R., 68
Henderson, A. S., 412
Henderson, J. L., 501
Hendin, H., 567
Hendricks, P. S., 183
Heng, M. A., 285
Henley, C. L., 475
Henretta, J. C., 406
Henry, D. B., 322
Henry, J. D., 228
Hensley, W. E., 646
Herbert, B., 500
Hergenhahn, B. R., 37, 431, 535
Heron, M., 566
Herr, I., 529
Herring, M. P., 606
Herrmann, D. J., 256
Hersen, M., 606
Hetherington, E. M., 342
Hettingema, J., 544
Higgins, J. A., 492
Higgs, S., 312
Hilgard, E. R., 165
Hill, E. M., 294
Hill, G. J., 327
Hill, R. D., 645
Hillis, L. D., 175
Hilt, L. M., 21
Hingson, R., 171
Hinsz, V. B., 630
Hirst, W., 243
Hitzig, E., 90
Ho, M. Y., 327
Hobson, J. A., 159
Hockett, J. M., 489–490
Hoerger, T. J., 334
Hoff, E., 276, 278, 280
Hoffman, H., 572
Hoffman, W., 171
Hogan, H.P., 238
Hojnoski, R. L., 451
Holden, C., 71

Holf, H. G., 145
Hollan, D., 159
Holland, A. C., 243
Holland, C. R., 293
Holland, J. J., 217
Hollinger, L. M., 631
Hollingshead, A. B., 557
Hollon, S. D., 596, 603
Holmes, T. H., 502
Holroyd, K. A., 521
Honorton, C., 143
Honzik, C. H., 212
Hoover, R. N., 519
Hopkins, W. D., 275
Horan, W. P., 555
Horgan, J., 8
Horn, J. M., 297, 403
Horn, M. C., 404
Hornsby, L. B., 101
Hoshi, E., 85
Hovey, J. D., 513
Howard, G. S., 143
Howard, K. J., 510
Hoyert, M., 137
Hrabosky, J., 314
Hu, F. B., 528
Hu, X., 513
Huchard, E., 478
Huesmann, L. R., 216, 218
Huestis, M. A., 348
Hugdahl, K., 474
Hughes, M. E., 551
Hughes, T. F., 228
Huizink, A. C., 348
Hum, R. W., 593
Hunt, M., 281
Huntjens, R. J. C., 546
Hunts, C. R., 332
Hurd, Y., 348
Hurka, T., 320
Hussain, A., 419
Hustad, J. T. P., 171
Hutchings, J., 478
Hutton, H. E., 171
Hwang, C. H., 132
Hyde, J. S., 294, 396, 462–463

I

Iacono, W. G., 332
Imel, Z. E., 593
Inaba, M., 253
Inerocci, L., 98
Inhelder, B., 277
Irons, G., 196
Ironson, G. H., 433
Isarida, T., 245
Isarida, T. K., 245
Isen, J., 434
Isen, Joshua, 563
Itier, R. J., 631
Ito, M., 393
Iwasaki, A., 517
Izard, C. E., 329

J

Jaaniste, T., 145
Jackson, B., 8
Jackson, E. C., 162, 393
Jackson, L. C., 597
Jackson, M. L., 156–157
Jackson, P., 287
Jackson, R. L., 567
Jacob, S., 136, 471
Jacobs, L. F., 294
Jacobs, S., 416
Jacobsen, J. S., 413
James, W., 307
Jamison, K. R., 550
Janero, D. R., 179
Jang, R. G., 562
Janis, I., 642
Janos, P. M., 296
Janowitz, H. D., 311
Janowsky, J. S., 98
Jaušovec, K., 461
Jaušovec, N., 461
Jemal, A., 523, 529
Jennings, M., 41
Jensen, M., 145, 164
Jentsch, J. D., 56
Jeste, D. V., 414
Jester, J. M., 218
Jhangiani, R., 243
Joffe, P., 567
Johansen, M., 537
Johhson, W., 73
Johnson, V., 482–483, 487
Johnson, W., 326–327, 387, 460–461
Johnston, J. L., 177–178
Johnston, L. D., 168–171, 173, 175
Jones, J. L., 620
Jonsdottir, I. H., 528
Joormann, J., 501
Jorgensen, G., 390
Josephs, R. A., 171
Judd, C. M., 625

K

Kagan, J., 434
Kahana, E., 513
Kahneman, D., 273
Kaiser, N. C., 377
Kakko, J., 173
Kalavana, T. V., 510
Kalil, A., 397
Kamalanabhan, T. J., 641–642
Kamphaus, R. W., 447
Kanayame, G., 98
Kandel, E. R., 253–255
Kaplan, K., 182
Kaplan, R. M., 291
Karolewicz, B., 80
Karwautz, A., 315
Katigbak, M. S., 433
Katz, J., 139–140

- Kazdin, A. E., 567, 594
 Kazim, S. F., 616–617
 Kee, K. F., 393
 Keenan, P. A., 348
 Kegeles, L. S., 559
 Keller, A., 558
 Keller, M. B., 603
 Kellerman, J., 631
 Kelley, H. H., 630
 Kellman, P. J., 356
 Kelly, J. F., 593
 Keltner, D., 328, 477
 Kemeny, M., 515, 517
 Kendler, K. S., 544
 Kensinger, E. A., 243
 Kerlin, J. R., 152
 Kessel, F., 443
 Kessler, R. C., 538–539, 549
 Key, W. B., 110
 Kiecolt-Glaser, J. K., 164, 519
 Kiene, S. M., 492
 Kikuchi, H., 251
 Kilpatrick, D. G., 542
 Kim, B. S. K., 447, 597
 Kimble, D. P., 470
 King, B. J., 275
 King, L. A., 506
 King, R., 389
 Kinsey, A. C., 35, 37–38, 396, 484
 Kirke, D. M., 392
 Kishino, N. D., 139, 145
 Kitayama, S., 446
 Klarlberg, L., 508
 Klavir, R., 270
 Klein, C., 487
 Kleinke, C. L., 631
 Kleinmuntz, B., 332
 Klintsova, A. Y., 361
 Knickmeyer, R., 464
 Knight, R. G., 228
 Kobasa, S., 510
 Koch, C., 547
 Koelling, R. A., 192
 Koenig, P., 226
 Koerber, A., 38
 Kohl, C., 354
 Kohlberg, L., 370, 389–390
 Kohn, N., 271
 Kolb, B., 253
 Kong, L. L., 547
 Kontak, A. C., 175
 Koo, M., 246
 Kooijman, C. M., 140
 Kosciak, T., 461
 Koss, M. P., 488, 542
 Koster, E. H., 543
 Kotagal, S., 162
 Kovacs, N., 245
 Kovera, M. B., 240
 Kownacki, R. J., 593
 Krähenbühl, S., 240
 Kramer, M. D., 550
 Kramer, P. D., 522
 Kramer, R., 390
 Krantz, D. S., 522
 Kratochvil, C. J., 174
 Krogh, J., 606
 Kröner-Herwig, B., 588
 Kruefer, F., 40
 Krueger, R. F., 326–327
 Kubinyi, E., 435
 Kuczmariski, R. J., 360
 Kuehn, B. M., 492
 Kumari, V., 562
 Kuntzman, G., 133
 Kuo, P. H., 170
 Kurth, T., 528
 Kurzban, R., 476
 Kvavilashvili, L., 243
 Kwok, H. K., 406
- L**
- Laaksonen, E., 173
 Labouvie-Vief, G., 400
 Lacaboni, M., 91
 Lachman, M. E., 404
 Lai, S., 349
 Lakin, J. M., 294
 LaMay, M. L., 294
 Lamers, C. T. J., 179
 Lan, Y., 644
 Lander, K., 432
 Landy, F. J., 285
 Lane, R. D., 332
 Laney, C., 21
 Lang, A., 43–44
 Lang, A. R., 52, 55–56
 Lang, E. V., 164–165
 Lang, F. R., 414
 Lange, R. A., 175
 Langlois, J. H., 623–624
 Larsen, J. T., 332
 Lashley, K., 253
 Latané, B., 645–646
 Lau, A. S., 376
 Laucht, M., 172
 Laumann, E. O., 409, 485–486
 Laungani, P., 626
 Laursen, B., 392
 Lavee, Y., 502
 Lawler, C., 349
 Lazarus, R. S., 501
 Le, T. N., 18
 Leach, K. P., 553
 Leary, M. R., 620
 LeDoux, J. E., 324
 Lee, A., 373
 Lee, C. W., 601
 Lee, D. J., 377
 Lee, I. C., 19
 Lee, I. M., 245, 279
 Lee, Y., 478
 Leenars, A. A., 616
 Lefcourt, H. M., 504, 511
 Lehman, B. J., 617, 620
 Leibing, E., 596
 Leichsenring, F., 596
 Lejeune, C., 348
 Lengen, C., 94
 Lenroot, R. K., 84, 387
 Leonard, B. E., 553
 Leonardo, E. D., 68
 Leppel, K., 446
 Lespérance, F., 519
 Leung, K. K., 327
 Levine, D., 479
 Levine, E. S., 536
 Levinson, D. J., 401, 403–404
 Levinson, S., 196
 Levis, D. J., 582
 Levy, D., 521
 Levy, R., 594–596
 Lewinsohn, P. M., 607
 Ley, J., 435
 Li, C., 342
 Li, M., 273
 Lichter, D. T., 419
 Lickliter, R., 73
 Lieber, C. S., 171
 Liem, J. H., 445
 Lim, K. O., 360
 Lim, R. F., 536
 Lin, M. M., 97
 Lincoln, T. M., 554–555
 Lindberg, L. D., 418
 Linde, S., 412
 Lindgren, A. P., 170
 Lindoerfer, J. S., 642
 Lindstrom, P., 473
 Linn, M. W., 504
 Lippa, R. A., 396, 412–413, 460, 463, 473
 Lipsitt, L. P., 358
 Liu, W. M., 474
 Livesly, W. J., 562
 Livne, N. L., 287
 Lloyd, K. B., 101
 Lock, J., 314, 316
 Locke, E. A., 438–440
 Löckenhoff, C. E., 414
 Lockhart, R., 241–242
 Lockwood, T. W., 22
 Loewenstein, D. A., 413
 Loftus, E. F., 21, 30, 37, 238–240, 250–251, 425
 Logan, C., 73
 Loges, William, 624
 Lohman, D. F., 294
 London, H., 309
 Lonner, W. J., 461
 Lonstein, J. S., 475
 Lopez, S. R., 534
 Lorenz, K., 375
 Louw, D. A., 164
 Loving, T. J., 480
 Lowe, C. F., 603
 Lu, L., 327
 Lubinski, D., 283
 Luchins, A. S., 267, 626–627
 Luchins, E. H., 267
 Luciana, M., 360
 Ludwick-Rosenthal, R., 513
 Lukaszewski, A. J., 66
 Luo, L., 242
 Lupien, S. J., 514
 Lurigio, A. J., 55–56
 Luszczynska, A., 510
 Lutgendorf, S., 523–524
 Lykken, D., 71, 326, 414
 Lynn, B. M., 478
 Lynn, S. J., 164, 240
- M**
- Maas, J. B., 182
 MacDorman, M. F., 397
 Machery, E., 264
 Machery, O., 134
 Maciejewski, P. K., 416
 MacPhillamy, D. J., 607
 Macrae, C. N., 619
 Maddi, S. R., 510–511
 Magno, C., 446
 Maiden, B., 640
 Maier, N. R. F., 271
 Mair, C., 268–271
 Major, G. C., 335
 Makriyannis, A., 179
 Malpass, R., 461
 Mamelak, M., 161
 Manning, R., 645
 Manning, W. D., 419
 Mansouri, F. A., 85
 Manuck, S. B., 509
 Mapes, R. R., 505
 Marcia, J., 394
 Marco, A., 58
 Marco, R., 58
 Marcus, D., 548
 Marian, V., 245
 Markham, B., 400
 Markon, K. E., 71
 Markowitsch, H. J., 225
 Markus, M. J., 446
 Marlatt, G. A., 170
 Marquis, C., 419
 Martin, E., 544
 Martin, R. A., 511
 Martinez, E., 510
 Marttunen, M. J., 566
 Marziali, E., 511
 Maslow, A., 308–310
 Mason, V., 500
 Massad, L. S., 492
 Master, A., 323, 487
 Masters, W., 482–483, 487
 Mata, I., 40
 Mathews, J. R., 555
 Mathews, T. J., 397
 Matsumoto, D., 326
 Matthews, K., 502
 Maxwell, J. P., 320
 May, D. E., 174, 601

- Mayer, J. D., 285
Mayers, A. G., 156
Mayes, L. C., 349
Maziocco, M. M., 462
Mazure, C. M., 551
Mbwana, J., 91
McAuley, C., 397
McCabe, D. P., 42
McCabe, S. B., 508
McCall, R., 342
McCardle, P., 278
McCarley, R. W., 157
McCarthy, M. M., 84
McCauley, J. L., 542
McClave, E. Z., 630
McClelland, D. C., 323
McClintock, M. K., 471
McCormick, B., 562
McCormick, M., 55
McCourt, S. N., 562
McCrae, R., 71, 431, 462
McDevitt-Murphy, M. E., 542
McDonald, A. W., III, 17
McDonald, M. G., 441
McDonald-Miszczak, L., 228
McDougall, W., 233, 307
McGaugh, J. L., 249, 254
McGraw, A. P., 273
McGreevy, M. A., 560
McGue, M., 296
McGuffin, P., 553
McKee, P., 413
McKeever, W. F., 466
McKenzie, C. R. M., 620
McKimmie, B. M., 322
McLachlan, N., 152
McLaughlin, K. A., 502
McMillan, C. T., 252
McNeil, D., 244
McQueen, M., 553
Mead, G. E., 606
Mead, M., 320
Mechner, F., 254
Medland, S. E., 94
Medzhitov, R., 517
Meguid, M. M., 311
Mehta, J., 523
Mehta, P. H., 56, 551
Meier, B. P., 477
Meijer, J., 369
Meijer, W. M., 174
Meinert, C. L., 413
Meltzoff, A. N., 213, 279, 368
Melzack, R., 139–140, 144
Mendelsohn, F., 315
Menustik, C. E., 584
Merari, A., 616, 628
Mercado, E., 91
Mertz, J. E., 294, 462
Mesoudi, A., 639
Messineo, M., 625
Metcalf, J., 270, 276
Metz, R., 223
Meyer-Lindenberg, A., 558
Michael, R. T., 485–486
Michaels, S., 485–486
Michela, J. L., 630
Milevsky, A., 445
Milgram, R. M., 287
Milgram, S., 535, 616, 632–637
Milius, S., 210
Miller, A. L., 566
Miller, C. F., 234
Miller, G., 236
Miller, J. L., 152
Miller, L., 628
Miller, M. A., 171
Miller, M. F., 165
Miller, N., 643
Miller, N. E., 166–167, 209, 312, 504
Miller-Perrin, C. L., 377
Milne, R. D., 92
Milner, P., 166
Milstead, M., 389
Milton, J., 143
Mincka, S., 543–544
Mineka, S., 192, 198
Miniño, A. M., 391
Minneka, S., 197
Mirin, S. M., 176
Misyaki, J. B., 281
Miyake, Y., 314
Mohr, D. C., 597
Molenda-Figueira, H. A., 348
Molfese, V., 298
Montero, I., 370
Montgomery, G. H., 145
Montovani, A., 523
Montoya, R. M., 477
Moore, C. C., 277
Moos, B. S., 593
Moos, R. H., 593
Mordock, B., 641
Morewedge, C. K., 158
Morey, R. D., 108, 111
Mori, N., 225
Morris, M. W., 629
Morris, W. N., 639
Morton, S. M. B., 346
Mosher, W. D., 419, 473, 486
Moshman, D., 400
Moskowitz, T., 513
Most, S. B., 467
Mott, M., 130
Mudd, S. A., 242
Mukamal, R. K., 173
Mulder, E. J. H., 348
Mullally, W. J., 529
Muñoz, R. F., 603
Munro, V. E., 627
Muraleedharan, V., 470
Murata, A., 369
Murphy, F. C., 332
Murray, C. J. L., 408
Murray, H., 323
Murray, L., 376
Mussweiler, T., 625
Muzzatti, B., 462
Myers, L. B., 425
Mystkowski, J. L., 198
- N**
- Nader, K., 252
Naimi, T. S., 171
Nampiaparampil, D. E., 140
Naragon-Gainey, K., 540
Narayan, V. M., 563
Narusyte, J., 72
Naveh, Benjamin, N., 228
Ndekha, M., 355
Nduati, R., 349
Neiss, M. B., 445
Neisser, U., 245, 284–285, 292, 297
Nelson, C. A., 360
Nemeroff, C. B., 544
Nestoiuc, Y., 529
Neufeld, R. W. J., 513
Neve, K. A., 79
Newman, S. D., 40
Nguyen, M., 173
Nidich, S. I., 166
Niesta, D., 478
Nikitina, T. V., 280
Nir, Y., 162
Nisbett, R. E., 41, 282, 292–293, 298, 438
Nistico, H., 326
Nock, M. K., 567
Nokes, T. J., 270
Nolan, J. M., 632
Nolen-Hoeksema, S., 21, 542, 551
Noll, J. L., 403
Nonaka, A. M., 279
Norcross, J. C., 578, 581, 591–592
Nordgren, L. F., 336
Norton, A., 370
Norton, M. I., 158
Novick, L. R., 269–270
Nowicki, S., 512
Numan, M., 17
Nuttal, H., 567
- O**
- Odbert, H. S., 432
O'Dell, C., 137
O'Driscoll, M. P., 502
Oehlberg, K., 543–544
Oertelt-Prigione, S., 171
Ohayon, M. M., 162, 539
Ohlsson, M. G. O., 619
Ohman, A., 192, 197
Oishi, S., 246
Okifuji, A., 145
Olatunji, B. O., 545
Old, S. R., 228
Oldenburg, D., 130
Olds, J., 87, 166
Oliver, B. R., 296
Oliver, M. B., 625
Olson, M. J., 598
Olthof, A., 204
Omizo, M. M., 597
Ong, A. D., 19, 395
Ong, J. C., 160
Ormerod, T. C., 271
Orsi, J. M., 524
Oster, H., 357
Ostrove, J. M., 404–405
Ozanne, S. E., 346
- P**
- Packard, M. G., 79
Packer, D. J., 642
Packer, P. J., 634
Paffenbarger, R., 527–528
Palmer, J. C., 238, 240
Pang, J. J., 119
Pani, P. P., 168
Pansky, A., 228
Panza, F., 173
Papadatou-Pastou, M., 93
Park, B., 434, 625
Park, G., 295
Park, J., 621
Parker, K. J., 97
Parker, S., 463
Pastor, L. H., 616
Paterson, D. S., 358
Patterson, C. J., 473
Patterson, D. R., 145
Patterson, G. R., 202
Paulussen-Hoogeboom, M. C., 376
Pease, B., 489–490
Penfield, W., 238
Penton-Voak, I. S., 98, 477
Perea, G., 74
Perls, F. S., 581
Perna, F. M., 502
Perrett, D. I., 98, 476
Perry, W., 400
Pesjack, M., 503, 508
Peterka, M., 347
Petersen, J. L., 396, 463
Peterson, C., 434
Peterson, D., 38
Peterson, L., 237
Peterson, M., 237
Petrill, S. A., 296
Petry, N. M., 584
Petty, R. E., 617–620
Phelps, E. A., 88, 324
Phillips, L., 474
Phinney, J. S., 19, 395, 446–447
Piaget, J., 277, 363, 367, 369
Piattelli-Palmarin, M., 73
Piccinni, A., 600

