Understanding Psychology

TWELFTH EDITION

CHARLES G. MORRIS | ALBERT A. MAISTO

Pearson

Understanding Psychology

Twelfth Edition

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Preface

Continued Focus on Basic Unifying Concepts

In this new edition, we continue to focus on three unifying, basic concepts, which have been woven throughout every edition of our texts:

1. **Psychology is a science that is rapidly evolving.** From the thousands of articles that have appeared during the past several years, we selected more than 300 new references for this edition, almost all of which are from 2013–2016. Examples of new material include common myths about psychology, the "replication crisis," the influence of color on psychological functioning, neuroimaging of dreaming, effects of marijuana, binge drinking, increased heroin use, mindful meditation, role of images and concepts in thinking, Kahneman and Tversky's System 1 and System 2, multitasking and cellphone use while driving, "brain training," eating disorders, sexual orientation, attachment theory, early- and late-maturers, youth violence, personality change in young adulthood, the changing role of marriage, Holland's approach to career choice, cognitive-social learning theories, preparing for the impact of climate change, resilience, group walks in nature, the effects of mental health stigma, diagnosis of gender dysphoria, specific phobias, positive and negative symptoms of schizophrenia, basis of systematic desensitization, and combating "fake news."
2. **Human behavior and thought are diverse, varied, and affected by culture.** We have continued to give close attention to diversity. Woven throughout the chapters we emphasize the importance of understanding the role culture, gender, and human diversity play in shaping virtually every aspect of human behavior including: cognition, learning, memory, emotion, motivation, stress, mental illness, sexuality, development, perception, and drug effects.
3. **The study of psychology involves active thinking, questioning, and problem solving.** We retained all of the "Thinking Critically" exercises and now encourage students to actively weigh in through Journal Prompts tied to these features in Revel. The topics encourage the reader to engage in genuine critical thinking by questioning the methods used to gather data, considering possible alternative explanations for findings, and imagining further research that might shed additional light on the phenomenon under study.

Continuing Attention to Enduring Issues

We believe that an important part of active learning is for students to recognize recurring themes that run through the material they are reading. In Chapter 1, we introduce a set of five **Enduring Issues** that cut across and unite all subfields of psychology (see pages 7–8):

- **Person–Situation:** To what extent is behavior caused by processes that occur inside the person, such as thoughts, emotions, and genes? In contrast, to what extent is behavior caused or triggered by factors outside the person, such as incentives, cues in the environment, and the presence of other people?
- **Nature–Nurture:** Is the person we become a product of innate, inborn tendencies, or a reflection of experience and upbringing?
- **Stability–Change:** Are the characteristics we develop in childhood more or less permanent and fixed, or do we change in predictable (and unpredictable) ways over the course of our lives?
- **Diversity–Universality:** Because we are all human, each person is like every other person. But in some respects, each person is only like certain other people. And in other respects, each of us is like no other person. Thus, anywhere humans exist there will be both similarity and diversity.
- **Mind–Body:** How are mind and body connected? Many psychologists are fascinated by the relationship between what we experience, such as thoughts and feelings, and biological processes, such as activity in the nervous system.

These five issues represent enduring themes in the history of psychology. Depending on the events and intellectual climate of a given time period, one or another of these issues has assumed special prominence. For example, the role of genetics (heredity) is receiving much greater attention today than it has in the past. Diversity is also an issue of much greater concern, as is the role of biological processes.

Throughout this book, we will highlight the importance of these matters. Each chapter opens with a section highlighting the enduring issues to be encountered in that chapter. Several times in each chapter we will call the reader's attention to the way in which the topic under consideration—whether it be new discoveries about communication within the nervous system, research into how we learn, or the reason that people abuse drugs—reflects one of these issues. In this way, we will show the surprising unity and coherence of the diverse and exciting science of psychology.

LEARNING OBJECTIVES

The chapter learning objectives were carefully written to cover the content of each chapter and to ensure that students who master the objectives will indeed have a thorough grasp of the material. The objectives also help to organize the supplementary material, allowing for easy customization by instructors.

OPENING VIGNETTES

Each chapter of our text begins with an opening vignette. Reviewers have often commented on how useful it is to have the

vignette woven throughout the chapter to help students understand and apply information.