- Pietrzak, R., 510–511, 513
Piffer, R. C., 475
Piliavi, J. A., 645
Pincus, A. L., 596
Pind, J., 282
Pinel, P., 535
Pinker, S., 91–92, 276, 278, 280–281
Piolino, P., 251
Plant, E. A., 294, 624
Platania, J., 640
Plina, E. R., 79
Plomin, R., 68, 70, 73, 296
Plous, S., 56
Pluess, M., 167, 536
Pogue-Geile, M. F., 558
Polanczyk, G., 559
Pollatos, O., 332
Pope, H. G., 319
Popenoe, D., 419
Popma, A., 319
Porsolt, R. D., 599–600
Porter, R. H., 357
Porter, S., 326, 328
Posada, G., 373
Postmes, T., 644
Potter, W. J., 216
Pradhan, D. S., 319
Prato-Previde, E., 279
Prescott, P. A., 356
Pressman, S. D., 513
Preuss, H. G., 524
Priner, R., 356
Prinz, W., 213
Pritchett, J., 432
Prochaska, J. O., 578, 581, 591–592
Pronin, E., 629
Pulido, R., 58
Pulley, B., 207
Purdie-Vaughns, V., 21
Puri, B. K., 558
Pusey, A., 38
Putnam, S. K., 319
- Q**
- Qi, Z., 79
Qin, W., 413
Quinlan, M. B., 536
Quinlivan, J. A., 397
- R**
- Rachman, S., 582–583, 591
Radcliffe, R. A., 170
Rahe, R. H., 502
Raine, A., 434–435, 563
Rajasethupathy, P., 254
Rakic, P., 276
Ramagopalan, S. V., 473
Ramasubramanian, S., 625
Randolph, M. E., 171
Rappaport, N. B., 521
Rathus, J. H., 592
Rathus, S. A., 402, 457, 484, 609
Rattan, S. I. S., 411
Rawano, Y., 172
Rawley, J. B., 90
Rayner, L., 600
Read, C. N., 602
Redlich, F. C., 557
Redrobe, J. P., 600
Reed, J. M., 100
Reeder, G. D., 627
Rees, T., 630
Regier, T., 277
Regitz-Zagrosek, V., 171
Rehm, L. D., 588
Reich, M., 524
Reid, L. W., 625
Reinders, A., 547
Reinecke, M. A., 551
Reis, O., 392
Reiser, M., 159
Rendell, P. G., 411
Rescorla, R. A., 195, 207
Retsinas, J., 415
Reynolds, C. A., 419
Rhee, S. H., 562
Ribbert, H., 646
Ricca, V., 336
Richardson, J., 524
Richardson, K. M., 527
Richdale, A. L., 162
Rimm, E., 487
Rimm, E. B., 173
Ringach, D. L., 56
Rinninger, K. A., 234
Risch, N., 79
Rizzo, A. A., 571
Rizzo, J., 597
Rizzolatti, G., 91
Robbins, J., 572
Roberson, D., 264
Roberts, J., 158, 444
Roberts, S., 405
Roberts, W. A., 204
Robins, R. W., 16
Rocca, W. A., 98
Rodin, G., 439, 444
Rodrigues-Galdina, A. M., 135
Rodriguez, C., 513
Roediger, H. L., 42
Roepke, S., 561
Roger, D., 21
Rogers, C. R., 38
Rohr, M. K., 414
Roid, G. H., 291
Roland, D. L., 98
Rolls, E. T., 136
Romero, E., 562
Roney, J., 66
Rosekind, M. R., 156
Rosenberg, M. J., 640
Rosenstein, D., 357
Ross, C. A., 547
Ross, D., 216
Ross, J. L., 471
Ross, L., 438
Ross, S. A., 216
Rossem, R. V., 387
Roth, T. L., 79
Rothstein, H. R., 527
Rotter, J. B., 511
Rouder, J. N., 108, 111
Rowatt, W. C., 332
Roze, P. D., 488
Rubella, 347
Rubia, K., 166
Ruck, C., 602
Rudd, M., 567
Rudolph, K. D., 550
Rudy, D., 376
Ruiter, R. A. C., 620
Rumbold, A. R., 347
Rupp, H., 478
Rusconi, A., 405
Rush, A. J., 589
Rushton, J. P., 293
Rutkowski, G. K., 646
Rutter, C. M., 566
Rutter, M., 361
Ryan, G. L., 314
- S**
- Saccuzzo, D. P., 291
Sadker, D., 438
Sadker, M., 438
Safford, S., 552
Saffran, J. R., 279
Saggino, A., 283
Sagi-Schwartz, A., 378
Saklolske, D. H., 282
Salovey, P., 285
Salthouse, T. A., 403, 411
Salzarulo, P., 357
Samuelson, P., 390
Sanchez, M., 19
Sanders, G. S., 240
Sanderson, W. C., 592, 596
Sandman, C., 414
Sanjuan, P. M., 171
Santarius, T., 523
Sarbin, T. R., 165
Saroglou, V., 395
Saudino, K. J., 434
Saul, A. L., 501
Saunders, K. W., 216
Sava, S., 387
Savage-Rumbaugh, E. S., 275
Savic, I., 473
Savin-Williams, R. C., 473
Sayette, M. A., 42
Saywitz, K. J., 377
Scarr, S., 297, 299
Schachter, S., 330–333
Schacter, D. L., 226
Schaie, K. W., 300, 403
Schalkwyk, L. C., 68
Schatzberg, A., 539
Scheff, T., 514
Scheirla, T. C., 271
Scherf, T. J., 360
Schick, V. R., 316
Schiffman, S., 136
Schmelkin, L. P., 536
Schmidt, N. B., 540
Schmitt, D. P., 462–463, 465, 481
Schnall, S., 645
Schneider, R. H., 166
Schneider-Garces, N. J., 242
Schneidman, E., 415
Schonfeld, L., 183
Schrager, S. B., 100
Schubert, S., 601
Schuckit, M. A., 172
Schuetze, P., 348
Schulte, M. T., 170
Schultheis, M. T., 571
Schuster, M., 542
Schwartz, B. L., 244
Schwartz, R. M., 621
Schwartz, S. J., 394–395, 446–447
Schweighofer, N., 241–242
Scott, J., 533
Scott-Sheldon, L. A. J., 517
Sebe, N., 326
Secker-Walker, R. H., 349
Segerdahl, P., 275–276
Self, D. R., 309
Seligman, M. E. P., 41, 434
Selkizuka, H., 161
Selye, H., 514, 517, 526
Senehi, J., 642
Shadish, W. R., 593–595
Shafran, R., 591
Shah, C., 80
Shankman, S. A., 316
Shansky, R. M., 254
Shapiro, F., 601
Shedler, J., 595
Sheeber, L. B., 391
Sheldon, K. M., 434
Shelton, R. C., 596, 603
Sherman, D. K., 439, 444
Sherrington, J. M., 551
Sherwood, C. C., 275
Shiffrin, R., 231
Shirayama, Y., 558
Shneidman, E. S., 566–567
Short, S., 559
Showers, C. J., 479
Shrager, Y., 251
Shuper, P. A., 204
Shyrack, J., 434
Sica, A., 523
Siegel, J. M., 159
Siegel-Hinson, R. I., 466
Siever, J., 561
Silberman, S. A., 160

- Silver, R. C., 416
 Silver, S. M., 601
 Silverstein, M., 406
 Silvia, P. J., 629
 Simeon, D., 547
 Simon, T. R., 322
 Simonsen, E., 562
 Simonton, D. K., 285, 287
 Singareddy, R. K., 158
 Singer, J. E., 330–333
 Singh, L., 279
 Singh, S., 418
 Sio, U. N., 271
 Sixsmith, R. A., 335
 Skinner, B. F., 202, 437
 Slobin, D. I., 279
 Sloman, S. A., 264
 Small, E., 177
 Smetana, J. G., 392
 Smillie, L. D., 434
 Smith, G. F., 619
 Smith, K. L., 511
 Smith, L., 369
 Smith, M., 595
 Smith, N. A., 279
 Smith, S. E. P., 347
 Smith, S. M., 271
 Smith, S. W., 537
 Snarey, J., 390
 Snarey, J. R., 394–395
 Snijders, T., 392
 Snyder, D. J., 136
 Soares, C. N., 551
 Soleymani, R. M., 348
 Solomon, R. C., 324
 Somerfield, M. R., 431
 Sorensen, S. B., 566
 Souren, N. Y., 71
 Southall, D., 444
 Spears, R., 644
 Spelts, K., 144
 Spencer, M. D., 559
 Spencer, M. S., 597
 Spencer, N., 349
 Spencer, T. J., 226
 Sperling, G., 233
 Spieker, S. J., 373
 Spielman, A. J., 182–183
 Spinath, B., 293
 Spinath, L. C., 296
 Spinhoven, P., 553
 Spittle, A. J., 361
 Sporer, S. L., 624
 Sprecher, S., 463, 479
 Spritzer, M. D., 254
 Squire, L. R., 88, 252, 254–255
 Srnick, J. L., 173
 Sroufe, L. A., 373
 Stacy, A. W., 617
 Staff, J., 391
 Stanley, B., 561
 Stasser, G., 640
 Staudinger, U. M., 413
 Steadman, H. J., 560
 Steele, C., 21
 Steele, C. M., 171, 292
 Steele, H., 373
 Stein, A. D., 559
 Steinmayr, R., 293
 Steptoe, A., 521
 Sternberg, R., 151, 284–285, 413
 Sternberg, R. J., 30, 282, 287, 292, 480–481
 Stevens, B., 359
 Stewart, A., 404–405
 Stewart, J. G., 504
 Stewart, J. Y., 414
 Stewart, R. E., 591
 Stewart, S. H., 212
 Stier, D. S., 631
 Stocco, A., 40
 Stolzenberg, D. S., 17
 Stone, J., 622–623
 Stormark, K. M., 279
 Story, P. A., 323
 Strack, F., 328
 Strathearn, L., 377
 Strickland, B. R., 512
 Striegel-Moore, R. H., 314, 537
 Strom, J. C., 631
 Struas, M., 377
 Stuart, K., 159
 Stunkard, A. J., 71, 334
 Su, R., 444
 Suarez, E., 490
 Sue, S., 22, 597
 Suh, E. M., 446
 Suinn, R. M., 22
 Sullivan, E. A., 321
 Sumter, S. R., 392
 Suslow, T., 332
 Susser, E., 559
 Sutin, A. R., 434
 Swaab, D. F., 475
 Swan, G. C., 38
 Swartout, K. M., 171
 Sweeney, J. A., 251
 Sweeny, T. D., 110
 Szala, M., 270
 Szentirmai, E., 308
 Szuck, J. J., 332
- T**
- Taber, C. S., 620
 Tait, M., 134
 Takahashi, T., 557
 Talboom, J. S., 100
 Talwar, S. K., 210
 Tamis-LeMonda, C. S., 278
 Tanji, J., 85
 Tanner, J. M., 360
 Taylor, A., 166
 Taylor, H. H., 407
 Taylor, M. J., 510
 Taylor, S., 515–516, 552, 601
 Teachout, T., 411
 Tejada-Vera, B., 566
 ten Brinke, L., 326, 328
 Tenebaum, H. R., 468
 Terracciano, A., 434
 Terrace, H., 276
 Terry, D., 395, 410
 Teti, A., 347
 Tetlock, P. E., 273
 Thomas, A., 41
 Thomas, A. K., 251, 640
 Thomas, J., 179
 Thompson, D. S., 216
 Thompson, L. E., 620
 Thompson, M. E., 489
 Thompson, P. M., 557
 Thompson, R. A., 378–379
 Thompson, S. C., 513
 Tigner, R. B., 284
 Tigner, S. S., 284
 Timmerman, L. M., 378
 Tippin, S. M., 291
 Titov, N., 228
 Tohidian, I., 277
 Tolman, E. C., 211–212
 Toma, C. L., 332
 Tomiyama, T., 413
 Tong, H., 552
 Tonigan, J. S., 593
 Tonnesen, P., 164
 Tononi, G., 162
 Tormala, Z. L., 619
 Tost, H., 559
 Touhara, K., 471
 Towl, G. J., 8
 Townsend, E., 567
 Trainor, L. J., 279
 Trautman, E., 588
 Travis, S. E., 252
 Treisman, A. M., 255
 Triandis, H. C., 446
 Tripodi, S. J., 183
 Trudel, G. A., 409
 Trull, T. J., 596
 Tsang, Y. C., 311
 Tsui, J. M., 462
 Tulving, E., 225
 Turk, D. C., 145
 Turner, E. A., 323
 Turner, J., 145
 Tversky, A., 273
 Twenge, J. M., 635–636
 Tyagi, H., 602
 Tyler, T., 617
- U**
- Uhlhaas, P. J., 157
 Umek, L. M., 369
 Uzakov, S., 254
- V**
- Vacek, P. M., 349
 Valenzuela, A., 254
 Valenzuela, S., 393
 Valkenburg, P. M., 393
 Van de Beek, C., 464
 Van der Kolk, B. A., 601
 Van der Schouw, Y. T., 470
 Van de Wetering, S., 251
 Van Guilder, G. P., 528
 Vanhauzenhuysse, A., 163
 Van IJzendoorn, M., 378
 VanLehn, K., 270
 Van Straaten, I., 477
 Van Swol, L. M., 640
 Veenstra-Vanderweele, J., 71
 Vellas, B., 413
 Vennemann, M. M., 358
 Vercelli, D., 73
 Verhagen, A. P., 596
 Verkuyten, M., 395
 Vermeer, H., 378
 Vernon, D., 209
 Verny, T., 378
 Verona, E., 321
 Viets, V. L., 598
 Villamil, O. S., 370
 Visintainer, M. A., 524
 Visscher, W. A., 348
 Viulli, W. F., 143
 Vodosek, m., 19
 Volz, J., 414
 Voorspoels, W., 265
 Voss, J. L., 239
 Vosshall, L. B., 471
 Voytko, M. L., 100
 Vukman, K. B., 400
 Vygotsky, L. S., 369–367
- W**
- Wacker, J., 434
 Wade, N., 159
 Wade, T. D., 315
 Wagner, J. J., 603
 Wagstaff, G. S., 639
 Wais, P. E., 251
 Waite, L. J., 327
 Waitt, C., 478
 Waldman, I. D., 562
 Walk, R. D., 362
 Walker, J. S., 587
 Wall, P., 144
 Wallace, D. M., 630
 Wallen, K., 466

- Walter, A. A., 238
 Wanchoo, S. J., 174
 Wang, L., 41
 Wang, Q., 251
 Wang, X., 348, 513
 Wang, Y., 239, 269
 Ward, A., 349
 Ward, C. P., 156
 Ward, E., 525
 Ward, L. M., 474
 Wareham, J., 218
 Waring, T. M., 646
 Warman, D. M., 209, 218
 Warren, M., 315
 Wartik, N., 551
 Washburn, A., 311
 Washburn, D. A., 275–276
 Waters, M., 567
 Watson, H. J., 315
 Watson, J. B., 11–12, 151, 436–437
 Watt, M. C., 212
 Watts, C., 494
 Watts, R. E., 598
 Webb, R. T., 358
 Weeden, J., 476
 Weems, C. F., 500
 Wegener, D. T., 619
 Weinberg, R. A., 297, 299
 Weiner, B., 211, 451, 511
 Weingardt, K., 183
 Weinmann, M., 552
 Weinstein, A. A., 520
 Weiss, R. D., 176
 Weisskirch, R. S., 447
 Weitekamp, L. A., 327
 Welch, K., 559
- Welling, L. L. M., 98
 Weng, X., 348
 Werner, L. A., 356–357
 Wessel, J., 71
 Westen, D. I., 597
 Westenberg, H. G. M., 599
 Wetzler, C. G., 631
 Wetzler, S. E., 251
 Wheeler, A., 252
 Wheeler, M. A., 619
 Wheeler, M. E., 255
 White, J. W., 171
 White, M. A., 315
 Whitehead, B. D., 419
 Whorf, B., 277
 Wickwire, E. M., Jr., 409
 Widiger, T. A., 562
 Widom, C. S., 377
 Wiebe, R. E., 508
 Wienke, C., 327
 Wiens, A. N., 584
 Wijers, S. L. J., 335
 Wild, R. A., 98
 Wilhelm, K., 327
 Willcutt, E., 553
 Willer, R., 644
 Williams, C. L., 249
 Williams, J., 460
 Williams, J. E., 522
 Williams, W., 294
 Williamson, G. M., 513
 Willmott, C., 242
 Wills, T. A., 171
 Wilner, P., 174
 Wilson, A., 241
 Wilson, G. T., 315, 599
 Wilson, H. W., 377
- Wilson, K. D., 123
 Wilson, R. S., 296
 Wilson, S., 152
 Windich-Biermeier, A., 524
 Wisco, B. E., 551
 Wiseman, R., 143
 Wolitzky-Taylor, K. B., 545
 Wolpe, J., 583
 Wong, A. K., 171, 435
 Wood, L., 321
 Wood, W., 618–619
 Woodward, B., 642
 Woodward, M., 312
 Wortman, C. B., 416
 Wozniak, J. R., 360
 Wozniak, R. H., 234
 Wrage, L. A., 334
 Wrangham, R. W., 463
 Wright, D. B., 240
 Wu, A. H., 519
 Wu, C.-P., 32
 Wu, J., 553
 Wyatt, T., 471
 Wykes, T., 603
 Wylleman, P., 8
- X**
 Xie, Y., 293
- Y**
 Yamada, Y., 508
 Yamamoto, S., 136
 Yamasue, H., 645
 Yang, L., 170
 Yap, C., 593
- Yartz, A. R., 513
 Yazzie, A., 294
 Yeh, C., 293
 Yehuda, R., 524
 Yin, L., 119
 Yokota, F., 216
 Young, L. J., 97
 Youniss, J., 392
 Yuan, N. P., 491
 Yurgelun-Todd, D., 387
- Z**
 Zahavi, A., 644
 Zajonc, R., 619, 640
 Zallone, A., 347
 Zanarini, M. C., 561
 Zane, N., 22
 Zapf, P. A., 560
 Zayas, L., 566
 Zeifman, D. M., 358–359
 Zhang, Q., 159, 435
 Zhang, S. M., 173
 Zilberman, M. L., 170
 Zimbardo, P. G., 332, 616, 628
 Zimmer, C., 70, 275
 Zimmermann, R. R., 375
 Zitek, B., 551
 Zohar, J., 599
 Zosuls, K. M., 467
 Zucker, A. N., 404
 Zuckerman, M., 309
 Zuo, J., 644

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Subject Index

A

- AA. *See* Alcoholics
Anonymous (AA)
A-B problem, 617–618, 649
Absolute threshold,
108–109, 146
Absolutist thinking, 588, 605
Abstinence syndrome, 169
Abstinent, 494
Abstract concepts, 265
Academic intelligences,
286, 302
Acamprosate, 173
Accommodation, 363–364
Acculturation, 447, 449,
454–455
Accutane, 347, 350
Acetylcholine (ACh)
and dreaming, 159
functions of, 79–80, 102
memory and, 177, 254, 260
nicotine and, 176
Achievement motivation
extrinsic rewards, 324
intrinsic rewards, 324
parental behavior con-
nected with, 381
Thematic Apperception
Test (TAT), 323, 338
Acid, 181
Acoustic code, 230, 260
Acquired drives, 307, 338
Acronyms, as mnemonic
device, 258
Acrophobia, 539
Action potential, 77
Activating effects, 470
Activating event, 507
Activation-synthesis model,
159, 186
Active touching, 137
Actor-observer effect,
629, 649
Acupuncture, 144
Acute stress disorder, 542–543
Adaptation, 66, 193, 195
Adaptation stage, 516.
See also Resistance
stage
Adaptive thermogenesis, 335
ADH. *See* Antidiuretic
hormone (ADH)
ADHD. *See* Attention-deficit/
hyperactivity disor-
der (ADHD)
Adler, Alfred
concepts of, 15
creative self, 454
drive for superiority, 454
individual psychology and,
454
inferiority complex, 454
and psychodynamic
perspective on
personality, 448
view as neo-Freudian,
429, 578
Adolescence, 383
cigarette smoking, 178
cognitive development,
387–390, 420
defined, 384
drug abuse, 169, 171
and electroconvulsive
therapy study, 600
gray matter loss among
schizophrenics, 557
physical development,
384–387, 420
sexual urges, 428
social and emotional devel-
opment, 390–397
and violence in media,
216–218
See also Children
Adoptee studies, 297, 299
Adoption studies, 72, 102
Adrenal cortex, 96–97, 103,
514–515 (fig.)
Adrenaline
anxiety disorders and, 544
memory and, 254, 260
nicotine and, 176
stress and, 510, 514–515
(fig.), 530
Adrenal medulla, 97,
514–515 (fig.)
Adrenocorticotrophic
hormone, 96,
514–515 (fig.)
Adulthood, 373
death and dying, 398,
415–417
defined, 420
early, 399–401, 420
emerging, 397–399, 420
late, 407–415, 420–421
middle, 402–406, 420
personality development in
women, 405
relationship in middle, 405
Affective shift hypothesis,
480–481
Afferent neuron, 76, 102
Affluence, happiness and,
325–327, 339
African Americans
as doctoral-level psycholo-
gists, 22–23
problems in generalizing
from psychological
research, 35
and random and stratified
samples, 35
and transcendental medita-
tion, 166
Afterimage, 118–119, 146
Age regression, 164
Age-30 transition, 401
Aggression
alcohol consumption and,
42–44
of australopithecine's,
318, 338
biology, chemistry, and, 319
cognitive psychology and,
320–321
cross-cultural aspects of,
320
and evolutionary psychol-
ogy, 66–67
frustration induces, 195
learning and, 321–322
psychological aspects of,
319–322
and psychological traits,
68–69
sexual, 459, 488–491,
496
situational factors and,
322
socialization influence on,
467
under stress, 516
temperature and, 42, 319,
338
testosterone connected
with, 319, 338, 495
violence in media and,
216–218
Aging
cellular damage theory of,
411
programmed theories of,
410–411
reasons for, 410–411, 420
successful, 414
Agoraphobia
cognitive behavior therapy
for, 590–591
defined, 539–540
exposure therapy for, 596
(table)
flooding treatment of, 198
Agreeableness, 433, 448, 454,
462
Ainsworth, Mary Salter, 21,
373–374, 381
Alarm reaction, 514–516, 530
Alcohol, 350
abuse among Native
Americans, 510
aggression and consump-
tion of, 42–44
benefits of, 173
and cancer, 519, 531
controlling use of, 520
controversy surrounding,
173
dependency, 183
disadvantages of, 173
effects of, 171–172, 180,
186
ethical issues in research
study, 56
and functioning of cerebel-
lum, 87
and heart disease, 519, 531
and operant-conditioning
procedures, 584–585
popularity of, 168
as psychoactive substance,
170–172
risks to embryo and fetus,
348, 380
self assessment, 172
trends in use of, 169 (table)
Alcohol detoxification, 183
Alcoholics Anonymous (AA),
173, 593, 611
Alcoholism, among twins, 71
Aldehyde dehydrogenase,
171–172
Aleutian Islands, Alaska, 458
Algorithms, for problem
solving, 268–269,
302
Ali, Muhammad, 79
Alien, 129
All-or-none principle, 78
Allport, Gordon, 448, 454
Alpha-fetoprotein (AFP)
assay, 352–353
Alpha waves, 155, 166–167
Alprazolam (Xanax), 598
Alston, J. Henry, 21
Altered states of conscious-
ness, 153

- Alternating firing, 134
- Altruism, 66–67, 644–646, 650
- Alzheimer's disease
acetylcholine (ACh) and, 79–80
alcohol and, 173
cause or causes of, 413
medications for, 413
progression of, 413
risks of, 412–413, 420
- Amacrine cells, 115
- Ambiguous, 121–122
- Ambivalent/resistant attachment, 373
- Amenorrhea, 315
- American behaviorism, 11–12, 18. *See also* Behaviorism
- American Polygraph Association, 332
- American Psychological Association (APA), 24
Calkins, Mary Whiton, as president of, 21
ethical guidelines in animal research, 56
- Ames Room, 127
- Amnesia, 251–252, 260, 545. *See also* Dissociative amnesia; Forgetting; and entries for specific types
- Amniocentesis, 352–353
- Amniotic sac, 345
- Amphetamines
defined, 174
effects of, 79, 180, 187
trends in lifetime use of, 169 (table)
- Amplitude, 131 (fig.)
- Amygdala, 86, 88
and antisocial personality disorder, 563, 565
and anxiety disorders, 544
defined, 324
PET scans of heterosexuals and homosexuals, 475 (fig.)
- Anabolic steroids, 98
- Anagrams, for problem solving, 268
- Anal-expulsive trait, 427
- Anal fixation, 427
- Analogies, for problem solving, 269
- Anal-retentive trait, 427
- Anal stage, of psychosexual development, 426–427, 454
- Analytical intelligence, 284–286
- Analytical psychology, 428
- Anchoring and adjustment heuristic, 273
- Androgens (male sex hormones), 344, 384, 420, 470
- Androgyny, psychological, 459
- Angel dust (animal tranquilizer), 181
- Anger, 325–326, 331, 415, 529
- Angular gyrus, 92
- Animal Mind, The*, 20
- Animals
adaptation, 195
and dreams, 158
ethical issues in research with, 55–56, 61
extinction of, 193, 195
and law of effect, 200
and naturalistic observation, 38
research with, and sensory stimulation, 361
senses of, 130
sleep time for, 153–154
taste, sense of, 135
theoretical views of attachment study, 374–375
See also Skinner box; and entries for individual species
- Animism, 366–367
- Anonymity, 644
- Anorexia nervosa, 312–315, 338
- ANS. *See* Autonomic nervous system
- Anterograde amnesia, 251, 260
- Antianxiety drugs, 598–599, 604, 611
- Antibiotics, 347, 350
- Antidepressants, 100, 599–560, 611. *See also* entries for specific drugs
- Antidiuretic hormone (ADH), 96–97, 254
- Antigen, 517
- Antioxidants, 411, 413
- Antipsychotic drugs, 599, 601, 605, 611
- Antisocial personality disorder
brain impairments for people with, 563
characteristics of people with, 561–562
defined, 434–435, 562, 569
possible origins, 565
symptoms, 565
- Anvil, 131
- Anxiety, 553
and heart disease, 519, 522
and lying, 332
psychological disorders characterized by, 534
- Anxiety and Traumatic Stress Studies Program, 571
- Anxiety disorders
behavior and cognitive therapies for, 591, 596
defined, 538–539, 568
origins of, 543–545, 564, 568
types of, 539–542, 564, 568
- Anxiety sensitivity (AS), 540
- APA. *See* American Psychological Association (APA)
- APA Committee on Accreditation, 25
- APA Minority Fellowship Program, 25
- Apes, 275–276, 302. *See also* Animals; Chimpanzees
- Aphagic, 312
- Aphasia, 92, 103. *See also* Language functions
- Aplysia, 253
- Apnea, 161, 186
- Applied research, 5, 26
- Approach-approach conflict, 504–505, 530
- Approach-avoidance conflict, 504–505, 530
- Archetypes, 429, 454
- Aristotle, 9, 26, 263, 284–286
- Aromatic t-shirts, 136
- Arousal
facial feedback, 328
group behavior and, 644, 650
lying and, 332
stress and, 510, 527, 530
- Artificial ears, 134. *See also* Cochlear implants
- Artificialism, 366–367
- AS. *See* Anxiety sensitivity (AS)
- Asch, Solomon, 637–638, 650
- Asian Americans, 172, 22–23
- Asians, alcohol abuse among, 172
- Assimilation, 363
- Association, 211
- Association areas, 90–91
- Associative learning, 190. *See also* Classical conditioning
- Astrology, critical thinking and, 58–59
- Asylums, 573–574, 610
- Atkinson-Shiffrin model of memory, 231, 259
- Attachment
day care and bonds of, 378
defined, 373
stages of, 373–374, 381
theoretical views of, 374–375
- Attachment-in-the-making phase, 374, 381
- Attention-deficit/hyperactivity disorder (ADHD), 174
- Attitude-discrepant behavior, 622
- Attitudes
A-B problem, 617–618
changing, through cognitive dissonance, 622–623
changing, through persuasion, 619–622
defined, 616, 649
origins of, 618–619
- Attraction, 476–481, 495
- Attraction-similarity hypothesis, 477, 479, 495
- Attribution process, factors contributing to, 630
- Attribution styles, 552
- Attribution theory
actor-observer effect, 629, 649
defined, 627, 649
dispositional and situational attributions, 627, 649
factors contributing to attribution process, 630, 649
fundamental attribution error, 627–629
self-serving bias, 629–630, 649
- Audience, persuaded, 621–622
- Auditory, 129–130
- Auditory code, 259
- Auditory cortex, 92, 260
- Auditory feature detector, 112
- Auditory nerve, 132, 147
- Auditory stimulation, 259
- Australopithecine, 318, 338
- Authoritarian parents, 376, 381
- Authoritative parents, 376, 381
- Autism, 71, 91
- Autobiographical memory, 225
- Autokinetic effect, 124
- Automatic prejudice, 624–625

- Autonomic nervous system (ANS)
 and anxiety disorders, 544, 564, 568
 defined, 81–83, 102, 324
 parasympathetic nervous system and, 325
 role of, in stress, 514–515 (fig.), 516, 527
- Autonomy *vs.* shame and doubt, 372–373
- Availability heuristic, 272–273
- Avatar*, 107–108
- Average, 46–47
- Aversive conditioning, 584, 593, 604, 610
- Avoidance-avoidance conflict, 504–505, 530
- Avoidant attachment, 373
- Avoidant personality disorder, 562, 565
- Awareness, consciousness as, 151–151
- Axon, 74–77, 102, 146, 387
- B**
- Babbling, 278
- Babinski reflex, 356
- Baby talk, 279
- Bandura, Albert
 behavior studies of, 213–214, 220, 604
 media, effects of violence in, 217
 reciprocal determinism, 449
- Bandura studies, 213–214
- Barbiturates, 169 (table), 174, 180, 187
- Bardem, Javier, 8
- Bargaining, 415
- Barnum effect*, 58
- Basic instincts, 307
- Basilar membrane, 131–132, 134, 142, 147
- Battlefield neurosis, 251. *See also* Posttraumatic stress disorder (PTSD)
- Bayley Scale for Infant Development, 349
- Bazooka (cocaine derivative), 175
- Beautiful Mind, A*, 555–556
- Beck, Aaron, 587–589, 595–596, 601, 605, 610
- Bed-wetting (enuresis), 162, 186, 199, 596 (table)
- Behavioral genetics, 67–68
- Behavioral perspective, 26, 321–322
- Behavioral self-control training, 593
- Behavior and behavior therapy, 209–210, 219, 590
 for anxiety disorders, social skills deficits, and self-control, 596
 aversive conditioning, 584, 604, 610
 changing, through cognitive dissonance, 622–623
 controlling, and mental processes, 4–5
 defined, 582, 610
 for depression, 596, 596 (table)
 for developmental disabilities, 596 (table)
 electroconvulsive therapy for, 600
 fear-reduction methods, 582–583, 604, 610
 operant-conditioning procedures, 584–586, 604, 610
 self-control methods, 586, 604, 610
 for treating enuresis (bed-wetting), 596 (table)
See also Operants; and entries for specific behaviors
- Behaviorism
 defined, 12, 26
 evolutionary and biological perspectives, 16–17
 focus of research, 449, 454
 key concepts in, 15
 limitations of, 440
 Skinner, B. F., 13, 436–437
 view of personality, 449
 Watson, John Broadus, 11–13, 214, 436–437
- Behavior modification, 582, 596 (table). *See also* Behavior and behavior therapy
- Behavior-rating scales, 447
- Behrman, Andy, 550
- Bell-and-pad treatment, for bed-wetting, 199
- Bell-shaped curve, 51–52. *See also* Normal distribution
- Bem, Sandra Lipsitz, 459
- Bendectin, 350
- Bennies (Benzedrine), 174
- Benoit, Chris, 98
- Benoit, Nancy, 98
- Benson, Herbert, 527
- Benzedrine (bennies), 174
- Benzodiazepines, 544, 598, 611
- Bereavement, 416–417, 421
- Bernal, Martha E., 22, 449
- Beta waves, 155
- BFT. *See* Biofeedback training
- Bhutto, Benazir, 617
- Bias
 cultural, 22, 293, 303
 experimenter, 43
- Bible, 218
- Bimodal, 49
- Binet, Alfred, 288–289
- Binocular cue, 124, 126, 147
- Biochemical incompatibility, 351
- Biofeedback, 153, 186
- Biofeedback training (BFT), 166–167, 209, 585, 610
- Biological factors
 cancer, 519, 523
 health problems, 521–523 and health problems, 518–519
 heart disease, 519, 521
 mood disorders, 553, 565
 schizophrenia, 557, 559, 565
- Biological perspective
 of antisocial personality disorder, 562–563, 565
 on anxiety disorders, 544–545, 564
 defined, 17, 26
- Biological preparedness, 197
- Biological processes and structures, 16. *See also* Evolutionary psychology
- Biological therapies
 drug therapy, 598–600, 605, 611
 effectiveness of, 601, 603, 605
 psychosurgery, 601, 605
- Biology
 aggression, 319
 natural selection, 66
 traits, 434–436
- Biopsychosocial model (interactionist model), 536, 544–545, 568
- Bipolar cells, 114
- Bipolar depression, 550, 568, 605
- Bipolar disorder
 alleviating depression, 606
 defined, 549–550
 drug treatment for, 600, 605, 611
 origins of, 565
 psychodynamic perspective of, 552
- psychotherapy, effectiveness of, 595
 symptoms of, 568
- Bisexual, 471–472. *See also* Sexual orientation
- Blass, Thomas, 635–636
- Blind, 43, 45, 60
- Blind spot, 115–116
- Blood pressure, and meditation, 166
- BMI. *See* Body mass index (BMI)
- Body-kinesthetic talent, as aspect of intelligence, 283–284
- Body language, 581, 630–631, 649
- Body mass index (BMI), 316
- Body odor, 136
- Body temperature, and hypothalamus, 103
- Bogen, Joseph, 94
- Bone density, changes in, 409
- Borderline personality disorder, 561, 565, 569
- Bottom-up processing, 123, 147
- Botulism, 79
- Bower, Gordon, 330
- Boyd-Franklin, Nancy, 22
- Boys, sexual urges among adolescent, 428. *See also* Adolescence; Gender; Men
- Bradykinin, 139
- Brain and brain development during adolescence, 384, 387
 and biological perspective studies, 26
 central processing unit, 85–89
 cerebral cortex, 89–92
 damage to, 85
 deficits associated with schizophrenia, 557–558, 565
 electroencephalograph (EEG), 85
 and exaggerated associations, 257
 experimenting with, 85
 facial muscles and, 328
 functions of, 103
 gender-typing role in, 465–466, 468
 handedness and hyperactivity, 174
 during infancy and early childhood, 360–363, 380
 language functions, 91–92
 left brain, right brain, 93
 left hemisphere, 91–93

- Brain and brain development
(*continued*)
limbic system, 88 (fig.), 89
and memory, 251–255,
260
neural connections in,
360 (fig.)
parts of, 74–76, 86 (fig.)
and sexual orientation,
473–475
size of, related to intelli-
gence, 84
species, differences in,
73–74
split-brain experiments,
94–95, 103
structure and functions of,
103
weight of, 73
See also Mirror neurons;
Nervous system; and
*entries for specific
parts*
- Brain imaging, 39–41, 45
Brainstem, 74
Brain waves, 85, 154–155,
186. *See also* Sleep
Breathalyzer test, 584
Brightness constancy, 128–129
Broad average, 51
Broca, Paul, 92
Broca's aphasia, 92, 103
Broca's area, 92, 103
Bryant, William Cullen,
416–417
Bucy, Paul, 88
Buffers, 637, 650
Bulimia nervosa, 312–315,
338, 596 (table)
Bush, George W., 642
Bystander effect, 645, 650
- C**
- Caffeine, 348, 350–351
Cajal, Santiago Ramón y, 75
Calkins, Mary Whiton,
20–21, 26
Camel cigarettes, 12
Cancer
biological factors lead-
ing to, 519, 523,
530–531
cervical, 492
chemotherapy for,
524–525
death rates from, 524
preventing and coping
with, 529
psychological factors
leading to, 519, 524,
530–531
sociocultural factors lead-
ing to, 519, 524, 531
Canis lupus, 435–436
Cannon, Walter, 516
Cannon-Bard theory of
emotion, 330, 339
Capsulotomy, 602
Carbon monoxide, 187, 349
Carcinogenic genes, and
cancer, 523
Career
psychological tests for find-
ing, 451–453, 455
in psychology, 24–25
Carneal, Michael, 216
Cartwright, Joanne, 572
Case study, 37, 45
Cat, brain of, 74
Cataracts, 408
Catastrophize, 507, 605–606,
608, 610
Catatonic schizophrenia, 556,
565, 569
Catharsis, 576
Catharsis controversy, 321
CAT scan. *See* Computerized
axial tomography
Cattell's Culture-Fair Intelli-
gence Test, 293
Cause and effect, and cor-
relation research,
41–42. *See also*
Experimental
method
Ceci, Stephen J., 250
Cell body, 74–76, 102
Cell membrane, 77
Cells, 68, 107. *See also* *entries
for specific cell types*
Cellular clock theory,
410, 420
Cellular theories, of aging,
411, 420
Center, 367
Central nervous system
(CNS), 81, 83–84
and antianxiety drugs,
598–599
divisions and functions of,
103
Central nervous system
depressant, 87
Central processing unit, of
brain, 85–89
Central route to persuasion,
619
Central tendencies, measures
of, 47–49, 60
Cerebellum, 74, 86–87, 103
Cerebral cortex, 257
and articulating speech,
275–276
auditory input and, 132
during childhood,
360–361, 380
defined, 88–89
geography of, 89 (fig.)
hippocampus and, 252
language and thinking,
parts involved in,
90–93, 103
occipital lobe of, 146
parts of, 89–90, 103
Cerebrum, 74, 86–89
Cerletti, Ugo, 600
Cervical cancer, 492
*Character Strengths and Vir-
tues: A Handbook
and Classification
(the CVs)*, 434
Chariot, Jean Martin, 288
Chemical senses, 135–137,
147
Chemistry, and aggression,
319
Chemotherapy, 524
Child abuse
and eating disorders, 315
factors associated with,
377, 381
incidence of, 377
as influence on sexual
orientation, 473
repressed memories of,
250, 568
victims of, 377
See also Sex abuse
Childhood, physical develop-
ment during
brain, 360–361, 380
motor development, 361
perpetual development,
362–363
Children
hyperactive, 174, 187
and violence in media,
216–218
See also Adolescence
Children with oppositional
behavior, 596 (table)
Chimpanzees
as closest human genetic
relative, 70
“flash of insight,” 14
and sign language,
275–276
Chlamydia, 492, 493 (table)
Chlordiazepoxide, 598
Choleric type, 432
Cholesterol
and heart disease, 519, 521
and sexual dysfunctions,
487
Chomsky, Noam, 281
Chorionic villus sampling
(CVS), 352–353
Chromosomes, genes and,
68–70
Chronic fatigue, 519,
522, 531
Chunking, 236–237, 241, 259
Cigarettes, 169 (table), 187.
See also Nicotine
Cigars, 176–178
Cingulate gyrus, 88
Cingulotomy, 602
Circadian rhythm, 153–154,
186
Cirrhosis of the liver, 173
Clark, Kenneth, 21–22, 26
Clark, Mamie Phipps,
21–22, 26
Classical conditioning
applications of, 197–199
contingency theory, 212,
220
defined, 190, 219
discrimination, 195, 219
experiments with dogs, 212
extinction, 193–194, 219
generalization, 195, 219
higher order conditioning,
196, 219
operant conditioning *vs.*,
200
preparedness and condi-
tioning of fear,
197, 219
schematic representation
of, 192 (fig.)
spontaneous recovery in,
193–195, 204, 219
stimuli and responses in,
191, 219
taste aversion, 191–193,
219
Claustrophobia, 539
Clear-cut attachment phase,
374, 381
Clearness, 126, 147
Client-centered therapy
defined, 579, 604, 610
goal of, 443
measuring effectiveness of,
595, 611
qualities of, 580
Climacteric, 402
Clinical psychologist, 6, 26
Clinical scales, 450
Clitoris, 483
Closure, 147
Clozapine (Clozaril), 599
Coca-Cola, 175
Cocaine
defined, 174
dependency, 176, 183
derivatives, 175
effects of, 187
overdose do to, 171
and persistent arousal, 79
and risks of stillbirth,
350, 380
use, incidence of, 168
use of, in U.S., 170–171

- Cochlea, 147
- Cochlear implants, 131, 134, 147
- Cocktail-party effect, 152
- Codeine, 172
- “Coffee break,” 12
- Cognition, 18, 263, 277
- Cognitive adaptation theory, 515
- Cognitive appraisal, in
acquiring attitudes, 618–619
- Cognitive appraisal theory of emotion, 330–332, 339
- Cognitive-behavioral approach, 183–184
- Cognitive-behavior therapy, 590–591, 605–606
for bulimia nervosa, 596 (table)
for depression, 596
and drug therapy, 599
for generalized anxiety disorder, 596 (table)
for panic disorders, 596 (table)
for schizophrenia, 603
- Cognitive development
during adolescence, 387
egocentrism, 388–389, 420
formal operational stage, 388–389, 420
postconventional level of moral reasoning, 389–390
among children
cognitive-development theory (Jean Piaget), 363–369, 380
moral development theory (Lawrence Kohlberg), 370–371, 380
sociocultural theory (Lev Vygotsky), 369–370, 380
in college life, 400
during early adulthood, 400–401, 420
during late adulthood, 411–413, 420
during middle adulthood, 402–403, 420
postformal thinking, 400–401
- Cognitive-development theory (Jean Piaget)
accommodation, 363–364, 380
assimilation, 363, 380
concrete-operational stage, 364, 368, 380
evaluation of, 368–369
formal-operational stage, 364, 380
preoperational stage, 364, 366–368, 380
sensorimotor stage, 364–366, 380
- Cognitive-dissonance theory, 305, 622–623, 649
- Cognitive factors
contributed to depression, 552
in learning, 211–214, 220
- Cognitive learning.
See Observational learning
- Cognitive manipulations, 321
- Cognitive maps, 211–212, 220, 271 (fig.)
- Cognitive psychologist, 26
- Cognitive psychology, 197
and aggression, 320–321, 338
learning, defined, 189–190
- Cognitive skills, gender differences in, 460–464
- Cognitive theory
on anxiety disorders, 543, 564, 568
defined, 17, 26
and discrimination, 195
on mood disorders, 552, 565
on personality disorders, 562, 565
- Cognitive therapy
Beck, Aaron, 587–589
cognitive-behavior therapy, 590–591, 596, 605
defined, 587, 610
for depression, 596, 611
for headaches, 596 (table)
rational-emotive behavior therapy (Albert Ellis), 589–590, 605
for treating irrational fears, 601, 605
- Cohabitation (“living together”), 418–419
- Cohort effect, 343
- Coke (cocaine), 175
- Colic, 359
- Collective unconscious, 429, 454
- Collectivism, individualism *vs.*, 446, 454, 650
- Colleges, alcoholism on campus, 171
- Color
additive and subtractive mixtures, 117–118
complementary, 117
perception of, 118–120, 119 (fig.), 146
perceptual dimensions of, 146
warm and cool, 117
- Color-blindness, 120, 146
- Color constancy, 127
- Color vision, 20, 116–119
- Color wheel, 117 (fig.), 146
- Comas-Diaz, Lillian, 22, 449
- Command post (hearing), 132
- Commitment, 394, 480–481
- Common fate, 122–123, 147
- Common sense theory of emotions, 329
- Community mental health movement, 574
- Competencies, 438
- Complementary colors, 117
- Compulsions, 541, 543. *See also* Obsessive-compulsive disorder (OCD)
- Computerized axial tomography (CAT scan), 17, 40, 45, 85, 103
- Concept, 264–265, 302
- Concrete-operational stage, 364, 368
- Conditional positive regard, 443
- Conditional reflexes, 191
- Conditioned reinforcer, 204
- Conditioned response (CR), 191, 194, 214, 219
- Conditioned stimulus (CS)
and contingency theory, 212, 214
defined, 191
extinction role and, 198, 219
and higher order conditioning, 197
and taste aversion, 192
- Conditioning, 12, 26, 610
- Conditioning, in acquiring attitudes, 618
- Conditions of worth, 443
- Condoms, 494
- Conductive deafness, 147
- Cones, 114–115, 119, 142, 146. *See also* Photoreceptors
- Confident power, 404–405
- Conflict, and stress, 503–506, 530
- Conformity, 637–639, 650
- Congenital syphilis, 346–347, 380
- Conscientiousness, 433, 448, 454
- Conscious, 425, 454. *See also* Freud, Sigmund
- Consciousness, 17
altering through biofeedback, 186
drugs, 168–185
hypnosis, 186
meditation, 186
as awareness, 151–152
defined, 186
meanings of, 151–153
as personal unity, 153
and question of existence, 141
as waking state, 153
- Consensus, 630, 649
- Conservation, 367
- Conservation of resources theory, 515
- Consistency, 630, 649
- Consortium of Social Science Associations (COSSA), 628
- Consummate love, 480–481, 496
- Contact comfort, 374–375, 381
- Contemporary psychological models, 536–537
- Context-dependent memory, 245, 260. *See also* State-dependent memory
- Contingency theory, 212, 220
- Continuity, 122–1123
- Continuous positive airway pressure (CPAP), 161–162
- Continuous reinforcement, 207, 220
- Control, 511–513, 530
- Control group, 43, 45
- Conventional level, 371, 380
- Convergence, 126, 147
- Convergent thinking, 287
- Conversion disorder, 548–549, 564, 568
- Cornea, 114, 146
- Coronary heart disease
biological factors leading to, 519, 521, 531
and physical activity, 528–529
psychological risk factors of, 519, 521
reducing risk, 529
sociocultural influences leading to, 519, 522–523
- Coronary-prone behavior pattern, 509
- Corpus callosum, 86, 88–89, 94, 252
- Correlation, 34–35, 45
- Correlational method, 41–42, 60
- Correlation coefficient, 41, 45
- Cortex, 90–91, 103, 159