New to This Edition

With each new edition, we strive to make the text as current as possible. This is always a challenge because psychology is changing so rapidly. We have cited more than 300 new references in this edition in an effort to capture the most important new developments. We have also updated numerous figures with the most recent data available.

We also strive to improve the book based on suggestions from the professors and students who use the current edition. We were especially fortunate to have extremely thoughtful and helpful comments and suggestions from a dozen reviewers. We have taken their input to heart in every chapter with what we believe are significant improvements.

We have added a number of features that we hope will engage students more fully in what they are learning. There are dozens of new surveys, Journal Prompts, videos, and animations as can be seen in the list of new content below. The expanded Revel edition provides even more interactive features designed to increase student involvement.

At the same time, our original goals for this book remain the same. We wanted to present a scientific, accurate, and thorough overview of the essential concepts of psychology; to use engaging language that students can easily comprehend; to be current without being trendy; and to write clearly and accessibly about psychology and its concrete, real-life applications—without being condescending to the introductory-level student.

CHAPTER 1 The Science of Psychology

- Chapter reorganized and new material added to increase student involvement/interest
- New chapter introduction
- New survey: What Do You Know About Psychology?
- New material on subfields of psychology
- New Explore the Concept: Major Subfields of Psychology
- New section Critical Thinking: Thinking Like a Scientist
- New Social Explorer: Percentage of Women Recipients of PhDs in Psychology 1950–2010
- New Journal Prompt: Thinking Critically About Psychology and Minority Students
- New survey: Participating in a Research Survey
- New video: Independent vs. Dependent Variables
- New section: A Replication Crisis?
- New material on the importance of sampling/diversity
- New Journal Prompt: Thinking Critically About Internet Users
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 5 revised end-of-module quizzes and a new end-of-chapter quiz
- 17 new references

CHAPTER 2 The Biological Basis of Behavior

- New video: Structure of the Neuron
- New video: Sensory and Motor Neurons
- New Journal Prompt: Thinking Critically About Mirror Neurons
- New video: The Neural Impulse Action Potential
- New video: The Synapse
- New video: Reuptake of Dopamine
- New Explore the Concept: The Divisions of the Brain
- New figure displaying the four lobes of the cerebrum
- New Explore the Concept: The Four Lobes of the Cerebrum
- New figure of the limbic system displaying additional features
- New glossary term: cingulate cortex
- New figure of sympathetic and parasympathetic nervous system
- New Journal Prompt: Thinking Critically About Tools for Studying the Brain
- New video: The Spinal Cord Reflex
- New Explore the Concept: Functions of the Parasympathetic and Sympathetic Divisions of the Nervous System
- New survey: Do You Fight or Fly?
- New figure of the endocrine system
- New Explore the Concept: The Glands of the Endocrine System
- New video: Chromosomes and DNA
- New Journal Prompt: Thinking Critically About Media Accounts of Research
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 5 revised end-of-module quizzes and a new end-of-chapter quiz
- 29 new references

CHAPTER 3 Sensation and Perception

- New material at the start of the chapter that distinguishes sensation from perception
- New survey: Which Senses Do You Use?
- New Journal Prompt: Thinking Critically About Advertising and Subconscious Messages
- New video: Structure of the Eye
- New Explore the Concept: Interactive Eye Anatomy
- New material on the influence of color on psychological functioning
- New Explore the Concept: Color Vision in Different Species
- New Explore the Concept: Sound
- New Journal Prompt: Thinking Critically About an Ancient Question

- New video: Cochlear Implant
- New Journal Prompt: Thinking Critically About Pheromones
- New video: The Tongue and Taste Buds
- New Explore the Concept: Binocular Cues to Depth Perception
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 5 revised end-of-module quizzes and a new end-of-chapter quiz
- 9 new references