- Corticosteroids, 96–97, 514–515 (fig.), 517, 530
- Corticotrophin-releasing hormone, 96, 514–515 (fig.)
- Cortisol (epinephrine), 144, 518
- Cosmic rays, 113
- Cosmopolitan*, 38
- COSSA. *See* Consortium of Social Science Associations (COSSA)
- Costa Paul T., Jr., 448
- Counseling psychologist, 7, 26
- Counterconditioning, 198, 583. *See also* “Little Albert”
- Couple therapy, 592, 611
- CPAP. *See* Continuous positive airway pressure (CPAP)
- CR. *See* Conditioned response (CR)
- Crack (cocaine derivative), 175
- Creative self, 429
- Creativity, 284–288, 302
- Cretinism, 97
- Crib death, 358
- Crick, Francis, 68
- Critical periods, of vulnerability during pregnancy, 346–347, 380
- Critical thinking, 103
about psychological advice, on Internet, 32
defined, 30, 60
goals of, 30–31
principles of, 30–32
- Cross-linking, 411
- Cross-linking theory, 411
- Cross-sectional research, 342–343
- Crying, 278, 358–359, 380
- Crystallized intelligence, 402–404, 420
- Crystal supergrass (phencyclidine or PCP), 181
- CS. *See* Conditioned response (CR)
- CS. *See* Conditioned stimulus (CS)
- Culturally-biased intelligence test, 22, 293, 303
- Cultural stereotyping, 218
- Culture-bound disorders, 536
- Culture(s)
and aggression, 320
and alcohol abuse, 172
beliefs regarding sexuality, 457–458
dreams across, 158
language and, 277–278
- See also* Sociocultural factors; Sociocultural perspective; *and entries for specific cultures*
- Cumulative recorder, 202–203
- Cunningham, Merce, 411
- Curare, 79
- Cut friends, 418
- CVS. *See* Chorionic villus sampling (CVS)
- CyberPsychology and Behavior*, 479
- Cystic fibrosis, 353
- D**
- Daily hassles, stress and, 501–504, 530
- Danner, Mark, 616
- Dark adaptation, 116, 116 (fig.)
- Darwin, Charles
Descent of Man, The, 65
evolutionary perspective of, 26, 45–47
and facial expressions, 325, 339
and functionalists view, 11
and natural selection, 16
Origin of Species, 191
profile, 64–65
voyage to Galápagos Islands, 63
- Date rape, 488–489
- Dating, 418
- Day care, 378–379
- Deafness, 133–134, 147
- Death and dying, 415–417, 421
- Decentration, 368
- Deception, 56, 61
- Decibels, 131, 131 (fig.)
- Decision making
framing effect, 273–274, 302
group, 640–642, 650
heuristics in, 272–273, 302
overconfidence, 274
- Declarative memory, 225
- Deep brain stimulation, 602
- DeepPaint, 571
- Defense mechanism, 425–426, 431, 454
- Deindividuation, 322, 643–644, 650
- Dèjà vu, 245
- Delayed reinforcer, 204
- Delgado, José, 90
- Delirium tremens (DTs), 169
- Delta9-tetrahydrocannabinol (THC), 178, 187
- Delta waves, 155
- Delusions, 554, 556, 569
- Dementia, 412–413
- Demerol, 172
- Demjanjuk, John, 241
- Democritus, 9
- Demonological model, 535, 568, 610
- Dendrites, 74–76, 102, 387
- Denial, 415
- Denial, as defense mechanism, 426 (table)
- Department of Nutrition for Health and Development, World Health Organization, 355
- Dependence, 169–170, 186.
See also Substance abuse and dependency
- Dependent variable, 42, 45
- Depolarizing, 77
- Depressants
alcohol, 170–172, 180
barbiturates, 174, 180, 187
central nervous system, 87
defined, 168
opiates, 172–173, 180, 186
- Depression
among twins, 71
antidepressants for, 599, 603, 611
attributions for failure and, 552
cognitive-behavior therapy for, 591, 603, 611
defined, 606
and eating disorders, 315
excesses or deficiencies of neurotransmitters linked to, 79
gender differences, 551
and grief, 415
and heart disease, 519, 522
interpersonal psychotherapy for, 596 (table)
involving cognitions of helplessness and hopelessness, 325–326
and irrational beliefs, 508, 605
postpartum, 354
prevalence of, 568
treatment-resistant, 602, 605
women and, 550–551
See also Major depressive disorder
- Depression-mourning, 416
- Depressive disorder, 547
- Depth perception, 124–126, 147
- DES. *See* Diethylstilbestrol (DES)
- Descriptive statistics, 47–49, 60
- Desensitization, 112, 146
- Desire, 482–483
- Despair, integrity *vs.*, 372
- Developmental psychologist, 7, 26, 341
- Dexedrine, 174
- Dexies (Dexedrine), 174
- Diagnostic and Statistical Manual (DSM), 537, 568. *See also* DSM-IV-TR
- Diathesis-stress model, 536, 568
- Diazepam, 170
- Dichromat, 120
- DID. *See* Dissociative identify disorder (DID)
- Die Hard*, 216
- Diet, modify, to reduce risk of heart disease, 529
- Diethylstilbestrol (DES), 148, 350, 380
- Diet recommendations, from American Heart Association, 336
- Difede, JoAnn, 571
- Difference threshold, 110, 146
- Diffusion of responsibility, 322, 640, 642, 644–645, 650
- Dinosaur, 66
- Dinosaur Park, 197
- Direct inner awareness, 152–153
- Disaster survivors, rats searching for, 210
- Discrimination, 449. *See also* Prejudice
- Discriminative stimuli, 195, 206–207, 219–220
- Disgust, 325
- Disgust, emotion of, 332
- Disinhibition, 217
- Disorganization-despair, 416, 421
- Disorganized schizophrenia, 556, 565, 568
- Displace, 237, 259
- Displaced, 428
- Displacement, 277, 302, 426 (table)
- Dispositional attribution, 627, 629–630, 649
- Dissimilarity, prejudice from, 625
- Dissociative amnesia, 249, 545, 564, 568
- Dissociative disorders
defined, 568
origins of, 546–547, 564, 568
types of, 545–546

- See also entries for specific disorders*
- Dissociative fugue, 545, 564, 568
- Dissociative identify disorder (DID), 37, 533, 545–546, 564, 568
- Distinctiveness, 630, 649
- Disulfiram, 173
- Divergent thinking, 287
- Divided-brain experiment, 95.
See also Split-brain experiment
- Dizygotic (DZ) twins, 70–72, 296–297, 473, 544
and schizophrenia, 558
- DNA (deoxyribonucleic acid), 68, 102
- D.O. *See* Doctor of osteopathy (D.O.)
- Doctoral psychology workforce, 20
- Doctor of osteopathy (D.O.), 6
- Doctor of psychology (Psy.D.), 6, 25
- Dogs
and contingency theory, 212
and learned helplessness, 552
personalities of, 435–436
salivation, 190–191, 193–195, 219
sense of smell, 135
See also Pavlov, Ivan
- Doom, 216
- Dopamine
defined, 79
in extroverts *vs.* introverts, 434
functions, 80
and mood disorders, 553, 611
and nicotine, 176
Parkinson's disease, link to, 102
and schizophrenia, 599
- Dopamine theory, of schizophrenia, 559, 569
- Double-blind study, 43, 45, 60
- Dougherty, Darin D., 602
- Down syndrome, 69–71, 102, 295, 352
- Dream analysis, 577–578, 610
- Dreaming, 156
- Dreams and dreaming, 155, 157–159. *See also* Freud, Sigmund
- Drive for superiority, 429
- Drive-reductionism, 307, 338
- Drives, 306, 338. *See also* entries for specific drives
- Drugs
altering consciousness through, 186
depressants, 170–174
hallucinogenic, 178–181
stimulants, 174–178
substance abuse and dependence, 168–170
illicit, taken by pregnant mother, 348, 380
prescriptions taken by mother during pregnancy, 347–348, 380
psychoactive, 153
for sexual dysfunction, 488
sleeping without, 182–185
trends in lifetime use of various, 169 (table)
See also entries for specific drugs
- Drug therapy, 598–600
- DSM. *See* *Diagnostic and Statistical Manual (DSM)*
- DSM-IV-TR, 537
- 3D Studio MAX, 571
- DTs. *See* Delirium tremens (DTs)
- Duchenne smile, 328
- Ductless glands, 95, 103
- Dying. *See* Death and dying
- Dyslexia, 92
- Dyspareunia, 486–487, 496
- E**
- Eardrum, 131, 147
- Early adulthood, 399–401, 420
- Ears, 131–132, 142, 147
- Eating disorders
anorexia nervosa, 312–314, 338
antidepressants for, 599
bulimia nervosa, 312–315, 338
defined, 312
origins of, 315–317, 338
- Ebbinghaus, Hermann, 246–248, 260
- Echo, 234, 259
- Echoic memory, 234
- ECT. *See* Electroconvulsive therapy (ECT)
- ED. *See* Erectile dysfunction (ED)
- Education
for career in psychology, 24–25
influence on intelligence, 298
level of, connected with sexual behavior, 485, 496
- Educational psychologist, 7
- EEG. *See* Electroencephalograph (EEG)
- Efferent neuron, 76, 102
- Effexor, 600
- Effort justification, 622–623
- Ego, 425, 431, 448, 454
- Ego analysis, 578, 604
- Egocentrism
among adolescents, 388–390, 420
defined, 366–367
- Ego identity, 392–394, 401, 430
- Ego integrity, 413–414, 416, 421
- Eidetic imagery, 233
- Einstein, Albert, 84
- Ejaculation, 483–484
- Ekman, Paul, 326, 339
- Elaboration likelihood model, 649
- Elaborative rehearsal, 230, 241, 259
- Electra complex
and gender-typing, 428, 466, 495
psychosexual development and, 431
and sexual orientation, 473
- Electrical stimulation, and aggression, 319, 338
- Electrochemical voyage, 76–77
- Electroconvulsive therapy (ECT), 600, 603, 605, 611
- Electroencephalograph (EEG), 85, 103, 155, 186, 586. *See also* Sleep
- Electromagnetic energy, spectrum of, 113
- Electromyograph (EMG), 167, 585
- Elements of Psychophysics*, 10, 247
- Elle*, 38
- Ellis, Albert, 506–507
profile of, 589
psychotherapy, effectiveness of, 595
rational-emotive behavior therapy, 589–590, 605, 611
- Embarrassment, 325
- Embedded-figures test, 462 (fig.)
- Embryo, risks to, 347–349, 380
- Embryonic stage, 344, 345 (fig.), 380
- EMDR. *See* Eye-movement desensitization and reprocessing (EMDR)
- Emerging adulthood, 397–399, 420
- EMG. *See* Electromyograph (EMG)
- Emotional development. *See* Social and emotional development
- Emotional intelligence, 285, 302
- Emotional stability-instability, 448, 454
- Emotional strain, and heart disease, 519, 522.
See also Stress
- Emotion-focused coping, with stress, 526
- Emotions
and behavioral tendencies, 325–326
components of, 325 (table)
defined, 324
evaluation of theories, 332–333
expression of, 325–326
feelings, stimulated, 439–440
motivation and, 324–333, 339
motor neurons and, 91
theories of, 329–333
- Empathic understanding, 580, 610, 650
- Empathy, 91
- Empirical science, 33, 59
- Empty-nest syndrome, 404
- Encode, 438
- Encoding memory, 230, 259
- Endocrine system
adrenal gland, 97
and anxiety disorders, 544, 564
and biological perspective, 17, 26
defined, 95, 103
effects of stress on, 514–515 (fig.), 516
hypothalamus, 96
ovaries, 97–98
pineal gland, 97
pituitary gland, 96–97
steroids, behavior, and mental processes, 98–99
testes, 97–98
thyroid gland, 97
- Endogenous morphine, 80
- Endometriosis, 101
- Endorphins, 79–80, 102, 144, 511
- Engram, 253

- Environmental influences
 on intelligence, 298–299, 303
 on prenatal development, 345–350, 352–353, 380
See also Nurture (environment)
- Environmental psychologist, 7
- Epigenesis (epigenetic framework), 73
- Epilepsy, 94–95
- Epinephrine (adrenaline), 96–97, 103, 254, 514–515 (fig.), 518
- Episodic memory, 224–225, 229, 259
- Epstein-Barr virus, 518
- Erectile dysfunction (ED), 486–487, 496
- Erikson, Erik
 ego integrity *vs.* despair stage, 413
 as neoanalyst, 578
 profile of, 430
 psychoanalysis, 15, 18
 psychodynamic perspective on personality, 448, 454
 psychosocial development, stages of, 372–373, 380–381
 social and emotional developments in mid-adulthood, 416, 420–421
 social relationships, 429–430
- Erogenous zones, 426–427
- Eros, 426, 428
- ESP. *See* Extrasensory perception (ESP)
- Essential hypertension, 521. *See also* Hypertension
- Esteem needs, 310 (fig.)
- Estrogen
 cognitive functioning and, 254
 defined, 98
 depression and, 551
 DES (diethylstilbestrol), 348
 ovaries, 96–98
 during ovulation, 471
 and physical attraction, 478
 and PMS, 100–101
 secondary sex characteristics and, 384, 420
 stress and, 516
- Estrus, 470, 495
- Eternal Sunshine of the Spotless Mind*, 253–254
- Ethical, defined, 54
- Ethical issues, in research, 54–56, 60–61
- Ethical Principles of Psychologists and Code of Conduct* (APA), 56
- Ethnic difference, in intelligence, 292–293, 303
- Ethnic group, 19
- Ethnicity, 19, 449
 and identity development, 395
 in psychology, 20–23, 26
 and psychotherapy, 597–598
 and sexual behavior, 486
 and sexual orientation, 474
- European Americans
 as doctoral-level psychologists, 22
 problems in generalizing from psychological research, 35
- Eustress, 500–501, 530
- Evaluation apprehension, 640, 650
- Event-based task, 228
- Evidence, method of, 431
- Evidence-based practices, 96–597
- Evolution, 26
 defined, 16
 of motivation, 307, 338
 and preparedness, 219
 theory of, 11, 65–67, 102. *See also* Darwin, Charles
- Evolutionary psychology
 and altruism, 646
 and anxiety disorders, 544, 564
 defined, 66–67, 102
 gender-typing in, 465, 468
 methods of perception, 126
 and pain, 139
 and sexually aggressive men, 489
 and spontaneous recovery, 193
 and taste aversion, 193
 tend-and-befriend response, 516
- Exaggerated associations, 257
- Excitatory neurotransmitter glutamate, 544
- Excitement phase, 482–483, 496
- Executive functioning, 361
- Exemplars, 265
- Exercise
 to alleviate depression, 606, 608
 for pregnant women, 345
 to reduce cancer, 520
 to reduce risk of heart disease, 520, 529
 to reduce stress, 527–529
- Exhaustion stage, 517, 530
- Existential intelligence, 283–284
- Existentialism, 17, 441
- Expectancies, 437–439
- Experience, openness to, 433
- Experiment, 42–46
- Experimental group, 43
- Experimental method, 60
- Experimental psychologist, 8, 26
- Experimenter bias, 43, 276
- Expertise, problem solving and, 269–270, 302
- Explicit memory, 225, 229, 259
- Exploration, 394
- Exposure and response prevention, 596 (table)
- Exposure therapy, 582, 596 (table), 601
- Externalizing, responses to feelings of depression, 551
- External locus of control, 512
- Externals, 513
- Extinction, 193–194, 204, 219
- Extrasensory perception (ESP), 141, 143
- Extraversion, 448, 454, 462
- Extravert, 432, 434
- Extrinsic rewards, 323
- Eye, 114–118, 142, 146. *See also* Vision
- Eye contact, 631
- Eye-movement desensitization and reprocessing (EMDR), 601
- Eyewitness testimony, 240
- Eysenck, Hans, 31, 432–433, 448, 594
- ## F
- Facebook, 393
- Facial expression, 325–326, 332, 339
- Facial-feedback hypothesis, 328–329
- Factor analysis, 282
- Factor theories, 282–283
- Failure, attributions for, and depression, 552
- Fallopian tube, 341, 380
- False memories. *See* Pseudo-memories (false memories)
- False memory syndrome, 250
- Family history. *See* Genetic influences or factors
- Family therapy, 592–593, 611
- FAPs. *See* Fixed-action patterns (FAPs)
- Far Eastern meditation, 166
- Farsighted, 115
- FAS. *See* Fetal alcohol syndrome (FAS)
- Fear appeal, 620
- Fear of flying, overcoming, 583
- Fear-reduction methods, 582–583, 610
- Fear(s)
 amygdala and, 324–325
 counterconditioning and, 198
 preparedness and conditioning of, 197
See also entries for specific psychological disorders
- Feature detectors, 111–112, 146
- Fechner, Gustav Theodor, 10, 108–109, 247
- Feeling-of-knowing experience, 244–245
- Fels Longitudinal Study, 342
- Female sexual arousal disorder, 486–487, 496
- Femininity, 19
- Fertilization, egg, 341
- Fetal alcohol syndrome (FAS), 348, 380
- Fetal stage, 345, 380
- Fetal testosterone, and gender-typing, 464, 466
- Fetus, 345 (fig.), 346–349, 380
- Fight-or-flight reaction, 514–516
- Figure-ground perception, 121–122, 146
- File-drawer problem, 143
- Final acceptance, 415
- Firing, neuron, 78, 102, 134
- First impressions, importance of, 626–627, 649
- First-shift rule, 641, 650
- Fish, stickleback, 67
- Fissures, 89–90, 103
- Fitz-Roy, Robert, 63
- Five-factor model, 432–434, 448
- Fixation, 427
- Fixed-action patterns (FAPs), 307
- Fixed-interval scallop, 207 (fig.), 208, 212
- Fixed-interval schedule, 220
- Fixed-ratio schedule, 220
- Flashback, 181, 187
- Flashbulb memories, 243, 260
- Flavor, 135

- Flooding, 198, 582, 610
 Fluid intelligence, 404, 420
 Flying, overcoming fear of, 583
 fMRI. *See* Functional magnetic resonance imaging (fMRI)
 Follicle-stimulating hormone, 96
 Foot-in-the-door technique, 622, 636, 650
 Forbes Nash, John, 555–556
 Forced-choice format, 449
 Foreclosure, 394, 420
 Forensic psychologist, 8
 Forgetting, 250
 anterograde amnesia, 251, 260
 Ebbinghaus, Hermann, 246–248, 260
 infantile amnesia, 251, 260
 interference theory, 249
 memory tasks used in measuring, 247–248
 nonsense syllables, 246, 260
 repression, 249, 251, 260
 retrograde amnesia, 251–252
 See also Memory
 Formal operational stage, 364, 368, 388–390, 420. *See also* Preoperational stage
 Fornix, 88
 Foster, Jodie, 534
 Four S's
 sex therapy, 482, 487–488, 496
 sexual behavior, 482–486, 496
 sexual dysfunctions, 482, 486–487, 496
 sexual response cycle, 482–484, 496
 Fovea, 115
 Fox, Michael J., 79
 Frames of reference, 442, 580
 Framing effect, 273–274, 302
 Fraternal twins. *See* Dizygotic (DZ) twins
 Free association, 576
 Free-radical theory, 411
 Frequency theory, 134, 147
 Freud, Anne, 430, 578
 Freud, Sigmund, 14–15, 18
 and aggression, 319–321, 338
 and cocaine use, 175
 consulting room, 576 (image)
 dreams as expression of unconscious desires, 158–159, 581, 610
 as founder of psychoanalysis, 26
 and hypnotism, 165
 infantile amnesia, 251, 260
 and Oedipal complex, 543
 preconscious and unconscious thoughts and feelings, 152
 “protected sleep,” 186
 psychoanalysis, key concepts of, 14–15
 psychodynamic perspective on personality, 448
 psychodynamic therapies, 575–576, 604, 610
 psychosexual development theory, 424–428
 repressed memories, 260
 scientific analysis of human personality and behavior, 430–431
 sexual development as basis for personality development, 362
 and tension, 307
 theory regarding sexual orientation and, 473
 Friends with benefits (FWBs), 418
 Frontal lobe, 88–89, 91–92, 103, 420
Frontispiece to Kerby, 125
Frustration and Aggression, 195
 Fuji, Ken'ichi, 203
 Functional analysis, 586
 Functional fixedness, problem solving and, 271, 302
 Functionalism, 10–12, 15, 26
 Functional magnetic resonance imaging (fMRI)
 adolescents' frontal lobes, 387
 biological perspective and, 17
 as brain imaging technique, 40–41, 45, 103
 prefrontal cortex, 85
 Fundamental attribution errors, 627–629, 649
 FWBs. *See* Friends with benefits (FWBs)
- G**
 GABA. *See* Gamma-aminobutyric acid (GABA)
 Gage, Phineas, 39–40, 85
 Galton, Francis, 39
 Galvani, Luigi, 76
 Gamma-aminobutyric acid (GABA), 79–80, 102, 544, 564, 568
 Gamma knife surgery, 602
 Ganglion cells, 114–116
 Ganzfeld procedure, 143
 Garcia, John, 202
 Gardner's theory of multiple intelligence, 283–284, 286, 296, 302
 GAS. *See* General adaptation syndrome (GAS)
 Gate theory, 144
 Gay males, 19
 Gay marriage, 419
 Gazing, 631, 649
 Gazzaniga, Michael, 94
 Gender
 alcoholism, 171–172
 and altruism, 646
 cognitive skills, differences in, 460–462
 and cultural expectations, 19, 449
 defined, 459
 differences in intellectual functioning, 293–195, 303
 differences in moral development, 390
 influences of, on behavior and mental processes, 22–23
 internalizing and externalizing feelings of depression, 551
 pain, differences in responding and experiencing, 138 (table)
 personality differences, 462, 495
 and psychology, 26
 social behavior differences, 463
 women in psychology, 20–21
 See also Stereotypes
 Gender nonconformity, 473
 Gender role, 459, 461 (table), 495
 Gender-schema theory, 467–469, 495
 Gender stereotypes, 459–460, 495
 Gender-typing
 defined, 463–464
 nature and, 464–466, 468
 nurture and, 466–469
 parental roles in, 467
 prenatal brain development, 465–466, 468
 roles of evolution and heredity, 465
 General adaptation syndrome (GAS), 514–517, 520, 530
 General (g) factor, 286
 General intelligence, 282
 Generalization, 195, 219
 Generalize, 34–35
 Generalized anxiety disorder, 540–541, 564, 568
 Generativity *vs.* stagnation, 372, 403–406, 420
 Genes and chromosomes, 68–70, 102
 Genetic code, 67–69, 102
 Genetic counseling, 349, 352–353
 Genetic-environmental correlation, 72–73. *See also* Nature (heredity); Nurture (environment)
 Genetic influences or factors on anxiety disorders, 544, 564, 568
 on eating disorders, 316
 health problems and, 519
 on intelligence, 296–297, 303
 on mood disorders, 553, 565, 568
 on personality disorders, 562–563, 569
 on schizophrenia, 558–559, 565
 on sexual orientation, 473
 Genetic makeup, 70
 Genetic predisposition, 519
 Genital herpes, 492, 493 (table)
 Genital stage, of psychosexual development, 426, 428, 448, 454
 Genital warts, 492, 493 (table)
 Genotype, 69
 Genovese, 645–646
 Genuineness, 580, 610
 German measles. *See* Rubella (German measles)
 Germinal stage (period of the ovum), 344, 380
 Gershoff, Elizabeth, 205–206
 Gestalt psychology and therapy
 concepts of, 15
 defined, 13–14, 26
 directive methods of therapy, 604
 as humanistic therapy, 579–581, 610
 and perceptual organization, 121–123, 146–147
 See also entries for individual psychologists
 Giftedness, 295–296, 303
 Girls, 384, 386, 428. *See also* Adolescence; Gender; Women

- Glands, 95, 102. *See also* Endocrine system; *and entries for specific glands*
- Glaucoma, 408
- Glia, 74
- Globalizing, 608
- Glutamate, 254
- Gonorrhea, 493 (table)
- Goodall, Jane, 38
- Goodenough-Harris Drawing Test, 293
- Gottfredson, Linda, 285
- Gradient, 125. *See also* Texture gradient
- Graduate Record Examination (GRE), 24, 294–295
- Graduate Study in Psychology*, 24
- Grammar, development of, 278–279
- Grandma Moses, 411
- Grand Theft Auto*, 216
- Grasping, 355
- Gray matter, 83, 103, 557
- GRE. *See* Graduate Record Examination (GRE)
- Greens, Beverly, 449
- Grief, 325, 416–417, 421. *See also* Death and dying
- Group behavior, 639
 - altruism, 644–646, 650
 - deindividuation, 643–644, 650
 - group decision making, 640–642, 650
 - groupthink, 642–643, 650
 - mob behavior, 643–644, 650
 - polarization, 641–642, 650
 - social facilitation, 640, 650
 - victim, 646, 650
- Group decision making, 640–642, 650
- Group test, 291
- Group therapy
 - advantages, 591–592, 611
 - couple therapy, 592, 611
 - family therapy, 592–593, 611
 - self-help and support groups, 593, 611
- Groupthink, 642–643, 650
- Growth hormone, 97
- Growth-hormone-releasing factor (hGRF), 96
- Guilt, initiative *vs.*, 372–373
- H**
- Habit, importance of, 26
- Habitual task, 228
- Habituation, 217
- Hair cells, 132, 134, 142
- Hall, G. Stanley, 390
- Hallucinations, 29, 161, 187, 534, 556, 568
- Hallucinogenic drugs, 178–181, 187. *See also entries for specific types*
- Hallucinogen persisting perception disorder (HPPD), 181
- Hamlet*, 216, 218
- Hammer, 131
- Hammer of Witches, The*, 535
- Handedness, 93–94, 103
- Happiness, 325–327, 331, 339
- Harris, Eric, 216
- Hashish (hash), 178–179
- HDL. *See* High-density lipoprotein (HDL)
- Headaches, 520, 529, 531
- Head start program, 52
- Health, psychology and, 518–525, 531
- Health disease
- Health problems, stress and, 502–503, 530. *See also entries for specific problems*
- Health psychologist, 8, 26
- Healthy psychology, 501
- Hearing, 142
 - absolute threshold as measure of, 109
 - animal senses, 130
 - deafness, 133–134
 - ear, 131–132
 - pitch and loudness, 130–131
 - and sound, 129–130
 - sounds, locating, 132
- Hearing loss, 133
- Heart disease. *See* Coronary heart disease
- Heart rates, and biofeedback training, 166
- Heavenly body, 59
- Heredity
 - and biological perspective, 16, 26
 - gender-typing and, 465, 468, 495
 - genes and chromosomes, 68–70, 102
 - genetics and behavioral genetics, 67–68
 - kinship studies, 70–72
 - nature *vs.* nurture, 73
 - relationship between IQ scores and, 297 (fig.)*See also* Evolutionary psychology
- Hering, Ewald, 119
- Hering-Hemholt illusion, 128–129
- Heritability, of intelligence, 297
- Hermisenda, 253
- Heroin, 168
 - effects of, 172, 186
 - embryo and fetus, risks to, 350
 - overdose due to, 171
 - use of, in United States, 170–171
- Herpes, genital, 492, 493 (table)
- Hertz, 130
- Heterosexual orientation, 19, 471, 495. *See also* Sexual orientation
- Heuristic devices, 268–269, 272–273, 302
- hGRE. *See* Growth-hormone-releasing factor (hGRF)
- Hibernate, 154
- Hierarchical structure, 243–244, 260
- Hierarchy, 243–244, 264–265
- Hierarchy of needs, Maslow's, 309–310, 338, 449. *See also* Maslow, Abraham
- High-density lipoprotein (HDL), 173
- Higher order conditioning, 196, 219
- Hinckley, John, 533–535, 560
- Hindsight, 20–20, 274
- Hippocampus, 86 (fig.), 88 (fig.)
 - defined, 79
 - forgetting and, 251–252
 - memory formation and, 252, 260
 - where and when of things, 254–255*See also* Limbic system
- Hippocrates, 432–433, 448, 454, 535
- HIV, 346–347, 350
- HIV/AIDS, 492–494, 517
- HIV Community Coalition of Washington, 389
- Hofmann, Hans, 411
- Hogarth, William, 125
- Holophrases, 278–279
- Home environment, influence on intelligence, 298
- Homeostasis, 307, 338
- Homosexual orientation, 471, 495. *See also* Sexual orientation
- Homosexuals, 428. *See also* Gay marriage
- Horizontal cells, 115
- Hormonal stress theory, 410
- Hormones, 99, 260
 - growth, 103
 - and maintaining pregnancy, 346
 - and ovulation, 341
 - premenstrual syndrome, 100*See also entries for specific hormones*
- Hormones, sex, 17, 95–97
- Horney, Karen
 - as neoanalyst, 578
 - profile of, 429
 - psychoanalysis, 18
 - psychoanalysis, key concepts of, 15
 - and psychodynamic perspective on personality, 448, 454
- Horoscope, 59
- HPPD. *See* Hallucinogen persisting perception disorder (HPPD)
- HPV. *See* Human papilloma virus (HPV)
- Hubel, David, 112
- Hue, 113, 117, 146
- Hull, Clark, 307
- Human factors psychologist, 8
- Human Genome Project, 68
- Humanism, 17, 441
- Humanistic-existential perspective, 17, 26
 - evaluation of, 443, 454
 - existentialism, defined, 441, 454
 - humanism, defined, 441
 - on personality, 449, 454
 - self-actualization, 441, 449
 - self theory (Carl Rogers), 441–443*See also* Self-actualization
- Humanistic psychology, 17, 338
- Humanistic theory, of motivation, 308–310, 338
- Humanistic therapy
 - client-centered therapy, 579–580, 604, 610
 - defined, 579
 - Gestalt therapy, 580–581, 604, 610
- Human papilloma virus (HPV), 492–493
- Humans, ethical issues in research with, 54–55
- Human sexuality, investigating, 37–38
- Humor, sense of, 511, 530
- Hunger
 - biological influences on, 309–317, 338

- eating disorders, 312–317
 psychological influences
 on, 312
See also Physiological needs
- Hunger pangs, 311
- Hunter's notch, 134
- Hurricane Katrina, 499–500
- Hussein, Saddam, 642
- Hydrocarbons, 176–177
- Hyperactive children, 174, 187
- Hypermnnesia (heightened
 memory), 164
 (table), 186
- Hyperphagic, 311–312, 338
- Hypersomnia, 154
- Hypertension, 529
 exercise and, 528
 heart disease and, 519,
 521, 531
 meditation and, 166
- Hyperthyroidism, 97
- Hypnagogic state, 155
- Hypnosis
 changes in consciousness
 attributed to, 164
 (table), 186
 controversy surrounding,
 165
 to cope with pain, 145
 defined, 163
 evolution of, 163
- Hypnotic suggestibility, 164
- Hypnotic trance, 164
- Hypoactive sexual desire
 disorder, 486, 496
- Hypochondriasis (hypochon-
 dria), 548–549,
 564, 568
- Hypodermic syringe, 539
- Hypothalamus, 85–88
 and anxiety disorders,
 544, 564
 and body temperature, 103
 effects of stress on,
 514–515 (fig.)
 electrical stimulation of,
 aggressive behavior
 and, 319, 338
 and endocrine system,
 95–99
 and fear, 324–325
 and hunger, 311, 338
- Hypothesis, 33, 60
- Hypothetical state, 306
- Hypothyroidism, 97
- Hysterical neuroses, 548
- I**
- Iconic memory, 233
- Icons, 233, 259
- Id, 425–426, 430–431,
 448, 454
- Ideas of persecution, 534
- Identical twins. *See* Monozy-
 gotic (MZ) twins
- Identification, 426
- Identity achievement,
 394–395, 420
- Identity certainty, 404–405
- Identity diffusion, 394–395,
 420
- Identity status, 394–395, 420
- Identity *vs.* role diffusion, 372
- IDS. *See* Infant-directed
 speech (IDS)
- Iliad, The*, 479
- Illusions, 124
- Imaginary audience, 389, 420
- Imaging the brain, 39–41, 45
- Immediate reinforcer, 204
- Immune system
 aging and, 411, 420
 function of, 530
 negative correlation, 41
 stress and, 516–518,
 524, 530
- Immunization, for infectious
 diseases, 520
- Immunological theory, 411,
 420
- Implantation, 344
- Implicit memory, 225–226,
 229, 259
- Incentive, 306
- Incubation, problem solving
 and, 271, 302
- Independent variable, 42
- Indigestion, 83
- Indiscriminate attachment,
 374
- Individualism *vs.* collectivism,
 446, 454
- Individual psychology, 429
- Industrial/organizational psy-
 chologist, 452
- Industrial psychologist, 8, 26
- Industry *vs.* inferiority,
 372–373
- Infancy, physical development
 during, 360–363
- Infant-directed speech (IDS),
 279
- Infantile amnesia, 251,
 255, 260
- Infant rhesus monkey,
 374–375
- Infer, 53
- Inferential statistics, 47,
 52–54, 60
- Inferiority, industry *vs.*,
 372–373
- Inferiority complex, 429, 454
- Infinite creativity, 276, 302
- Inflammation, 517
- Information processing, 211
 prejudice from, 625
- Informed consent, 55
- Inhalants, 169 (table)
- Inhibitory neurotransmitter,
 544
- Inis Beag, sexuality on island
 of, 457–458
- Initial-preattachment phase,
 374, 381
- Initiative *vs.* guilt,
 372–373
- Inner ear, 147
- Insanity, 533
- Insanity defense, 560
- Insanity plea, 560
- Insight, problem solving and,
 270–271, 302
- Insomnia, 154, 159–161, 182,
 186–187
- Instinct, 66–67, 102, 307,
 338. *See also* entries
 for specific behaviors
- Instinctive behavior pattern,
 17, 66, 319
- Institutional accreditation*, 25
- Instrumental competence, 376
- Insular cortex, 332
- Insulin, 96
- Integrity *vs.* despair, 372
- Intellectual deficiency,
 295–296, 303
- Intellectual functioning,
 differences in
 gender, 293–295, 303
 intellectual deficiency and
 giftedness, 295–296
 socioeconomic and ethnic,
 292–293
- Intelligence
 creativity and, 286–288
 defined, 282, 302
 differences in intellec-
 tual functioning,
 292–296, 302–303
 enhancing intellec-
 tual functioning,
 300–301
 environmental influences
 on, 298–299, 303
 genetic influences on,
 296–297, 303
 heritability of, 297
 measurement of, 288–291
 nature and nurture in,
 296–299
 theories of, 282–286, 302
- Intelligence quotient (IQ),
 288–289, 297 (fig.)
- Intelligence test(s)
 and academic achievement,
 41–42, 303
 creativity, measure of, 287
 cultural bias in, 22, 293
 intellectual and occupa-
 tional status, 342
 normal curve, 52
- See also* Test scores; and
 entries for specific
 tests
- Intense stimuli, 152
- Interest inventories, 452–453
- Interference theory, 249, 260
- Intergroup contact and
 cooperation, 648
- Internalizing, responses to
 feelings of depres-
 sion, 551, 606
- Internals, 513
- Internet, psychological advice
 found on, 32
- Internet survey, 38
- Interneuron, 83
- Interpersonal attraction
 attraction-similarity
 hypothesis, 477,
 479, 495
 color red and, 478
 love, 479–481, 495
 physical appearance,
 476–477
 reciprocity, 479
- Interpersonal psychotherapy,
 596 (table)
- Interpersonal skill, as aspect
 of intelligence,
 283–284
- Interposition, 125, 125 (fig.),
 147
- Interpretation, 576
- Interval schedules, 207–208
- Intimacy, 480–481, 496
- Intimacy *vs.* isolation, 372, 401
- Intrapersonal skill, as aspect
 of intelligence,
 283–284
- Intrinsic rewards, 324
- Introspection, 9, 11, 26
- Introversion-extraversion,
 432, 448, 454
- Introvert, 432, 434
- Inuit (Eskimos), 77
- Ions, 77
- iPod, 133
- IQ. *See* Intelligence quotient
 (IQ)
- Iris, 114
- Irrational beliefs and
 thoughts, stress and
 cognitive-behavioral
 therapy, 605
 cognitive therapies,
 610–611
 controlling beliefs and
 thoughts, 526–527
 rational alternative
 thoughts, 608
 social approval and perfec-
 tionism, 506–508,
 530
- Isolation, intimacy *vs.*, 372

J

James, William, 10–11, 15, 21, 26
 James-Lange theory of emotion, 329–331, 339
 Jealousy, 325
 Job strain, and heart disease, 519, 522 (fig.), 531
 John Hopkins University, 12
 Johnson & Johnson Baby Powder, 12
 Joints, sensory organs in, 142
 Jones, Gilbert Haven, 21
 Jones, Mary Cover, 198
Journal of the American Medical Association, The, 358
 Judgment, 271–274, 302. *See also* Decision making
 Jung, Carl, 15, 428–429, 448, 454, 578
 Juries. *See* Group decision making
 Just noticeable difference, 110–111

K

Karremans, Johan, 110
 Keech, Marian, 622
 Keller, Helen, 11
 Killer joints (phencyclidine or PCP), 181
 Kinesthesia, 111, 140–142, 147
 King, Stephen, 571–572, 601
 Kinsey, Alfred, 37–38, 484–485
 Kinship studies, 70–72, 102, 296–297
 Klebold, Dylan, 216
 Klüver, Heinrich, 88
 Koffka, Kurt, 13, 15, 26
 Kohlberg, Lawrence, 370, 380
 Köhler, Wolfgang, 13–15, 26
 Kübler-Ross, Elisabeth, 415, 421
 Kwashiorkor, 355

L

La belle indifférence, 548–549
 LAD. *See* Language acquisition-device (LAD)
 Ladd-Franklin, Christine, 20, 26
 Landon, Alf, 34
 Lang, Alan, 43–44
 Lange, Karl G., 329
 Language
 as aspect of intelligence, 283–284

and cognition, 277, 302
 and culture, 277–278
 defined, 276–277, 302
 development of, 278–280, 302
 differences between
 chimps and humans, 275–276, 302
 nativist approach to development of, 281–282, 302
 nature and nurture in development of, 280–282, 302
 sign language, 275–276
 Language acquisition-device (LAD), 280–282
 Language functions, 91–92, 103
 Late adulthood, 407–415, 420
 Latency phase, of psychosexual development, 426, 428, 431, 448
 Latent content, 578
 Latent learning, 211–213, 220
 Lateral hypothalamus, 312, 338
 Latina and Latino Americans, as doctoral-level psychologists, 22–23
 Law of effect, 200–201
 Lawrence of Arabia, 561
 Lazarus, Richard, 330
 Learned helplessness, 552
 Learning
 and behavior, 18
 and bell-and-pad treatment for bed-wetting, 199
 classical conditioning, 190–199
 cognitive factors in, 211–214
 defined, 189–190, 219
 operant conditioning, 200–211
 perspectives
 on anxiety disorders, 543, 564, 568
 behaviorism, 436–437, 454
 evaluation of, 440
 on personality, 449, 454, 565
 social-cognitive theory, 437–440
 Learning theory
 and aggression, 321–322
 behaviorism, 436–437
 and cognitive-dissonance theories, 622
 and dissociative disorders, 547, 564
 and gender-typing, 469

and language development, 280
 on Madison Avenue, 12
 on mood disorders, 552, 565
 and schizophrenia, 556, 565
 Le Bon, Gustave, 643
 Left-handed. *See* Handedness
 Left hemisphere, of brain, 91–92, 252
 Lens, 114, 116, 146
Lenses of Gender, The (Bem), 459
 Lesbians, 19, 471. *See also* Sexual orientation
 Lesioning, 85
 Leukocytes, 517–518
 Levels-of-processing model of memory, 242, 260
 Levitra, 488
 Libido, 426, 430
 Librium, 598
 Lie detectors, 332–333, 339
 Lief, Harold, 250
 Life changes, stress and, 502–504, 530
 Life expectancy, 407–408
 Life span (longevity), 407
 Light, 113, 146
 visible, 117–118
 wavelength of, 146
See also Color
 Light adaptation, 116
 Liking, 325
 Limbic system, 87
 among adolescents, 420
 and anxiety disorders, 544
 defined, 88, 103
 and emotion, 324
 forgetting and, 251
 and memory, 255
See also Hippocampus
 Linguistic-relativity hypothesis, 277, 302
 Linguistic speech, 278
Literary Digest, 34
 Lithium, 600, 611
 “Little Albert,” 12, 196, 219
 Little Hans, 543
 Locomotion, 361, 380
 Locus of control, 511–512, 552
 Loftus, Elizabeth, 21, 26, 241
 Logical-mathematical intelligence, 283–284
 Longitudinal research, 342–343
 Long-term memory (LTM), 231–232
 accuracy of, 238–239, 259
 context-dependent memory, 245, 260
 defined, 237

eyewitness testimony, 240, 259
 flashbulb memories, 243
 hierarchical structure, 243–244, 260
 levels-of-processing model of memory, 242, 260
 organization in, 243–244, 260
 quantity of information stored in, 239
 state-dependent memory, 246, 260
 Tip-of-the-tongue (TOT) phenomenon, 244–245
 transferring information from short-term to, 240–241, 259
 Long-term potentiation (LTP), 254
 Loudness. *See* Pitch and loudness
 Love, 479, 495
 Love and belongingness, need for, 310 (fig.), 338
 LSD. *See* Lysergic diethylamide (LSD)
 LTM. *See* Long-term memory (LTM)
 LTP. *See* Long-term potentiation (LTP)
 Lucifer effect, 616
 Luteinizing hormone, 96
 Lying, 332
 Lynching, 643
 Lysergic diethylamide (LSD), 79–80, 168, 180–181, 187

M

MA. *See* Mental age (MA)
 MacArthur Longitudinal Twin Study, 296–297
Macbeth, 216, 218
 Macdonald, Gail, 250
 Magical predictions, 59
 Magnetic resonance imaging (MRI), 275
 Mahler, Margaret, 448
 Maintenance rehearsal, 230, 240–241, 259
 Major depressive disorder, 568
 alleviating, 606
 defined, 549
 genetic factors involved in, 553
 origins of, possible, 565
 psychosurgery for, 602
 psychotherapy, effectiveness of, 595
 symptoms of, 565

- Majority-wins scheme, 640–641, 650
- Making of an Illness* (Macdonald), 250
- Male erectile disorder (erectile dysfunction or ED), 486–487, 496
- Malnutrition, 355. *See also* entries for specific forms
- Malthus, Thomas, 64
- Mammillary body, 88
- Mangaia, sexuality on island of, 457–458
- Manic-depressive disorder, 550, 568
- Manic phase, 550
- Manifest content, 578
- Mantras, 166
- Marijuana
defined, 178–180
effects of, 180, 187
and phencyclidine (PCP), 181
trends in lifetime use of, 169 (table)
use compared to alcohol, 171
use by pregnant mother, 350, 380
- Marriage
defined, 419
postponing, 418
vs. being single, 418
- Marx, Karl, 168
- Masculinity, 19
- Maslow, Abraham
hierarchy of needs, 309–310, 338, 449
humanistic-existential perspective and, 17
humanistic theory of motivation and, 308
self-actualization and, 441, 449
- Master gland, 96. *See also* Pituitary gland
- Masturbation
cultural beliefs regarding, 457, 496
before phallic stage, 431
during phallic stage, 427–428
rates of men *vs.* women, 486
- Mate, selecting, 419
- Maternal health problems, effects of, 347, 380
- Mate selection
gender differences in, 463
strategies of, 66–67
- Matrix, The*, 107–108
- Maturation, 344, 370
- Maturation theorist, 362
- Maxwell House Coffee, 12
- Mayer, John, 285
- Maze, for experiments, 79, 210, 212
- McCrae, Robert, 448
- McDougall, 259
- McHugh, Paul, 250
- MDMA (ecstasy), 168
- Mean, 48–52
- Means-end analysis, 269
- Measurement, of central tendency, 46–49, 60
- Measures of variability, 49–51
- Mechanical comprehension, tests of, 452
- Media, violence in, 216–218
- Median, 48–49
- Medical model, 535–536
- Medicine
psychiatrists and, 6
See also Drugs
- Meditation, 153, 165–166, 186, 527
- Medulla, 86, 97, 103
- Melatonin, 96–97, 166
- Memory
and alien kidnappings, 29–30
and Alzheimer’s disease, 79–80
and association areas, 90–91
biology of, 253–255, 260
brain structures and, 254–255
Calkins and study of, 21
of college students, 227
defined, 231, 259
encoding, 230, 259
functioning of, in late adulthood, 411, 420
and hippocampus, 79
hypermnnesia (heightened memory), 164 (table), 186
kinds of, 224–229, 259
processes of, 229–231, 259
psychology of memory to enhance, 256–258
retrieval, 230–231, 259
stages of, 231–245, 259–260
storage, 230, 259
See also Forgetting; Repression
- Memory trace, 232–233, 259
- Memory wars, 241
- Men
alcoholism among, 171–172
changes in sexuality, 410
depression, 551
gender-typing, 464–469, 495
insomnia, 160
masturbation, 486
obesity among, 334–335
smoking among, 178
stress and, 516
suicide by, 566
See also Adolescence; Boys; Gender
- Menarche, 384
- Menopause, 402, 404, 551
- Menstruation, 98–101, 103
- Mental age (MA), 288–289
- Mental hospital, 574
- Mental processes, controlling behavior and, 4–5
- Mental retardation, 295, 380
- Mental sets, problem solving and, 270, 302
- Mental structure, 211
- Mental Traits of Sex, The* (Thompson), 21
- Merritte, Arvilla, 196
- Merritte, Douglas (“Little Albert”), 196
- Mescaline, 180–181
- Mesmer, Franz, 163
- Meta-analysis, 594–596, 611
- Metabolism, 97, 103
- Metals, heavy, 350, 380
- Methadone, 173
- Methamphetamine, 174
- Methedrine, 174
- Method of loci, 257
- Method of savings, 248
- Methylphenidate (Ritalin), 174, 187
- Middle adulthood, 402–406, 420
- Middle ear, 147
- Midlife crisis, 404
- Midlife transition, 403
- Migraine headaches, 520–521
- Milgram, Stanley, 628, 635 (image). *See also* Milgram studies
- Milgram studies, 632–637, 649–650
- Milner, Peter, 87
- Mind Sights*, 129
- Mineka, Susan, 197
- Minimata Bay, 349
- Minimizing, 608, 610
- Minnesota Multiphasic Personality Inventory (MMPI) Scales, 450
- Minnesota Study of Twins Reared Apart, 71–72
- Mirror neurons, 91, 213–214, 220
- Miscarriage, 347, 352–353, 380
- Mischel, Walter, 214
- Misinformation effect, 240
- MMPI. *See* Minnesota Multiphasic Personality Inventory (MMPI) Scales
- M’Naghten, Daniel, 560
- M’Naghten rule, 560
- Mnemonic devices, 257–258
- Mnemonics, 258
- Mnemosyne, 258
- Mob behavior, 643–644
- Mode, 48–49
- Model, 213
- Modeling
defined, 438, 610
and language development, 280
and observational learning, 583
and social cognitive learning, 438
See also Observational learning
- Moniz, Antonio Egas, 601
- Monkey
attachment in, 374–375, 381
brain parts of, 74, 91
gender differences in activity preferences of children found in, 466
- Monoamine oxidase (MAO) inhibitor, 599
- Monochromat, 120, 146. *See also* Colorblindness
- Monocular (pictorial) cue, 124–126, 147
- Monogamous relationship, 494
- Monosodium glutamate (MSG), 521
- Monozygotic (MZ) twins
defined, 70–71
intelligence studies, 296
and IQ scores, 296–297
kinship studies, 71–72
psychological disorders, genetic factors in, 544
and schizophrenia, 558
and sexual orientation, 473
studies of, 102
- Monroe, Marilyn, 561
- Monstrous illusion, 129
- Mood disorders
biological factors contributing to, 553
origins of, 551–553, 565, 568
types of, 549–551, 565, 568
- Mood disturbance, 511