CHAPTER 4 States of Consciousness

- New survey: What Altered States Have You Experienced?
- New video: Sleep Stages
- Updated terminology revising the stages of sleep
- New Journal Prompt: Thinking Critically About Sleep Deprivation
- New video: Sleep Disorders
- New Journal Prompt: Thinking Critically About Sleep Loss and Illness
- New survey: Are Dreams Meaningful?
- New material on the neuroimaging of dreaming
- New Explore the Concept: Activation and Synthesis Theory of Dreaming
- New material on increased potency of marijuana
- New survey: What Drugs Have You Used?
- New Social Explorer: Teenage Use of Alcohol
- Revised and updated material on Binge Drinking
- New Social Explorer: Persons Killed in Alcohol-Related Traffic Crashes
- New material on increased heroin use in the United States
- New Social Explorer: Teenage Use of Ecstasy
- New Social Explorer: Teenage Use of Marijuana
- New material on the effects of the early use of marijuana
- New Journal Prompt: Teenage Use of Marijuana
- New material on the use of mindful meditation to relieve chronic pain
- New material on the clinical applications of hypnosis
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 4 revised end-of-module quizzes and a new end-of-chapter quiz
- 29 new references

CHAPTER 5 Learning

- New Explore the Concept: Elements in Classical Conditioning
- New video: Classical Conditioning: An Involuntary Response
- New Explore the Concept: Elements of Operant Conditioning
- New video: Negative Reinforcement
- New Journal Prompt: Thinking Critically About Corporal Punishment
- New Journal Prompt: Biofeedback and Neurofeedback
- New video: Schedules of Reinforcement
- New Explore the Concept: Examples of Reinforcement in Everyday Life
- New Journal Prompt: Thinking Critically About Reinforcement Schedules
- New Social Explorer: Response Acquisition and Extinction in Classical Conditioning
- New Social Explorer: Results of the Tolman and Honzik Study
- New Social Explorer: Results of Bandura's Study
- New survey: What Learning Techniques Do You Use?
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 4 revised end-of-module quizzes and a new end-of-chapter quiz
- 6 new references

CHAPTER 6 Memory

- New video: Inattentional Blindness
- New video: Improving Your Memory Using Mnemonics
- New Journal Prompt: Thinking Critically About Types of Memory
- New video: The Neuroscience of Memory
- New Explore the Concept: The Biological Basis of Memory
- New video: Reasons for Forgetting
- New material on music as a retrieval cue
- New Journal Prompt: Thinking Critically About Eyewitness Testimony
- New survey: What Do You Remember?
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 6 revised end-of-module quizzes and a new end-of-chapter quiz
- 12 new references

CHAPTER 7 Cognition and Mental Abilities

- Extensively rewritten and reorganized to reduce length, increase student involvement and interest, and build stronger bridges between sections of the chapter
- New chapter introduction
- New video: Cognitive Advantages of Multilingualism
- New material on the role of images and concepts in thinking

- Additional examples of problem solving to clarify concepts
- New Journal Prompt: Thinking Critically About Solving Problems
- Clearer explanation of compensatory decision making
- New material on Kahneman and Tversky's System 1 and System 2 (thinking fast and slow)
- New material on multitasking and cellphone use while driving
- Explore the Concept: Measuring Intelligence
- New Journal Prompt: Thinking Critically About Multiple Intelligences
- New Social Explorer: IQ Scores and Family Relationships
- New material on "brain training"
- New Journal Prompt: Thinking Critically About the Flynn Effect
- New Journal Prompt: Thinking Critically About International Comparisons of School Achievement
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 7 revised end-of-module quizzes and a new end-of-chapter quiz
- 27 new references

CHAPTER 8 Motivation and Emotion

- New survey: What Motivates You?
- New Journal Prompt: Thinking Critically About Primary Drives
- New video: Maslow's Hierarchy of Needs
- New Summary Table: Perspectives on Motivation
- New material on eating disorders
- New figure on rising obesity among American youth
- New video: The Human Sexual Response Cycle
- New material on sexual orientation
- New video: Sexual Orientation
- New video: Nature/Nurture of Sexual Orientation
- New video: Factors Influencing Aggression
- New survey: How Do You Deal with Your Emotions?
- New material on how the brain reads the face
- New Summary Table: Theories of Emotion
- New Journal Prompt: Thinking Critically About Nonverbal Communication of Emotion
- New video: Display Rules
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 5 revised end-of-module quizzes and a new end-of-chapter quiz
- 21 new references

CHAPTER 9 Life-Span Development

- Extensively rewritten and reorganized to reduce length
- New Explore the Concept: Advantages and Disadvantages of Different Types of Developmental Research Methods
- Additional examples of teratogens
- New video: Newborn Reflexes
- New Social Explorer: Synaptic Density in the Human Brain from Infancy to Adulthood
- New Explore the Concept: Piaget's Stages of Cognitive Development
- Expanded coverage of attachment theory
- New video: Attachment
- New Explore the Concept: Erickson's Eight Psychosocial Stages
- New video: Parenting Styles
- New survey: Gender and Sexuality
- New Journal Prompt: Thinking Critically About Television's Effects
- New material on early- and late-maturers
- New Social Explorer: Sex Among High School Students
- New material on youth violence
- New Journal Prompt: Thinking Critically About Kids Who Kill
- New material on personality change in young adulthood
- New material on the ways in which the role of marriage is changing
- New Social Explorer: Marital Satisfaction
- New material on Holland's approach to career choice
- New data on dual-career families
- New Social Explorer: Psychological Well-Being Across the Life-Span
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 7 revised end-of-module quizzes and a new end-of-chapter quiz
- 48 new references

CHAPTER 10 Motivation and Emotion

- New survey: What Has Shaped Your Personality?
- New material on the Big Five Dimensions of Personality
- New material on cognitive-social learning theories
- New Journal Prompt: Thinking Critically About Cultural Universals
- New Explore the Concept: Theories of Personality
- New video: The Rorschach Test
- New end-of-chapter shared writing assignment
- New flashcards for key terms

- 5 revised end-of-module quizzes and a new end-of-chapter quiz
- 14 new references

CHAPTER 11 Stress and Health Psychology

- New Social Explorer: Sources of Stress in America
- New survey: The Undergraduate Stress Questionnaire
- New material on ways health professionals are preparing for the impact of climate change
- New Journal Prompt: Thinking Critically About Road Rage and You
- New Explore the Concept: Types of Conflict
- New material on learning to be resilient
- New material on the benefits of group walks in nature
- New Journal Prompt: Thinking Critically About Group Walks in Nature
- New Explore the Concept: Coping with Stress
- New Social Explorer: Mental Trauma in Societies at War
- New Journal Prompt: Thinking Critically About Posttraumatic Stress
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 6 revised end-of-module quizzes and a new end-of-chapter quiz
- 30 new references

CHAPTER 12 Psychological Disorders

- New survey: Attitudes Toward and Experiences with Psychological Disorders
- New video: Controversies Surrounding the DSM
- All new section and material: The Effects of Stigma on a Diagnosis of Mental Illness
- New Social Explorer: Gender and Race Differences in the Suicide Rate Across the Life Span
- New table: Some Common Specific Phobias
- New video: Panic Attacks
- New material addressing the diagnosis of gender dysphoria
- New video: Gender Dysphoria
- New Journal Prompt: Thinking Critically About Causation
- New information describing the positive and negative symptoms of schizophrenia
- New video: Schizophrenia
- New Journal Prompt: Thinking Critically About Genius and Mental Disorders
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 3 revised end-of-module quizzes and a new end-of-chapter quiz
- 32 new references

CHAPTER 13 Therapies

- New interactive using therapy dialogs
- New information on basis of systematic desensitization
- New introduction to cognitive–behavioral therapy
- New Social Explorer: Percent of Adults Participating in Mental Health Treatment
- Updated list of resources for finding mental health professionals
- New Journal Prompt: Thinking Critically About Survey Results
- New Social Explorer: Duration of Therapy and Improvement
- New Journal Prompt: Thinking Critically About Access to Mental Health Care
- New video: Electroconvulsive Therapy
- New Explore the Concept: Major Perspectives on Therapy
- New survey: How Do You Take Care of Your Mental Health?
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 8 revised end-of-module quizzes and 1 new end-of-chapter quiz
- 11 new references

CHAPTER 14 Social Psychology

- New video: Cognitive Dissonance
- New Journal Prompt: Thinking Critically About Attitudes Toward Smoking
- New Applied Psychology box: Combating the Impact of Fake News
- New video: Asch's Experiment on Conformity
- New video: Obedience to Authority
- New video: The Stanford Prison Experiment
- New Journal Prompt: Thinking Critically About Helping Someone in Distress
- New survey: Could You Be a Hero?
- New end-of-chapter shared writing assignment
- New flashcards for key terms
- 4 revised end of chapter quizzes and a new end-of-module quiz
- 31 references