- Moral development theory (Kohlberg), 370–371, 390
- Moral principle, 426
- Moral reasoning, postconventional level of, 389–390
- Moratorium, 394–395, 399, 420. *See also* Emerging adulthood
- Morgan, Christiana, 450
- Moro reflex, 356
- Morphine, 172–173, 186, 350
- Moruzzi, Guiseppe, 87
- Motherese, 279
- Motion, perception of, 123–124, 147
- Motion parallax, 126, 147
- Motivation
achievement, 323–324, 338–339, 381
defined, 306
psychology of, 306, 338
theories of, 307–310, 338
- Motivational enhancement, 593
- Motor abilities, tests of, 452
- Motor cortex, 89–92, 257
- Motor development, 361, 380
- Motor (efferent) neurons, 81, 83
- Mourning, 416
- Movies, violence in, 216–218
- Movite, 306
- Moyers, Bill, 144
- Mozart, Wolfgang Amadeus, 163
- MRI. *See* Magnetic resonance imaging (MRI)
- MSG. *See* Monosodium glutamate (MSG)
- Müller-Lyer illusion, 128–129
- Multifactorial model of schizophrenia, 559 (fig.)
- Multidirectionality, 400
- Multifactorial theory, 165, 186, 531
- Multiple approach-avoidance, 504–505, 530
- Multiple intelligences, 283–284, 286
- Multiple personality disorder, 533, 545–546, 564, 568
- Murray, Henry, 450
- Muscles, sensory organs in, 142
- Muscle sense (kinesthesia), 111
- Muscle-tension headache, 520
- Muscular dystrophy, 352
- Musical intelligence, 283–284
- Muslims, 616–618
- Mutations, 66
- Mutism, 554
- Myelin, 75–76
- Myelinated axon, 103
- Myelination, 360–361, 380
- Myelin sheath, 75
- Myotonia, 482–483, 496
- MySpace, 393
- MZ. *See* Monozygotic (MZ) twins
- N**
- Nalmefene, 173
- Naloxone, 144
- Naltrexone, 173
- Narcolepsy, 161, 186
- Narcotics, 172, 380. *See also* entries for specific drugs
- Narrowed attention, 164 (table), 186
- National AIDS Hotline, 493
- National Health and Social Life Survey (NHLS), 485–486
- National Institute on Child Health and Human Development (NICHD), 378
- National Science Foundation, 59
- National Sleep Foundation, 153
- Native Americans, alcohol abuse among, 172
- Nativist approach, to language development, 281–282
- Natural disasters, 499–500, 519, 522
- Naturalistic observation, 38, 45, 60
- Naturalist intelligence, 283–284
- Natural selection, 16, 65–66, 102, 544
- Nature (heredity), 69
and adoption studies, 72
in brain development, 361, 380
and gender-typing, 464–466, 495
in intelligence, 296–299
interaction of nurture (environment) and, 72–73
and language development, 280–282, 302
and psychological disorders, 537
and twin studies, 71–72
- Nearsighted, 115, 356, 380
- Necker Cube, 122 (fig.)
- Needle phobia, 539
- Needs, 306, 338. *See also* entries for specific needs
- Negative adaptation, 112, 146
- Negative correlation, 41–42, 45, 60
- Negative feedback loop, 96
- Negative instance, 265
- Negative reinforcer, 203–205, 219
- Negative symptoms, 554
- Nembutal, 174
- Neoanalyst (ego analysis), 16, 26, 448, 578
- Neodissociation theory, 165–166, 186
- Neo-Freudians, 428–430, 454. *See also* Freud, Sigmund
- Neonate, 344
crying, 358–359
reflexes, 355–356
sensory capabilities of, 356–357, 380
sleeping and waking, 357–358
soothing crying baby, 359
- Nerve, 81
- Nerve endings, 142
- Nervous system, 102
brain species, differences in, 73–74
neural impulse, 76–78
neurons, 74–76
neurotransmitters, 78–80
parts of, 81–84, 102
sensation and perception
absolute threshold, 108–109
different threshold, 110
feature detectors, 111–112
Fechner, Gustav Theodor, 108–109
sensory adaptation, 112
signal-detection theory, 111
subliminal stimulation, 109–110
- Neural activity, and memory, 253–254, 260
- Neural impulse, 76–78, 102
- Neural rebound effect, 119
- Neural stimulus, 214
- Neural tube defects, 346
- Neurons, 103
anatomy of, 74–76
in brain development, 387
defined, 76
firing, 78, 102
mirror neurons, 91, 220
- Neuroticism, 448, 454, 462, 553
- Neurotransmitter
anxiety disorders, 553, 568
and cocaine, 75, 78–79, 102, 175
premenstrual syndrome (PMS) and imbalances in, 100
- Nevarez, Carmen, 334
- Newton, Isaac, 113
- NHLS. *See* National Health and Social Life Survey (NHLS)
- NICHD. *See* National Institute on Child Health and Human Development (NICHD)
- Niche-picking, 73
- Nicotine
addiction to, 177
advertising, 177
dependency, 183
effects of, 176–177, 187
risks to embryo and fetus, 348–350, 380
warning messages regarding, 177
and weight control, 177
- Nightmares, 158. *See also* Sleep terrors
- Nociceptors, 139, 147
- No Country for Old Men*, 8
- Nonconscious, 153
- Nondeclarative memory, 225–226
- Nondirective therapy, for depression, 596
- Non-rapid-movement (NREM), 155–156, 158, 186
- Non-REM sleep, 357–358
- Nonsense syllables, 246–247, 260
- Nonspecific factors, 595
- Nontestable hypothesis, 33
- Noradrenaline, 176, 254, 510
antidepressants for, 599
and anxiety disorders, 544, 564
involved in eating and panic disorders, 599
stress and, 514–515 (fig.), 530
See also Norepinephrine
- Norepinephrine, 96–97, 254
defined, 79
functions of, 80, 102
stress and, 97, 514–515 (fig.)
See also Noradrenaline
- Normal curve, 47, 51–52
- Normal distribution, 51, 60
- Northside Center for Child Development, 22

- Nose, 142
Nova, 30
 Novel stimuli, 152
 NREM. *See* Non-rapid-movement (NREM)
 Nucleotides, 68
 Nucleus, 74–76
 Numbness-disbelief, 416
 Nurture (environment), 69
 and adoption studies, 72
 in brain development, 361, 380
 and gender-typing, 466–469, 495
 in intelligence, 296–299
 interaction of, and nature (heredity), 72–73
 and language development, 280–282
 and psychological disorders, 537
 and twin studies, 71–72
See also Nature (heredity)
- O**
- Obedience to authority, 632–637
- Obesity
 cancer and, 519
 heart disease, 519, 521–522
 origins of, 334–336
 weight control, 336–337
- Obesogenic environment, 335
- Objective responsibility, 367
- Objective test, 448–450
- Objective tests, 448–450, 455
- Object permanence, 365
- Observation, methods of, 35–36
 brain imaging, 39–41
 case study, 37
 Internet survey, 38
 naturalistic observation, 38
 survey, 37–38
- Observational learning, 212
 in acquiring attitudes, 618
 Bandura studies, 213
 mirror neurons and, 213–214
 modeling, 583, 604
 personality, understanding, 449, 454
 violence in media, 216–218
- Observer bias, 276
- Obsessive-compulsive disorder (OCD)
 antidepressants for, 599
 defined, 541, 568
 exposure and response prevention for, 596 (table)
 origins of, 543–544, 564
 treatment-resistant, 602, 611
- Occipital lobe, 88–92, 103, 115, 146
- OCD. *See* Obsessive-compulsive disorder (OCD)
- Odor, 135–136, 147
- Oedipus complex
 and gender-typing, 428, 466, 495
 Little Hans, 543
 psychosexual development and, 431
 and sexual orientation, 473
 as source for personality disorders, 562
- Ohman, Arne, 197
- Olds, James, 87
- Olfactory, 135
- Olfactory membrane, 147
- Olfactory nerve, 135
- Online psychotherapy, 588
- Online social networking, 393
- Openness to experience, 433, 448, 454
- Operant behavior, 202
- Operant chamber, 201. *See also* Skinner box
- Operant conditioning, 211
 applications of, 209–210
 behavior modification, 209–210, 610
 biofeedback training (BFT), 209
 classical conditioning, 200
 defined, 200, 202, 219
 discriminative stimuli, 206–207, 220
 extinction, 204, 219
 law of effect, 200–201, 219
 methods of, 202–203, 610
 procedures, 584–586, 604
 programmed learning, 210, 219
 punishments, 200–201, 205–206, 219–220
 rats searching for disaster survivors, 210
 reinforcement, 201–202, 219
 reinforcement schedules, 207–208, 220
 reinforcers *vs.* rewards and punishments, 205–206, 219–220
 reinforcer types, 203–204, 219–220
 shaping, 208–209, 220
 Skinner, B. F., 201–202, 219–220
- spontaneous recovery, 204, 220
- Thorndike, Edward L., 200–201, 219
 what is learned from, 214
- Operants, 202. *See also* Operant conditioning
- Opiates
 defined, 172–173
 dependency, 183
 effects of, 180, 186
 risks to embryo and fetus, 350
- Opioids, 172–173
- Opponent-process theory, 119, 134, 146
- Oppositional behavior, children with, 596 (table)
- Optic nerve, 115–116
- Optimism, 327
- Oral fixation, 427
- Oral stage, of psychosexual development, 426–428, 448, 454
- Organizational psychologist, 8
- Organizing effects, 471
- Organ of Corti, 132, 142, 147
- Orgasm, 482–484, 496
- Orgasmic disorder, 486–487, 496
- Orienting response, 191
- Origin of Species* (Darwin), 191
- Osteoporosis, 409
- Oval window, 131
- Ovaries, 96–98
- Overconfidence, in decision making, 274
- Overextension, 265, 302
- Overlapping, 126
- Overregularization, 280, 302
- Ovulation, 98, 341
- Oxazepam (Serax), 598
- OxyContin, 173
- Oxytocin, 103
- Oxytocin, 97, 516
- Ozone (animal tranquilizer), 181
- P**
- Pain
 acupuncture, 144
 distraction and fantasy, 145
 gate theory, 144
 gender differences responding to, 138
 hypnosis, 145
 incidence of, 138
 and irrational beliefs, 145
 nociceptors and, 139, 147
 origination of, 139, 147
 perception of, 139
- phantom limb, 139–140
 relaxation training, 145
 treating, 144–145
 video-game approach to, 145
- Paint fumes, 350
- Paired associates, 248
- Palmar reflex, 356
- Pancreas, 96–97
- Panic disorders, 564, 568
 antidepressants for, 599
 cognitive-behavior therapy for, 596 (table)
 coping with attacks, 545
 defined, 540
 noradrenaline and serotonin for, 599
- Paradoxical sleep, 155–156
- Parallel processing, 270
- Paranoid personality disorder, 560–561, 565, 569
- Paranoid schizophrenia, 555–556, 565, 568
- Parapsychological, 141
- Parasympathetic nervous system, 81–82, 102, 325, 530
- Parental investment model, 465
- Parents
 and adolescents, 391–392
 middle-aged children and, 406, 420
 roles of, in gender-typing, 467
 styles of, 375–377, 381
See also Adulthood
- Parent training programs, 596 (table)
- Parietal lobe, 88–89, 103
- Parkinson's disease, 79–80, 102
- Partial reinforcement, 207, 220
- Partial-report procedure, 233, 259
- Passion, 480–481, 496
- Passive observation, 165
- Passive smoking, 178–179
- Passivity, 164 (table), 186
- Pathogens, 346, 350–351, 501, 530
- Patterson, Charlotte J., 472
- Pavlov, Ivan, 190, 192–194, 214
 contribution of, 219
 and discrimination, 195
 and extinction, 194 (fig.)
 and generalization, 195
 and higher order conditioning, 196
 profile of, 191
 and schematic representation of classical conditioning, 192 (fig.)
- PCBs. *See* Polychlorinated biphenyls (PCBs)

- PCP. *See* Phencyclidine (PCP)
- PCP. *See* Pneumocystis carinii pneumonia (PCP)
- Peel, Robert, 560
- Peers, teenage relationships, 391–392
- Pelican*, 201
- Pelvic inflammatory disease (PID), 101
- PEM. *See* Protein-energy malnutrition (PEM)
- Penfield, Wilder, 85
- Penis envy, 429
- Pentagon, 615
- Perception, 13–14, 108, 146
- Perception of motion, 123–124
- Perceptual accuracy, tests of, 452
- Perceptual constancies, 127, 147
- Perceptual development, during childhood, 362–363, 380
- Perceptual distortions, 164 (table), 186
- Perceptual organization, 121–123, 146–147
- Perfectionism, 427
- Performance anxiety, 487, 496
- Period of the ovum, 34
- Peripheral nervous system, 81–83, 102
- Peripheral route to persuasion, 619
- Peri Psyches*, 9
- Perls, Fritz, 579–581, 580 (image), 581, 604, 610
- Permissive parents, 376, 381
- Perpetual development, 362
- Personal fable, 389, 420
- Personal intelligence, 286
- Personality
 - behavior-rating scales, 447, 454
 - gender differences in, 462
 - measurement of, 447
 - objective tests, 448–450, 455
 - projective tests, 451, 455
 - perspectives on, 448–449
- Personality disorders
 - cognitive-behavior therapy for, 591, 596
 - defined, 560
 - interpersonal psychotherapy for, 596 (table)
 - origins of, 562–563, 565, 569
 - types of, 560–562, 565, 569
- Personality psychologist, 7, 26
- Personality structure, 425–426
- Personal unity, consciousness as, 153
- Personnel tests, 452
- Person variables, 437–438
- Perspective, 125–126, 147
- Persuasion
 - audience, 621–622
 - central and peripheral routes to, 619, 649
 - changing attitudes through, 619–622
 - foot-in-the-door technique, 622
 - message communicator, 620
 - message context, 621
 - nature of message, 619–620
- PET scan. *See* Positron emission tomography (PET scan)
- Phallic stage, of psychosexual development, 426–428, 431, 448, 454
- Phallic symbol, 578
- Phantom limb pain, 139–140
- Pharmacotherapy, 603. *See also* Drugs
- Phencyclidine (PCP), 168, 180–181
- Phenothiazines, 79, 599
- Phenotype, 69
- Pheromones, 471, 495
- Philosophical intelligence, 286
- Phinney, Jean, 449
- Phio phenomenon, 124
- Phobic disorders, 539–540, 564, 568, 604
- Phonemes, 278
- Photoreceptors, 114–115, 119, 142, 146
- Physical appearance, and interpersonal attraction, 476–477
- Physical development
 - during adolescence, 420
 - brain, 384, 387
 - puberty, 384
 - stages, 385 (fig.), 386 (fig.)
 - during early adulthood, 399–400, 420
 - during infancy and early childhood
 - brain, 360–361, 380
 - motor development, 361
 - perceptual development, 362–363, 380
 - in late adulthood, 408–409, 420
 - in middle adulthood, 402, 420
- Physiological needs, 306, 309–310, 338
- Piaget, Jean, 370
 - cognitive-development theory, 363–369, 380, 388–389
 - knowledge without language, 277
 - and misinformation effect, 240
 - and perpetual development during infancy, 362–363
 - profile of, 365
- Picasso, Pablo, 411
- Pictorial cues, 147
- PID. *See* Pelvic inflammatory disease (PID)
- Pigeons, 201–202, 206
- Pigment. *See* Color
- Pineal gland, 96–97
- Pinel, Philippe, 574
- Pitch, 109
- Pitch and loudness, 130–131, 133, 147
- Pitch perception, 134
- Pituitary gland, 86, 96–97, 103
- Placebo, 43, 163
- Placenta, 345
- Place theory, 134, 147
- Plasticity, 400
- Plateau phase, 482–483, 496
- Plato, 413
- Pleasant events, for alleviating depression, 606–607
- Pleasure center, 87, 166. *See also* Hypothalamus
- Pleasure principle, 425
- PMS. *See* Premenstrual syndrome (PMS)
- PN. *See* Psychotherapy Networker (PN)
- Pneumocystis carinii pneumonia (PCP), 492
- Polarization, 77, 641–642, 650
- Polychlorinated biphenyls (PCBs), 349–350, 380
- Polygenic, 69
- Polygraph, 332–333, 339
- Pons, 86, 103, 159
- Ponzo illusion, 129
- Population, 34–35
- Positive adaptation, 112, 146
- Positive correlation, 41–42, 45, 60
- Positive instance, 265
- Positive psychology, 326–327, 434
- Positive regard, self-esteem and, 442–443
- Positive reinforcer, 203–204, 219
- Positive symptoms, 554
- Positron emission tomography (PET scan), 40–41, 45, 85, 103, 159
- POSSLQ (people of opposite sex sharing living quarters), 418–419
- Postconventional level, 371, 380, 389–390
- Postformal thinking, 400–401
- Posthypnotic amnesia, 164, 186
- Posthypnotic suggestion, 164, 186
- Postpartum depression (PPD), 354
- Posttraumatic stress disorder (PTSD), 251, 542–543, 572
- Potassium ion, 77
- Poverty, 449
- PPD. *See* Postpartum depression (PPD)
- Practical intelligence, 284, 286, 302
- Practicum, 5
- Preconscious, 152–153, 425. *See also* Freud, Sigmund
- Preconventional level, 371, 380
- Predictability and control, 511, 513, 530
- Predictive validity, of diagnosis standards, 537
- Prefrontal cortex, 85, 103, 569
- Prefrontal lobotomy, 601, 611
- Pregnancy, teenage, 396–397
- Prejudice
 - automatic, 624–625
 - combating, 648
 - defined, 623–624, 649
 - discrimination and, 624–625, 649
 - sources of, 624–625, 649
- Prelinguistic vocalization, 278
- Premature ejaculation, 486–487, 496
- Premenstrual syndrome (PMS), 100–101
- Prenatal development, 495
 - alcohol, nicotine, and caffeine, 348–349, 380
 - critical periods of vulnerability, 346–347, 380
 - embryonic stage, 344, 380

- environmental hazards, 349, 380
- environmental influences on, 345–349, 352–353
- fetal stage, 345, 380
- genetic counseling and testing, 349, 352–353
- germinal stage, 344, 380
- illicit drugs taken by mother, effects of, 348
- implantation, 344
- maternal health problems, effects of, 347
- prescription drugs during pregnancy, effects of, 347–348
- risks of various agents to embryo and fetus, 347–351
- role of brain organization in gender-typing, 465–466
- Prenatal testing, 349, 352–353
- Preoperational stage, 364, 366–368
- Preparedness theory, 198
- Presbycusis, 409
- Presbyopia, 116, 146
- Prescription drugs, taken by pregnant mother, 347–348, 380
- Pressure. *See* Touch and pressure
- Primacy effect, 235, 259, 626–627
- Primary drives, 307, 338
- Primary mental abilities, 283, 286
- Primary reinforcer, 204, 219
- Primary sex characteristics, 98
- Priming, 110, 226
- Prince and the Pauper, The*, 14
- Principles of Psychology, The* (James), 11
- Prism, 113, 146
- Prison. *See* Stanford Prison Experiment
- Privacy, adolescent desire for, 389
- Proactive interference, 249
- Problem-focused coping, with stress, 526
- Problem solving
- algorithms for, 268–269, 302
 - analogies for, 269
 - and convergent thinking, 287
 - factors that affect, 269–271, 302
 - heuristic device for, 268–269, 302
 - tools for, 266, 302
 - understanding problem, 266, 268
- Procrustes, 238
- Productive intelligence, 285
- Progesterone, 98, 100, 478
- Progesterin, 347–348, 350
- Programmed learning, 210, 219
- Progressive relaxation, 166, 527
- Projection, as defense mechanism, 426 (table)
- Projective tests, 451, 455
- Project Pigeon, 201–202
- Prolactin, 17, 96–97, 103
- Prospective memory, 225–226, 228–229, 259
- Prostaglandins, 139
- Protected sleep, 186
- Protective test, 451
- Protein-energy malnutrition (PEM), 355
- Prototypes, 264–265
- Proximity, 122–123, 146
- Prozac, 600
- Pseudomemories (false memories), 164 (table), 250
- Pseudoscience, 58–59
- Psi communication, 141–143
- Psi phenomenon, 141
- Psychedelic, 178–179
- Psychiatrists, and medicine, 6
- Psychic structures, 431, 454
- Psychoactive drugs, 22. *See also* Drugs; Psychoactive drugs
- Psychoactive substances, 153, 168, 170–172. *See also* Drugs; Psychoactive drugs
- Psychoanalysis
- defined, 14, 575, 610
 - Freud's psychoanalytic theory, 425, 589
 - key concepts in, 15
 - role of, today, 26, 604
- Psychoanalyst, 18, 37
- Psychoanalytic theory, 425, 589
- Psychodynamic perspective, 18, 443
- and aggression, 319
 - on anxiety disorders, 543–544, 564
 - defined, 424, 426, 454
 - and dissociative disorders, 547, 564
 - evaluation of, 430–431, 454
 - gender-typing and, 466, 469, 495
 - and identification, 426
 - neo-Freudians, 428–430, 454
 - on personality, 448
 - and personality disorders, 562, 565
 - psychosexual development theory, 424–428, 454
 - for schizophrenia, 557, 559, 565
 - sexual orientation roots with, 473, 495
- Psychodynamic therapies, 595
- defined, 575
 - for depression, 596, 611
 - dream analysis, 577–578
 - ego analysis, 578
 - free association, 576
 - modern approaches, 578, 610
 - for personality disorders, 596
 - traditional psychoanalysis, 575–578, 604, 610
 - transference, 576–577
- Psychodynamic treatment, 593
- Psycholinguistic theory, 280–281
- Psychological androgyny, 459
- Psychological disorders
- anxiety disorders, 538–545, 564, 568
 - biological factors leading to, 536
 - classifying, 537, 568
 - defined, 533–534, 568
 - dissociative disorders, 533, 545–547, 564, 568
 - genetic factors implicated in, 544
 - mood disorders, 549–553, 565, 568
 - personality disorders, 560–563, 565
 - perspectives on, 535–537, 568
 - prevalence of, 537–538, 568
 - psychological factors leading to, 536
 - schizophrenia, 553–559, 565, 568–569
 - sociocultural factors leading to, 536
 - somatoform disorders, 547–549, 564, 568
 - suicide, 566–567
- Psychological hardiness, 510–511, 530
- Psychological influences and risk factor
- for aggression, 319–322
 - on cancer, 519, 524
 - on health, 519–522
 - on heart disease, 519, 521
 - on hunger, 312
- Psychological models, contemporary, 536–537
- Psychological moderators, of stress, 510–511, 513
- Psychological perspectives
- on anxiety disorders, 543–544, 564, 568
 - on mood disorders, 552, 565, 568
 - on schizophrenia, 556, 565, 568–569
- Psychological sensation and perception, 10
- Psychological tests, 452–453
- Psychologists
- degrees, 6
 - prescribing medicine, 6
 - topics of interest to, 4
 - types of, 5–8
- Psychology
- behavior and mental processes, 4–5
 - controversy in, 4–5
 - defined, 4, 26
 - doctorates of, 6
 - ethnicity and, 21–23
 - evolutionary, 66–67
 - fields of, 5–8
 - gender, ethnicity and, 20–23, 26
 - getting ready to work in, 24–25
 - goals of, 4, 26
 - and health, 518–528, 531
 - history of, 9–15, 26
 - women in, 20–21
- Psychomotor retardation, 549
- Psychoneuroimmunology, 517
- Psychopathology, 536
- Psychophysicist, 108
- Psychophysics, 109
- Psychosexual development
- conscious, 425
 - personality structure, 425–426
 - preconscious, 426
 - stages of (Freud, Sigmund), 426–428, 448, 454
- Psychosocial development, 372–374, 380–381, 430
- Psychosurgery, 601–602
- Psychotherapy, 18, 536
- analysis of effectiveness of, 595–596
 - defined, 573–574, 610
 - effectiveness of, 594, 611
 - ethnicity and, 597–598
 - evidence-based practices, 596–597
 - problems in conducting research on, 594–595, 611