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About the Authors

Charles G. Morris received his B.A. from Yale University (1962) and his M.A. (1964) and Ph.D. (1965) in psychology from the University of Illinois. He joined the University of Michigan in 1965 where he served until his retirement in 2002. From 1972–1977, he served as Associate Dean in the College of Literature, Science and the Arts. From 1980–1990, he served as Associate Chair of the Department of Psychology. Upon his retirement in 2002, he was appointed Emeritus Professor. He is a Fellow of the American Psychological Association and the American Psychological Society.

Morris has written more than two dozen books, numerous articles, and more than 30 papers and presentations. His books include *Psychology: An Introduction, Understanding Psychology, Basic Psychology, Psychology: Concepts and Applications, Psychology: The Core*, and *Contemporary Psychology and Effective Behavior*.

His early research centered on leadership, group interaction, and group problem solving. More recently, his publications and presentations have focused on various aspects of undergraduate education, on contemporary views of leadership, and on the "Big 5" personality traits.

Albert A. Maisto, the Carnegie Foundation's U.S. Professor of the Year for 1997–1998, is the Bonnie E. Cone Distinguished Professor for Teaching at the University of North Carolina at Charlotte. Maisto earned both his Ph.D. and M.A. in Psychology from the University of Alabama.

His books include *Psychology: An Introduction, Understanding Psychology, Basic Psychology, Psychology: Concepts and Applications*, and *Psychology: The Core.*

Earlier in his career, he served as a visiting Professor to the University of Nottingham in England, and he spent two years on the faculty of the University of Connecticut. Throughout his career, Dr. Maisto has distinguished himself as an exemplary instructor of general psychology, winning the prestigious Bank of America Award for Teaching Excellence.

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Charles G. Morris

Albert A. Maisto

Chapter 1

The Science of Psychology

Learning Objectives

LO 1.1 Define *psychology*, and describe some of the major subfields within psychology.

LO 1.2 Describe the five enduring issues that cut across the subfields of psychology.

LO 1.3 Explain what psychology has in common with other sciences, how psychologists use the scientific method, and the difference between theories and hypotheses.

LO 1.4 Characterize critical thinking by its various steps.

LO 1.5 Describe the emergence of scientific psychology in the late 19th and early 20th centuries.

LO 1.6 Explain the roles voluntarism, structuralism, functionalism, and psychodynamic theory played in initially defining psychology as "a science of the mind."

LO 1.7 Explain how Watson and Skinner redefined the field of psychology.

LO 1.8 Describe what is meant by "the cognitive revolution" in psychology.

LO 1.9 Explain how evolutionary psychology and positive psychology are changing the focus of contemporary psychology.

LO 1.10 Describe the role of women in the history of psychology.

LO 1.11 Discuss the ways in which knowledge and awareness of human diversity can and does inform and enrich psychological study.

LO 1.12 Describe the characteristics, strengths, and weaknesses of naturalistic observation, case studies, surveys, and correlational research.

LO 1.13 Describe the differences between independent and dependent variables and between control groups and experimental groups.

LO 1.14 Differentiate between random and representative samples, and describe the factors that can influence a research study.

LO 1.15 Identify key ethical issues in psychological research with humans and nonhumans.

Why are you taking a psychology course? What would you like to learn from it? What questions would you like to have answered? When students like you were asked these questions, they mentioned things like:

- Is multi-tasking effective?
- How much of a person's behavior is inherited?
- How do drugs like marijuana and cocaine work? Why do people get addicted to some drugs?
- How valid are IQ tests? Do IQ tests and tests like the SAT and ACT really tell us how well we are likely to do in school and college?
- What is the best and most effective way to learn?
- Why do we forget things that we want to remember?
- Do online brain-training exercises work?
- Why is talking on a cellphone while driving dangerous?
- What effect does punishment have on children's behavior?
- Is it beneficial to express pent-up anger, to "let it all out"?
- How does the brain function? How does it affect our behavior?
- Does ESP exist?
- Who determines what is classified as "abnormal behavior"? Is any type of behavior truly abnormal?
- How successful is psychotherapy in curing psychological problems?
- Is the polygraph test an accurate detector of lying?
- Why major in psychology? Does it have practical uses?

As you can see, psychology students have a surprising number and variety of interests. Surely you share some of them. It is likely that you have begun to develop your own answers to these kinds of questions. We all like to observe ourselves and others. We exchange our various experiences, philosophies, and advice with friends. We speculate on why people sometimes act as they do and think about how they might act in other situations. And over time, we each begin to develop our own ideas about human psychology. We will explore each of these questions and many others in this text.

Applying Psychology

The Benefits of Studying Psychology

Although psychology is the fourth most popular undergraduate major (after business, health professions, social sciences, and history) (National Center for Educational Statistics, 2015), we know that many students take psychology classes in order to fulfill a general requirement for their degree, rather than out of a compelling interest in the subject. Those students, and even some who are keenly interested in psychology, may wonder, "What am I going to gain from taking this course?" There are several benefits that you can gain from studying psychology:

- **Self-understanding.** Almost all of us want to understand ourselves and others better. In our daily lives, we often look for answers by relying on our own experience, knowledge, and assumptions. But, as you will see, that barely scratches the surface. As a psychology student, you will learn to look deeply into human behavior and ask complex and precise questions. In the process, you will not only achieve a better understanding of yourself and your fellow human beings, but also come to realize

that much of what we consider "just plain common sense about people" doesn't hold up under scrutiny.

- **Critical thinking skills.** In addition to greater understanding of yourself and others, by studying psychology you will also have an opportunity to acquire some specific skills. As we have seen, one of those skills is the ability to think critically about psychological issues. As a result of practicing critical thinking, you will become a more sophisticated consumer of the information available to you in the mass media (Bensley, Crowe, Bernhardt, Buckner, & Allman, 2010; Gray, 2008). You will also become more cautious about too quickly accepting what looks like "common sense."
- **Skill in the application of the scientific method.** Because psychology uses the scientific method to understand behavior, studying psychology will help you to understand and become proficient in the principles and application of the scientific method. Perhaps this is why increasing numbers of educators use psychology to teach the fundamentals of the scientific method to undergraduates who show little interest in more traditional scientific disciplines like chemistry or physics (Dingfelder, 2007).
- **Study skills.** You will also have the opportunity to acquire better study skills that will serve you well in all your courses. You will find an entire chapter on human memory (Chapter 6) containing excellent information about making the most of your study time. But you will also find information about the relation between sleep and learning and the effects of drugs on memory (Chapter 4), about the nature of intelligence and its relation to success in school and in later life (Chapter 7), about the effects of motivation and arousal on the ability to learn and to perform (Chapter 8), and about age differences in the ability to learn and remember (Chapter 9).
- **Job skills.** Finally, you may acquire some skills that will help you find a job. This chapter lists many career possibilities for students who earn degrees in psychology. In addition, many careers outside psychology draw on a person's knowledge of psychology. For example, personnel administrators deal with employee relations, vocational rehabilitation counselors help people with disabilities find employment, and day-care center supervisors oversee the care of preschool children. Indeed, employers in areas such as business and finance seek out psychology majors because of their knowledge of the principles of human behavior and their skills in experimental design and data collection and analysis.

Of course, all of these benefits are much more likely to accrue to students who regularly attend class, study, and try to apply what they learn to their own lives. As with many other opportunities, the benefits you receive are, in large part, up to you.