- Psychotherapy Networker* (PN) magazine, 38
 Psychotherapy online, 588
 Psychotic disorders, 595
 Psy.D. *See* Doctor of psychology (Psy.D.)
 PTSD. *See* Posttraumatic stress disorder (PTSD)
 Puberty, 384
 Pubic lice, 493 (table)
 Public, behaviors, 12
 Punishments
 defined, 200–201
 law of effect, 200–201, 219–220
 reinforcers *vs.* rewards and, 205–206
 Pupil, 114, 146
 Pure research, 5
- R**
- Race. *See* Ethnicity
 Racial bias, 624. *See also* Discrimination
 Radio waves, 113
 Ramsey, Evan, 216
 Random controlled experiments (RCEs), 596
 Random sample, 35, 60
 Range, 46, 49
 Rape, 458
 common pathway to sexual aggression, 490
 date rape, 488–489
 myths about, 489–490
 preventing, 491, 496
 rate of, 488–489
 why men rape women, 489–490, 496
 Rapid-eye-movement (REM), 155–158, 186, 357–358
 Rapid flight of ideas, 550, 568
 Rapid smoking, 584
 RAS. *See* Reticular formation (RAS)
 Rational-emotive behavior therapy (REBT), 589–590, 605, 610–611
 Rational-emotive therapy, 590, 605
 Rationalization, as defense mechanism, 426 (table)
 Ratio schedules, 208–209, 220
 Rats
 and acetylcholine (ACh), 79
 alcohol research, 171
 and behavior reinforcers, 13
 brain of, 74
 hyperphagic, 312 (fig.)
 “Little Albert” and conditioning, 12, 219
 and long-term potentiation (LTP), 254
 in mazes, 210, 212
 pleasure center, 166–167
 searching for disaster survivors, 210
 and taste aversion, 192–193
 Rayner, Rosalie, 12, 196–197
 RCEs. *See* Random controlled experiments (RCEs)
 Reaction formation, as defense mechanism, 426 (table)
 Reagan, Nancy, 59
 Reagan, Ronald, 59, 560
 Reality principle, 425
 Reality testing, 450
 Rebound anxiety, 599
 REBT. *See* Rational-emotive behavior therapy (REBT)
 Recall, 247–248, 260
 Recency effect, 235, 259, 626–627
 Receptor cells, 142
 Receptor neurons, 134, 142
 Receptor site, 75, 78, 95, 175, 544, 564
 Reciprocal determinism, 437, 449
 Reciprocity, 479, 495
 Recognition, 247, 260
 Recovering memories, 241
 Recovery, as grief stage, 416
 Red (color), and interpersonal attraction, 478
Redneck Rampage (video game), 216
 Reeve, Christopher, 327
 Reflex, 190, 483
 Reflex arc, 83
 Reflexes, 83–84, 103, 355–356, 380.
 See also Spinal cord
Reflexes of the Brain (Pavlov), 191
 Refractory period, 78, 484, 496
 Reinforcement, 13, 211
 Reinforcement schedules, 207–208, 220
 Reinforcers
 defined, 201
 immediate *vs.* delayed, 204
 primary, 204
 rewards and punishments *vs.*, 205–206
 secondary, 204
 types of, 203–204, 220
 Relapse prevention training, 593
 Relative size, 125–126
 Relaxation response, 166
 Relaxation training, 145, 601
 Relearn, 248, 260
 Reliability, of diagnosis standards, 537
 Reliability intelligence test, 291
 Religion, sexual behavior and, 486, 496
 REM. *See* Rapid-eye-movement (REM)
 Remote Associates Test, 287
 REM sleep, 155–156
 Reorganization, 416, 421
 Repetition, 11. *See also* Habit, importance of
 Repetitive stimuli, 152
 Replicate, 34–35
 Representativeness heuristic, 272
 Repression
 as defense mechanism, 425–426
 defined, 152–153, 237
 and dissociative disorders, 249–251, 260, 564, 568
 and posttraumatic stress disorder, 251
 Research
 applied, 5
 ethical issues in, 54–56, 60–61
 psychotherapy and, 594–595, 611
 pure, 5
 Stanford Prison Experiment, 55–56
 Research questions, 33
Resident Evil (video game), 216
 Residual type schizophrenia, 556
 Resistance, 576
 Resistance stage, 516, 530
 Resolution phase, 482–483, 496
 Responses, in classical conditioning, 191
 Response set, 450
 Response set theory, 165, 186
 Resting potential, 77
 Reston, James, 144
 Reticular formation (RAS), 86–88, 103, 159
 Retina, 114–115, 119, 142, 146
 Retinal disparity, 126, 147
 Retinal ganglion cells, 146
 Retirement age, 408
 Retrieval, 230–231
 Retrieval cues, 231
 Retroactive interference, 249, 260
 Retrograde amnesia, 251
 Retrospective memory, 226, 228–229, 259
 Retrospective memory task, 228
 Reuptake, 78–80, 175
 Reversibility, 368
 Rewards, 200–201, 205–206
 Rh antibodies, 347, 350–351
 Rhesus monkeys, 466
 Rh incompatibility, 347, 352, 380
 Rhine, Joseph Banks, 143
 Right-handed. *See* Handedness
 Risky shift, 641–642
 Ritaline (methylphenidate), 174, 187
 Rocket fuel (animal tranquilizer), 181
 Rods, 114–115, 115 (fig.), 142, 146
 Rogers, Carl, 601
 and empathic understanding, 580–581
 and humanistic-existential perspective, 17, 581
 profile of, 579
 self theory, 441–443, 449, 454
 Roid rage, 98
 Role diffusion, identity *vs.*, 372
 Role theory, 164 (table), 165, 186
 Romantic fallacy, 318
 Roosevelt, Franklin, 34
 Rooting reflex, 356
 Rorschach inkblot test, 451
 Rote, 236, 241, 259
 Rotter, Julian, 214
 Rousseau, Jean-Jacques, 318
 Rubella (German measles), 346–347, 350, 380
 Rubin vase, 122 (fig.)
 Runner’s high, 80
- S**
- Saccadic eye movements, 232–233, 259
 Sadness, 325
 Safety needs, 310 (fig.), 338
 Sagan, Carl, 30, 33
 Salem, Massachusetts, 535
 Salivation, 190–191, 193–195. *See also* Pavlov, Ivan
 Salovey, Peter, 285
 Sample, 34–35, 37, 60
 Sanchez, Jorge, 19, 22, 26
 Sandwich generation, 406, 420
 Sanguine type, 432

- Sarbin, Theodore, 165
- Satiety, 311, 338
- SAT test, 52
- Saturation, 117, 146
- Savings, 248
- Scaffolding, 368–369, 380
- Schachter, Stanley, 330, 332–333, 339
- Schacter, Daniel, 226
- Schedules of reinforcements, 207–208, 220
- Schemas, 238–239, 259, 363–364
- Schizoid personality disorder, 561, 565, 569
- Schizophrenia
and antipsychotic drugs, 601, 605, 611
brain deficits associated with, 557–558
cognitive-behavior therapy for, 603
defined, 554, 568
and dissociative disorders, 547
and dopamine imbalance, 102
excesses or deficiencies of neurotransmitters linked to, 79
genetics of, 558–559
Hinckley, John, 533–535, 560
linked to dopamine, 79, 569
multifactorial model of, 559 (fig.)
nature *vs.* nurture, 536–537
origins of, 556–560, 565, 569
psychotherapy, effectiveness of, 595
symptoms of, 554–555, 565, 568
and token economies, 585
types of, 555–556, 565, 568
- Schizotypal personality disorder, 561, 565, 569
- Scholastic Aptitude Test, 293
- School psychologist, 7, 26
- School segregation, 22
- Science, *vs.* pseudoscience, 58–59
- Scientifically selected sample, 37
- Scientific method, 33–34, 60
- Sclera, 114
- Sea snails, and biology of memory, 253
- Sechenov, Ivan, 191
- Seconal, 174
- Secondary reinforcer, 204, 219
- Secondary sex characteristics, 98, 384
- SecondLife.com, 107
- Secure attachment, 373
- Sedation, 599
- Sedative, 600
- Sedatives, dependency on, 183
- Selection factor, 34–35
- Selective attention, 152–153
- Selective avoidance, 620–621
- Selective exposure, 620–621
- Selective optimization with compensation, 414
- Selective serotonin reuptake inhibitors (SSRIs), 100, 553, 599–600, 603
- Self-actualization, 310 (fig.)
challenge of, 411, 610
defined, 308, 441
humanistic *vs.* psychodynamic perspectives, 454
See also Hierarchy of needs, Maslow's
- Self concept, 442, 449, 454
- Self-control methods, 586, 604, 610
- Self-destructive ruminating, 21
- Self-efficacy expectations
and anxiety, 544
defined, 439, 510–511, 530, 583
See also Self-esteem
- Self-esteem
developmental factors and, 444–445, 449, 454
enhancing, 444–445
and happiness, 327
parental behavior and, 381
and positive regard, 442–443
- Self-help group, 593, 611
- Self-ideals, 443
- Self-regulatory systems and plans, 440
- Self-serving bias, 629–630, 649
- Self theory, 441–443, 454
- Selye, Hans, 500–501, 514–517
- Semantic, 275
- Semantic code, 230, 259–260
- Semanticity, 276, 302
- Semantic memory, 225, 229, 259
- Semicircular canals, 141–142
- Sensation, 108, 146
- Sense of humor, 511, 530
- Sense of self, 153
- Senses, 109, 135–137, 142. *See also* Absolute threshold; *and entries for individual senses*
- Sensitization, 112, 146
- Sensorimotor stage, 364–366
- Sensorineural deafness, 133–134, 147
- Sensory adaptation, 112
- Sensory (afferent) neurons, 81, 83
- Sensory awareness, 151. *See also* Consciousness
- Sensory capabilities, of neonates, 356–357, 380
- Sensory-deprivation studies, 338
- Sensory memory, 231–234, 259
- Sensory receptor, 108, 146
- Sensory register, 232–233
- Sensory stimulation, 110–111
- Separation distress (yearning-anger-anxiety), 416
- Serial monogamy, 418
- Serial-position effect, 235, 259
- Serial processing, 270
- Serotonin
emotional arousal and sleep and, 79–80, 102
involved in eating and panic disorders, 599
learning and memory and, 254, 260
PMS linked to imbalance in, 100, 102
underutilization of, in depression, 553, 568
- Serum cholesterol, 519, 521, 529
- SES. *See* Socioeconomic status (SES)
- Sesame Street*, 216
- Set point, 334–335
- Seurat, George, 118
- Sex abuse, repressed memories of childhood, 250. *See also* Child abuse; Rape
- Sex characteristics, primary and secondary, 98
- Sex chromosomes, 69, 102
- Sex hormones, 95–97
organizing effects of, 471 and PMS, 101
prenatal sexual differentiation and, 103
role of, in gender-typing, 464–465, 468
and sexual motivation, 17, 470–471, 495
- Sex therapy, 482, 487–488, 496
- Sexual activity, 472
- Sexual aggression. *See* Rape
- Sexual behavior, 482
ethnicity and 486, 495
gender and education level and, 485–486, 495
Kinsey reports, 484–485
religion and, 485–486, 495
surveys of, 484–486, 496
- Sexual Behavior in the Human Female* (Kinsey), 37–38
- Sexual Behavior in the Human Male* (Kinsey), 37
- Sexual coercion, 488–491
- Sexual dysfunction, 482, 486–487, 496
- Sexual harassment, 458
- Sexuality
adolescent, 396
changes in, 409–410
cultural beliefs regarding, 457–458
investigating human, 37–38
- Sexual motivation, hormones and, 470–471, 495
- Sexual orientation
defined, 471, 495
ethnicity and, 474
Freudian theory, 173
origins of, 473–475, 495
research with humans, 475, 495
research with nonhumans, 475, 495
vs. sexual activity, 472
- Sexual response, 84
- Sexual response cycle, 484
defined, 482, 496
four phases, 482–483
- Sexually transmitted infections (STIs), 492–494
- s factors, 286
- Shadowing, 125–126, 125 (fig.), 126, 147
- Shaie, Walter, 300
- Shame and doubt, autonomy *vs.*, 372–373
- Shape constancy, 128–129
- Shaping, 208–209, 220
- Shepard, Roger N., 129
- Shields, Brooke, 354
- Shiffrin, R., 259
- Shock-numbness, 416, 421
- Short-term memory (STM), 231–232, 259
chunking, 236–237
defined, 234
interference in, 237
serial-position effect, 235
transferring information from, to long-term memory, 240–241
- Siamese fighting fish, 307
- Sickle-cell anemia, 352–353

- SIDS. *See* Sudden infant death syndrome (SIDS)
- Signal-detection theory, 111, 146
- Similarity, 122–123, 146
- Singer, Jerome, 330, 332–333, 339
- Single, being, 418
- Situational attribution, 627, 629, 649
- Situational factors
 - aggression and, 322
 - child abuse and, 371, 381
 - personality and, 449, 454
- Size constancy, 125, 127
- Sizemore, Chris, 546
- Skepticism, 33
- Skin, 142, 147
 - pain, 138–140
 - phantom limb pain, 139–140
 - temperature receptors, 138
 - touch and pressure, 137–138
- Skinner, B. F., 13–15, 26, 214, 219–220, 449, 454
- Skinner box, 201–202, 202 (fig.), 206, 212
- Sleep and sleep disorders
 - apnea, 161, 186, 409–410
 - bed-wetting, 162, 186, 199, 596 (table)
 - biological and circadian rhythms, 153–154
 - insomnia, 156, 159–161, 182, 186
 - myths about getting to, 160
 - narcolepsy, 161, 186
 - patterns of, among neonates, 357–358, 380
 - reasons for, 186
 - sleep talking and sleep-walking, 162–163, 186
 - stages, 154–156, 186
 - without drugs, 182–185
- Sleep apnea, 161, 186, 409–410
- Sleep cycles, 156 (fig.)
- Sleep deprivation, 156
- Sleeping and waking, neonates, 357–358, 380
- Sleeping pills, 182
- Sleep paralysis, 161
- Sleep spindles, 155
- Sleep talking, 162–163, 186
- Sleep terrors, 155, 161–162, 186. *See also* Nightmares
- Sleep time, for mammals, 153–154
- Sleepwalking, 162–163, 186
- Smell, 109, 135, 137, 142, 147
- Smiling, 325, 328, 339
- Smoking, 187
 - and cancer, 519
 - death and, 519–520
 - effects of, 176–178, 584
 - and heart disease, 519, 531
 - See also* Aversive conditioning; Cigarettes; Nicotine
- Social and emotional development
 - among adolescents, 390
 - deaths among adolescents, 391
 - ego identity *vs.* role diffusion, 392–394
 - identity status, 394–395
 - pregnancy, 396–397
 - relationships with
 - parents and peers, 391–392, 420
 - sexuality, 396
 - social networking online, 393
 - among children
 - attachment, 373–375
 - child abuse, 377
 - parenting styles, 375–377
 - psychosocial development, stages of (Erik Erikson), 372–373
 - during early adulthood, 401, 420
 - in late adulthood, 413–414, 420–421
- Social anxiety, 585
- Social approval, 508
- Social behavior, gender differences in, 463
- Social categorization, prejudice from, 625
- Social-cognitive theory, 16, 18, 26
 - and aggression, 321–322, 338
 - competencies, 438, 449
 - defined, 437
 - emotions, 439–440, 449
 - encoding strategies, 438, 449
 - expectancies, 438–439, 449
 - gender-typing and, 466–467, 495
 - observational learning, 438, 449, 454, 473, 495
 - self-regulatory systems and plans, 440, 449
 - and sexual behavior, 473
- Social conflict, prejudice from, 625
- Social-desirability scale, 36
- Social facilitation, 640, 642, 650
- Social influence
 - conformity, 637–639
 - defined, 632, 650
 - obedience to authority, 632–637
- Social instincts, 307
- Social intelligence, 285–286
- Socialization, 467, 495, 636, 650
- Social learning, prejudice from, 625
- Social-learning theorist. *See* Social-cognitive theory
- Social loafing, 640, 650
- Social networking online, 393
- Social norms, 637
- Social perception
 - attribution theory, 627–630, 649
 - body language, 630–31, 649
 - defined, 626
 - primacy and regency effects, 626–627, 649
- Social phobia, 539, 599
- Social psychologist, 7, 26
- Social psychology
 - attitudes, 616–623, 649
 - defined, 616, 649
 - group behavior, 639–646, 649
 - prejudice, 623–625, 648–649
 - social influence, 632–638, 649
 - social perception, 626–631, 649
- Social skills training, 585, 604, 610
- Social support, to buffer
 - effects of stress, 513, 530, 611
- Society for the Scientific Study of Sexuality, 482
- Sociocultural factors
 - contributing to heart disease, 519, 522–523
 - contributing to schizophrenia, 559
 - of eating disorders, 315
 - leading to cancer, 519, 524
 - of psychological disorders, 536
 - on sexual orientation, 485–486, 495
 - in suicide, 566
- Sociocultural perspective, 18–19, 26
- on personality, 445–447, 449, 454
- on schizophrenia, 556–557, 565
- Vygotsky, Lev, 369–370
- Socioeconomic differences, in intelligence, 292–293, 303
- Socioeconomic status (SES) and cancer, 519
- in personality, 449, 454
- Socrates, 17
- Sodium ion, 77
- Sodium-potassium pump, 77
- Somatic nervous system, 81, 102
- Somatoform disorders
 - defined, 547
 - origins of, 548, 564, 568
 - types of, 548, 564, 568
 - and women, 549
- Somatosensory cortex, 89–90, 103
- Sonogram, 353
- Soothing, 359
- Sound and sound waves, 129–130, 132, 147. *See also* Hearing
- Spanking, 377
- Spano, Nichola, 165
- Spatial-relations skill, as aspect of intelligence, 283–284, 495
- Spearman, Charles, 282, 286, 302
- Specialized accreditation*, 25
- Species, 66–67
- Species-specific behavior, 66–68, 338
- Specific phobia, 539
- Speed, 174
- Sperling, 259
- SpiderWorld*, 572
- Spina bifida, 352
- Spinal cord, 74, 81, 83, 86, 103
- Spinal reflexes, 83
- Split-brain experiment, 94–95, 103
- Spontaneous recovery, 193–195, 204, 219–220
- Spontaneous remission, 594
- Sport psychologist, 8
- SSRIs. *See* Selective serotonin reuptake inhibitors (SSRIs)
- Stabilizing, 608
- Stagnation, generativity *vs.*, 372, 403–406, 420
- Standard deviation, 49–52
- Standardized test, 448, 455
- Stanford, Theodore, 288–289
- Stanford-Binet Intelligence Scale, 288–289, 302–303