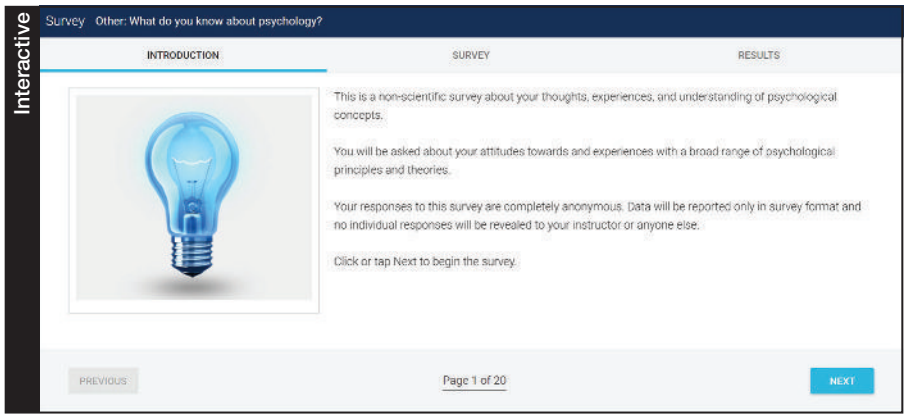
What Is Psychology?

LO 1.1 **Define *psychology*, and describe some of the major subfields within psychology.**

"Most psychologists study mental and emotional problems and work as psychotherapists." Is this statement true or false?

Psychology is the scientific study of behavior and mental processes in all their many facets. Thus, psychology is not confined to investigating abnormal behavior, as many people mistakenly assume. One way to get a better understanding of the field of psychology is to look at the kinds of issues that interest and concern contemporary psychologists.

psychology
The scientific study of behavior and mental processes.



Weigh in on the Survey "*What Do You Know About Psychology?*"

The Breadth of Psychology

The American Psychological Association is made up of 54 divisions (see **Table 1.1**), each of which represents an area of special interest to psychologists today. The great diversity of topics in Table 1.1 reflects the richness and variety of issues explored by psychologists. A closer look at several of these specialty areas should give you an even better idea of what psychology is all about.

Table 1.1 American Psychological Association Divisions (2017)

The two major organizations of psychologists in the United States are the American Psychological Association (APA), founded over 100 years ago, and the Association for Psychological Science (APS), founded in 1988. Members of both groups work in a wide variety of areas. The following list of divisions of the APA reflects the enormous diversity of the field of psychology.

Division*	
1. Society for General Psychology	**30.** Society of Psychological Hypnosis
2. Society for the Teaching of Psychology	**31.** State, Provincial, and Territorial Psychological Association Affairs
3. Society for Experimental Psychology and Cognitive Science	**32.** Society for Humanistic Psychology
5. Division for Quantitative and Qualitative Methods	**33.** Intellectual and Developmental Disabilities/Autism Spectrum Disorders
6. Society for Behavioral Neuroscience and Comparative Psychology	**34.** Society for Environmental, Population, and Conservation Psychology
7. Developmental Psychology	**35.** Society for the Psychology of Women
8. Society for Personality and Social Psychology	**36.** Society for the Psychology of Religion and Spirituality
9. Society for the Psychological Study of Social Issues (SPSSI)	**37.** Society for Child and Family Policy and Practice
10. Society for the Psychology of Aesthetics, Creativity, and the Arts	**38.** Society for Health Psychology
12. Society of Clinical Psychology	**39.** Psychoanalysis
13. Society of Consulting Psychology	**40.** Society for Clinical Neuropsychology
14. Society for Industrial and Organizational Psychology	**41.** American Psychology—Law Society
15. Educational Psychology	**42.** Psychologists in Independent Practice
16. School Psychology	**43.** Society for Couple and Family Psychology
17. Society of Counseling Psychology	**44.** Society for the Psychological Study of Lesbian, Gay, Bisexual, and Transgender Issues
18. Psychologists in Public Service	**45.** Society for the Psychological Study of Culture, Ethnicity, and Race
19. Society for Military Psychology	**46.** Society for Media Psychology and Technology
20. Adult Development and Aging	**47.** Society for Sport, Exercise, and Performance Psychology
21. Applied Experimental and Engineering Psychology	**48.** Peace Psychology
22. Rehabilitation Psychology	**49.** Society of Group Psychology and Group Psychotherapy
23. Society for Consumer Psychology	**50.** Society of Addiction Psychology
24. Society for Theoretical and Philosophical Psychology	**51.** Society for the Psychological Study of Men and Masculinity
25. Division of Behavior Analysis	**52.** International Psychology
26. Society for the History of Psychology	**53.** Society of Clinical Child and Adolescent Psychology
27. Society for Community Research and Action: Division of Community Psychology	**54.** Society of Pediatric Psychology
28. Psychopharmacology and Substance Abuse	**55.** American Society for the Advancement of Pharmacotherapy (ASAP)
29. Society for the Advancement of Psychotherapy	**56.** Trauma Psychology

*There are no divisions 4 or 11. For information on a division, e-mail the APA at division@apa.org, or locate them on the Internet at www.apa.org/about/division.html

SOURCE: American Psychological Association (2017). Divisions of the American Psychological Association from www.apa.org/about/division/index.aspx.