- Stanford Prison Experiment, 55–56
- Staring, 631, 649
- Start eating center, 312
- Startle reflex, 356
- State-dependent memory, 246, 260. *See also* Context-dependent memory
- Statistically significant differences, 53–54, 60
- Statistical (mathematical) methods, 45
- Statistics, 48, 53–54
 defined, 46–47, 60
 measures of variability, 49–51
 normal curve, 51–52
- Steele, Claude, 21–22, 292
- Steele, Shelby, 292
- STEM (science, technology, engineering, and mathematical skills) fields, 294–295
- Stereotypes, 459, 617, 650.
See also Discrimination; Prejudice; *and entries for specific stereotypes*
- Stereotype threat, 21–22, 292
- Sternberg, Robert, 284–286, 302, 495
- Steroids, 98–99, 103, 168, 517, 530
- Stevens, Arthur, 643
- Stickleback fish, 67
- Stillbirth, 346, 350, 380
- Stimulants
 amphetamines, 174, 180
 cocaine, 174–176, 180
 defined, 168
 nicotine, 176–178, 180
See also Drugs
- Stimulation, search for, 308
- Stimulus, 190
 in classical conditioning, 191
 and taste aversion, 191–193
See also Pavlov, Ivan
- Stimulus motives, 308, 338
- Stirrup, 131
- STIs. *See* Sexual transmitted infections (STIs)
- STM. *See* Short-term memory (STM)
- Storage, memory, 230, 259
- Stranger anxiety, 374
- Strange Situation model, 21
- Strategic role enactment, 165
- Stratified sample, 35, 60
- Streptomycin, 347, 350
- Stress
 alarm reaction, 514–516
 in America, 506–507
 and body, 514–518, 530
 conflict, 503–506, 530
 coping with, 526–529
 daily hassles, 501–502, 504, 530
 defined, 499–500, 530
 effects on immune system, 517–518
 exhaustion stage, 517
 gender and, 550
 general adaptation syndrome (GAS), 514–517
 and health problems, 502–503, 519, 521, 530–531
 irrational beliefs, 506–508, 530
 life changes, 502–504, 530
 management techniques, 507
 as pain source, 145
 psychological moderators of, 510–511, 513, 530
 resistance stage, 516
 Type A behavior, 508–509
- Stress disorders, 541–542, 564, 568
- Stressor, 500
- Strickland, Tony, 22
- Stroboscopic motion, 124, 124 (fig.), 147
- Structuralism, 10, 13, 15, 26
- Stupor, 555
- Subjective, 368
- Subjective feelings, 10
- Subjective values, 437
- Sublimation, as defense mechanism, 426 (table)
- Subliminal perception, 110
- Subliminal stimulation, 109–110, 146
- Substance abuse and dependency
 among adolescents, 168–169 (table)
 causal factors in, 170, 186
 cognitive-behavioral approaches to, 183–184
 defined, 169
See also entries for specific drugs
- Subvocalizing, 92
- Successive approximation, 209, 585, 610
- Sudden infant death syndrome (SIDS), 358, 380
- Sue, Stanley, 22, 449
- Sugar pill. *See* Placebo
- Suggestibility, 186
- Suicide, 566–567
 Suicide terrorism, 615–617
 Suicide terrorists, 628
- Suinn, Richard, 449
- Sunday Afternoon on the Island of La Grande Jatte*, 118 (fig.)
- Superego, 426, 431, 448, 454
- Superiority, drive for, 429
- Superordinate, 243–244
- Support group, 593, 611
- Suppression, 153
- Survey, 37–38, 45
- Survivor*, 65
- Susto, 536
- Sybil*, 546
- Sympathetic arousal, 332
- Sympathetic nervous system, 81–82, 102, 324–325, 339, 530
- Synapse, 78, 102, 387
- Synaptic cleft, 75, 78, 175
- Syntax, 279
- Syphilis, 346–347, 350, 380, 492, 493 (table), 535
- Systematic desensitization, 583, 604, 610
- Systematic random search algorithm, 268
- Systems approach, to family therapy, 592–593, 611
- T**
- Talwar, Sanjiv, 210
- Taste
 absolute threshold, as measure of, 109
 in animals, 135
 smell and, 135, 147
 taste cells, 136–137, 142
- Taste aversion, 191–193, 219
- Taste buds, 136–137, 147
- Taste cells, 136–137, 142
- TAT. *See* Thematic Apperception Test (TAT)
- Taylor, Shelley, 516
- Tay-Sachs disease, 352–353
- Telegraphic speech, 279
- Telepathy, 143
- Television, 216–218
- Telomeres, 410
- Temperature, 42, 138
- Tempest, The* (Shakespeare), 157
- Templates, 211
- Temporal lobe, 88–89, 103
- Tend-and-befriend, 515–516
- Tendons, sensory organs in, 142
- TENS. *See* Transcutaneous electrical nerve stimulation (TENS)
- Tension, 307, 338, 531.
See also Stress
- Teratogens, 346, 380
- Terman, Louis, 296
- Terman Studies of Genius, 342
- Terminal buttons, 74–76
- Terminals, 74–76
- Terrorism, study of, 8.
See also Social psychology; Suicide terrorism
- Testes, 97–98
- Testosterone, 96–98, 254
 and aggression, 319, 338, 495
 and gender-typing, 464, 466, 495
 stress and, 516
- Testosterone replacement therapy, 471
- Tests. *See entries for specific tests*
- Test scores, 50
- Tetracyclic antidepressant, 599
- Tetracycline, 347, 350, 380
- Texture gradient, 125–126, 147
- Thalamus, 88 (fig.), 252 (fig.)
 defined, 87, 103
 and formation of verbal memories, 255, 260
- Thalidomide, 347, 350, 380
- THC. *See* Delta9-tetrahydrocannabinol (THC)
- Thematic Apperception Test (TAT), 323, 338, 450
- Theory, 4
- Therapeutic alliance, 595, 601
- Theta waves, 155
- Thinking
 concepts, 264–265
 defined, 263, 302
 judgment and decision making, 271–274
 problem solving, 265–271
- Thompson, Helen Bradford, 20–21
- Thompson, J. Walter, 12
- Thorazine, 599
- Thorndike, Edward L., 200–201, 219
- Thought disorder, 554.
See also Schizophrenia
- Three Faces of Eve, The*, 37, 546
- Threshold, 78
- Thurstone, Louis, 283, 286, 302
- Thyroid gland, 96–97
- Thyrotrophin, 96
- Thyroxin, 103

- Thyroxin deficiency, 97
 Time-based task, 228
 Time out, 209–210
 Tip-of-the-tongue (TOT) phenomenon, 244–245, 260
 TM. *See* Transcendental meditation (TM)
 Tobacco. *See* Nicotine; Smoking
 Token economy, 585, 610
 Tolerance, 169
 Tolman, E. C., 211–212, 220
 Tongue, 142, 147
 Top-down processing, 123
 TOT. *See* Tip-of-the-tongue (TOT) phenomenon
 Touch and pressure, 109, 137–138, 142
 Touching, 631, 649
 Toxemia, 347, 380
 Traditional psychoanalysis, 575–578
 Trait perspective
 biology and traits, 434–436
 defined, 431–432, 454
 evaluation of, 436, 454
 five-factor model, 432–434
 on personality, 448, 454
 positive psychology and, 434
 trait theory (Hans Eysenck), 432–433, 454
 Trait(s)
 biology and, 434–436
 defined, 432
 genes influence psychological, 69
 Trance state, 576
 Tranquilizers and tranquilizing agents, 170, 181–182, 605
 Transcendental meditation (TM), 166
 Transcutaneous electrical nerve stimulation (TENS), 144
 Transduction, 109
 Transference, 576–577
 Treatment, in experiments, 42
 Triandis, Harry, 449
 Triangular Model of Love, 480–481, 480 (fig.)
 Triarchic theory of intelligence, 284–287, 302
 Trichromat, 120, 146
 Trichromatic theory, 119, 134, 146
 Tricyclic antidepressant, 599
 True language, 276
 Trust *vs.* mistrust, 372–373, 380–381, 392, 430
 Truth-wins scheme, 641, 650
 T-shirt, aromatic, 136
 Tsunami, 130
 Tuke, William, 574
 Tulving, Endel, 225
 Turnbull, Colin, 127
 Twain, Mark, 14
 20-20 hindsight, 274
 Twins, 70–72
 Twin studies, 102, 296–297
 Two-point threshold, 137
 Two-thirds majority scheme, 641, 650
 Two-word utterances, 279–280, 302
 Type A behavior pattern
 defined, 508–509, 530
 heart disease and, 519, 521–522, 529, 531
 and migraines, 521
 Type B behavior pattern, 509, 530
U
 UC. *See* Unconditioned stimulus (UCS)
 UCR. *See* Unconditioned response (UCR)
 UCS. *See* Unconditioned stimulus (UCS)
 UFO memories, 29–30
 Ultrasound, 352–353
 Umami, 136
 Umbilical cord, 345
 Unconditional positive regard
 in client-centered therapy, 604, 610
 defined, 442–443, 449, 454, 580
 Unconditioned response (UCR), 191, 199, 214
 Unconditioned stimulus (UCS)
 bell-and-pad treatment for bed-wetting, 199
 in classical conditioning experiments with dogs, 212
 defined, 191, 214, 219
 flooding and systematic desensitization, 198
 in taste aversion, 192
 Unconscious, 425
 Unconsciousness, 152–153.
 See also Preconscious; Sleep
 Unconscious thinking, importance of, 590
 Undifferentiated type schizophrenia, 556
 Uninvolved parents, 376–377
 United States, drug and alcohol use in, 170–171
 United States of Tara, 546
 Uplifts, 502
 Uppers, 174
 U.S. Army, 571
 U.S. Council of Foreign Relations, 628
 Uterus, 344, 352–353, 380
 Utopian society, 437
 Utterances, two-word, 279–280, 302
V
 Vaginismus, 486–487, 496
 Validity, of diagnosis standards, 537
 Validity intelligence test, 291
 Validity scales, 450
 Valium (diazepam), 598
 Value, 117, 146
 Variability, measures of, 49–51, 60
 Variable-interval schedule, 208–209, 220
 Variable-ratio schedule, 208–209
 Vasocongestion, 482–483, 496
 Vasopressin, 254, 260
 Ventral prefrontal cortex, 563
 Ventricles, enlarged, 558
 Ventromedial nucleus (VMN), 311, 338
 Verdi, Giuseppe, 411
 Vested interest, 649
 Vestibular sense, 140–142, 147
 Viagra, 488
 Vibration, 147. *See also* Sound and sound waves
 Vicodin, 173
 Video-game approach, to coping with pain, 145
 Video games, 216–218
 Violence, in media, 216–218.
 See also Aggression
 Virtual Iraq, 571
 Virtual therapy, 571–572
 Visible light, 113, 146
 Visible spectrum, 113 (fig.)
 Vision
 absolute threshold, as measure of, 109
 color vision, theories of, 118–120
 eye, 114–118
 light, 113–114
 nature of, 142
 Visual acuity, 115
 Visual cliff experiment, 362
 Visual code, 230, 259–260
 Visual cortex, 146
 Visual feature detectors, 112
 Visual illusion, 128–129
 Visual movement perception, 147
 Visual perception
 defined, 120
 depth perception, 124–126
 of motion, 123–124
 perceptual constancies, 127–128
 perceptual organization, 121–123
 visual illusions, 128–129
 Visual sensory memory, 259
 Visual-spatial ability, 461, 466
 Visual stimulation, 146
 Visual stimuli, 110
 Vitamin(s), 348, 350, 380
 VMN. *See* Ventromedial nucleus (VMN)
 VNO. *See* Vomeronasal organ (VNO)
 Vocabularies, growth, 280, 302
 Vocational personality types, 453
 Vocational Preference Inventory, 453
 Volley principle, 134, 147
 Voluntary muscles, 29–30
 Volunteer bias, 35
 Vomeronasal organ (VNO), 471, 495
 Von Békésy, Georg, 134
 Von Helmholtz, Hermann, 119, 134
 Vygotsky, Lev, 369–370, 380
W
 Wack (animal tranquilizer), 181
 Waking state, consciousness as, 153, 155
Walden Two, 201, 437, 454
 Wallace, Alfred Russell, 64
 Ward, W. S., 145
 Warts, genital, 492, 493 (table)
 Washburn, Margaret Floy, 20, 26
 Watson, James, 68, 151, 362
 Watson, James B., 191, 196–198
 Watson, John B., 11–15, 18, 26, 109, 214, 436–437, 449
 Watters, Ethan, 292
 Waxy flexibility, 556
 Wear-and-tear theory, 411
 Weber, Ernst, 110–111
 Weber's constant, 110, 146
 Wechsler Intelligence Scales, 51, 290–291, 303

- Weight control, 336–337. *See also* Obesity
- Wernicke-Korsakoff syndrome, 173
- Wernicke’s aphasia, 103
- Wernicke’s area, 92, 103
- Wertheimer, Max, 13, 15, 26, 121
- White matter, 83, 103
- White sunlight, 146
- Whole-report procedure, 233
- Wiesel, Torsten, 112
- Wisdom, 413
- Wish fulfillment, 578
- Withdrawal reflex, 356
- Wolpe, Joseph, 604
- Women
 - adulthood sexuality, 409–410
 - alcoholism among, 171–172
 - and depression, 550–551
 - and estrogen, 98
 - and gender-typing, 464–469, 495
 - and influences of gender and ethnicity on behavior, 22
 - and insomnia, 160
 - with “male” sex hormones, 470
 - and masturbation, 486
 - and obesity, 334–336
 - and penis envy, 429
 - and premenstrual syndrome, 100–101
 - in psychology, 20–21
 - and rape, 899–490
 - single, 418
 - and smoking, 178
 - somatoform disorders among, 549
 - and stress, 516
 - and suicide, 566
- See also* Adolescence; Gender; Girls
- Working alliance, 595
- Working memory, 234, 259, 283. *See also* Short-term memory (STM)
- World Trade Center, 571–572, 615
- Worry circuit, 544
- Wright, Frank Lloyd, 411
- Wundt, Wilhelm, 10–11, 15, 26, 247
- X**
- X-rays, 350–351
- Y**
- Yala National Park, 130
- Yearning-searching, 416, 421
- Yogi, Maharishi Mahesh, 166
- Young, Thomas, 117, 119
- Young-Helmholtz theory, 119, 134
- Yo Yo Ma, 70
- Z**
- Zajonc, Robert, 330
- Zener cards, 143
- Zimbardo, P., 55
- Zolof, 600
- Zone of proximal development (ZPD), 368–369, 380
- ZPD. *See* Zone of proximal development (ZPD)
- Zygote, 71, 341, 344, 380

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APPLICATIONS

- Mini-Experiment about Studying Eating Behavior (p. 3)
- LIFE CONNECTIONS: Getting Ready to Work in Psychology (p. 24)
- LIFE CONNECTIONS: Critical Thinking, Science, and Pseudoscience (p. 58)
- LIFE CONNECTIONS: Coping with PMS (p. 100)
- Find Your Blind Spot (p. 116)
- Adaptation to Different Lighting Conditions (p. 116)
- Mini-Experiment on Afterimages (p. 118)
- What Dichromats See (p. 120)
- Mini-Experiment on Light Adaptation (p. 120)
- Figure–Ground Perception (p. 121)
- Mini-Experiment on Proximity and Parallel Lines (pp. 122–123)
- Monocular Cues in Perception of Impossible Scenes (p. 125)
- Visual Illusions: Is Seeing Believing? (p. 128)
- Taste and Aging (p. 137)
- Mini-Experiment on Touch Sensitivity (p. 137)
- Mini-Experiment on Testing Kinesthesia and Your Vestibular Sense (p. 140)
- LIFE CONNECTIONS: Pain Management (p. 144)
- How Advertisers Break through into Our Consciousness (p. 152)
- Becoming Conscious of Direct Inner Awareness (p. 152)
- SELF-ASSESSMENT: Do You Have a Problem with Alcohol? (p. 172)
- LIFE CONNECTIONS: Getting to Sleep (p. 182)
- SELF-ASSESSMENT: Are You Getting Your Zs? (p. 182)
- Mini-Experiment Illustrating Classical Conditioning in Infants (p. 191)
- Understanding Higher-Order Conditioning (p. 196)
- Applications of Classical Conditioning: Counterconditioning, Flooding and Systematic Desensitization, the Bell-and-Pad Treatment for Bed-Wetting (p. 197–199)
- Immediate versus Delayed Reinforcers That Can Interfere with Studying (p. 204)
- Applications of Operant Conditioning: Biofeedback Training, Behavior Modification in the Classroom, Programmed Learning (pp. 209–210)
- LIFE CONNECTIONS: Violence in the Media and Aggression (p. 216)
- Teaching Children *Not* to Imitate Media Violence (p. 218)
- SELF-ASSESSMENT: Five Challenges to Your Memory (p. 224)
- Mini-Experiment about Memory of Routine Tasks (p. 228)
- Mini-Experiment on Tip-of-the-Tongue Phenomenon or Déjà Vu (p. 246)
- LIFE CONNECTIONS: Using the Psychology of Memory to Enhance Your Memory (p. 256)
- Using an Analogy to Solve a Problem (p. 268)
- SELF-ASSESSMENT: The Remote Associates Test (p. 287)
- Measuring Creativity (p. 287)
- How Do Group Factors Affect Your Test Performance? (pp. 288–291)
- LIFE CONNECTIONS: Enhancing Intellectual Functioning (p. 300)
- SELF-ASSESSMENT: The Sensation-Seeking Scale (p. 309)
- How to Enhance Your Happiness (p. 327)

- Controlling Your Weight (pp. 334–336)
- Mini-Experiment Involving Preoperational Thinking in 3- and 4-Year-Olds (p. 366)
- LIFE CONNECTIONS: Day Care: Blessing, Headache, or Both? (p. 378)
- How to Live Longer and Healthier (p. 410)
- SELF-ASSESSMENT: Determine Your Life Expectancy (p. 412)
- Enhancing Self-Esteem (p. 444–445)
- Preventing Rape (p. 491)
- SELF-ASSESSMENT: Cultural Myths That Create a Climate That Supports Rape (p. 490)
- LIFE CONNECTIONS: Preventing HIV/AIDS and Other Sexually Transmitted Infections (p. 492)
- SELF-ASSESSMENT: Are You a Type A or Type B? (p. 509)
- SELF-ASSESSMENT: The Locus of Control Scale (p. 512)
- LIFE CONNECTIONS: Preventing and Coping with Health Problems (p. 526)
- Coping with Stress (p. 526)
- Preventing and Coping with Headaches (p. 529)
- Reducing Coronary Heart Disease (pp. 527–529)
- Preventing and Coping with Cancer (p. 529)
- LIFE CONNECTIONS: Preventing Suicide (p. 566)
- LIFE CONNECTIONS: Alleviating Depression (p. 606)
- SELF-ASSESSMENT: Assess Your Assertiveness (p. 609)
- Mini-Experiment on Personal Motives and Advertising (p. 623)
- Mini-Experiment on the Actor–Observer Effect (p. 629)
- LIFE CONNECTIONS: Understanding and Combating Prejudice (p. 648)

DIVERSITY

- The Sociocultural Perspective (p. 18)
- Gender (p. 19)
- Gender, Ethnicity, and Psychology (p. 20)
- Women in Psychology (p. 20)
- Ethnicity (p. 19)
- Ethnicity in Psychology (p. 21)
- Problems in Generalizing from Psychological Research (p. 35)
- The Amygdala and Racially Oriented Responses (p. 88)
- Cultural Differences in Size Constancy (p. 127)
- Dreams in Diverse Cultures (p. 158)
- Gender Differences in Insomnia (p. 160)
- Ethnic Comparisons of Drug Use (p. 171)
- Gender Differences in Alcohol Consumption (p. 171)
- Diversity among People Who Smoke (p. 178)
- Age-Related Decline in Memory (p. 228)
- Memory and Prejudice (p. 239)
- Memory and Bilingualism (p. 245)
- Geometric Concepts and Culture (p. 264)
- Language and Culture (p. 277)
- The Linguistic-Relativity Hypothesis (p. 277)

- Socioeconomic and Ethnic Differences in Intelligence Test Scores (p. 292)
- Cultural Differences in Intelligence Testing (p. 293)
- The Testing situation and the Performance of Diverse Ethnic Groups (p. 300)
- Stereotype Vulnerability and Intelligence Test Scores (p. 292)
- Adoptee Studies and the Determinants of Intelligence (p. 297)
- Ethnicity and Socioeconomic Status among Women with Anorexia Nervosa (p. 314)
- Ethnicity and Socioeconomic Status among Women with Bulimia Nervosa (p. 315)
- A CLOSER LOOK: Cross-Cultural Aspects of Aggression (p. 320)
- Some Cultural Coverage in Situational Factors and Aggression (p. 322)
- Culture and Facial Expressions (p. 325)
- Cultural Differences and Happiness (p. 326)
- Puerto Rican Study Explains Scaffolding in Cognitive Development (p. 370)
- Stages of Attachment in Different Societies (p. 373)
- Gender Differences in Moral Development (p. 390)
- Aging, Gender, and Ethnicity (p. 410)
- Midlife Transition for Women (p. 404)
- A Woman's Renewed Sense of Self (p. 404)
- The Sociocultural Perspective on Personality (p. 445)
- Sociocultural Factors and Self-Esteem (p. 447)
- Gender and Self-Esteem during Adolescence (p. 444)
- Cultural Differences in the Expression of Sexuality (p. 458)
- Gender Differences in Cognitive Skills (p. 4)
- Gender Differences in Intelligence (pp. 460–462)
- Gender Differences in Personality (p. 462)
- Gender Differences in Social Behavior (p. 463)
- Gender Differences in Mate Selection (p. 463)
- Sexual Orientation (pp. 471–473)
- Culture and the Perception of Attractiveness (p. 476)
- Gender Differences in Responses to Stress (p. 516)
- Ethnicity and Breast Cancer (p. 519)
- Ethnicity and Incidence and outcome of Heart Attacks (p. 522)
- Ethnicity and Incidence and Outcome of Cancer (p. 524)
- Women and Depression (p. 550)
- Sociocultural Factors in Suicide (p. 566)
- Fundamental Attribution Error in Different Cultures (p. 627)
- Gender Differences in Attributions for Friendly Behavior (p. 630)
- Gender Differences in Altruism (p. 646)
- Discrimination (p. 648)
- Stereotypes (p. 623)
- Sources of Prejudice (p. 625)

EVOLUTIONARY PSYCHOLOGY

- Evolutionary Theory and William James (pp. 10–11)
- The Evolutionary and Biological Perspectives (p. 16)
- Evolution and Curiosity (p. 64)
- Introduction to Darwin and the Theory of Evolution (p. 63)
- Evolution and Evolutionary Psychology: “Survivor” Is More Than Just a Game (p. 65)
- “In Profile” on Charles Darwin (p. 64)
- Heredity and Evolution (p. 67)
- Kinship Studies (p. 70)
- Genetic-Environment Correlation (p. 72)
- Evolution and the Brain (p. 85)
- Evolution and the Limbic System (p. 88)
- Evolution and Depth Perception (pp. 124–126)
- Evolution and Preferences for Odors (p. 135)
- Evolution and the Location of Taste Buds (p. 136)
- Pain as an Evolutionary Adaptation (p. 144)
- Evolution and Length of Sleep in Diverse Species (pp. 153–154)
- Evolution of Taste Aversion (pp. 192–193)
- Extinction, Spontaneous Recovery, and Adaptation (pp. 193–195)
- Generalization, Discrimination, and Adaptation (p. 195)
- Evolution and Various Kinds of Learning (p. 200)
- Nature and Nurture in Language Development (pp. 280–281)
- The Evolutionary Perspective on Motivation (p. 307)
- Evolution and Aggression (pp. 318–319)
- Universal Expression of Emotions (pp. 325–326)
- Identification with Heroes and Evolution (p. 427)
- Evolution and Gender-Typing (p. 465)
- Evolution and Mate Selection (p. 465)
- Evolution and the Desire for Sexual Variety (p. 465)
- The Affective Shift Hypothesis (pp. 480–481)
- Controversy in Psychology: Why Do Men Rape Women? (p. 489)
- The Fight-or-Flight Reaction (p. 514)
- Gender Differences in Response to Stress (p. 516)
- Anxiety as a Reflection of Natural Selection (p. 544)
- Evolution of Social Norms (p. 637)
- Evolution and Altruism (p. 644)