DEVELOPMENTAL PSYCHOLOGY *Developmental psychologists* study all aspects of human growth and change—physical, mental, social, and emotional—from the prenatal period through old age. Most specialize in a particular stage of human development. As we will see in Chapter 9, developmental psychologists are interested in such things as whether babies are born with distinct temperaments, how long it takes before an infant can recognize its parents, and at what age sex differences in behavior emerge. In studying adolescents, they are interested in such things as how puberty affects relationships with peers and parents, the extent to which adolescence is a stressful period, and the search for a personal identity. They are also interested in the challenges and changes of adulthood, from marrying and having children to facing the transitions related to aging and eventual death.

PHYSIOLOGICAL PSYCHOLOGY *Physiological psychologists* investigate the biological basis of human behavior, thoughts, and emotions. They concentrate particularly on the brain, the nervous system, and the body's biochemistry. In Chapter 2, we will discuss the biological processes studied by physiological psychologists (or psychobiologists, as

they are sometimes called). In their work, they may study why coffee makes us nervous and alcohol makes us relaxed or why some people who have had a stroke have difficulty speaking whereas others do not. They may study whether some of the differences in behavior between men and women are due to differences in the nervous system or hormones or if heredity plays a role in the development of alcoholism. Some psychologists who are interested in the biological basis of behavior focus exclusively on the brain and central nervous system. They often employ advanced *neuroimaging* techniques and are called *neuropsychologists*.

Psychologists are employed in many settings that might surprise you.

EXPERIMENTAL PSYCHOLOGY *Experimental psychologists* investigate such basic processes as learning, memory, sensation, perception, cognition, motivation, and emotion. We will discuss experimental psychology in the chapters on sensation and perception, learning, memory, cognition, and motivation and emotion. Experimental psychologists are interested in the answers to such questions as: How do people remember and what makes them forget? Does subliminal perception really work? Are there any differences in the way men and women store and retrieve information from memory? Why can't you taste food when you have a stuffy nose? How do people make decisions and solve problems, and do men and women go about solving complex problems in different ways?

PERSONALITY PSYCHOLOGY *Personality psychologists* are interested in the differences among people's traits, such as anxiety, sociability, self-esteem, the need for achievement, and aggressiveness. Personality psychology will be the focus of our attention in Chapter 10, where we will examine such issues as: Does personality change much during a person's lifetime, or does it for the most part stay the same? Is shyness a personality trait or simply the response to an unfamiliar social situation? Personality psychologists may also attempt to determine what causes some people to be optimists and others to be pessimists; why some people are outgoing and sociable while others are cold and unfriendly; and if there are consistent differences between men and women on personality characteristics such as extroversion, anxiousness, agreeableness, and conscientiousness.

CLINICAL AND COUNSELING PSYCHOLOGY When asked to describe a psychologist, most people think of a therapist who sees troubled people in an office, clinic, or hospital. This popular view is half correct. About 50% of psychologists with advanced degrees specialize in clinical or counseling psychology, both of which seek to help people deal more successfully with their lives (Stamm, Lin, & Christidis, 2016). *Clinical psychologists* are interested primarily in the diagnosis, causes, and treatment of psychological disorders, such as depression or acute anxiety. *Counseling psychologists*, in contrast, are concerned mainly with the everyday problems of adjustment that most of us face at some point in life, such as making a difficult career choice or coping with a troubled relationship. In Chapters 11, 12, and 13, we will see that clinical and counseling psychologists are interested in what causes psychological disorders and how effective psychotherapy or counseling is. They may seek to find answers to questions like: Are men more or less likely than women to experience certain kinds of psychological disorders, and if so, what causes these differences? Are there sex differences in the kinds of day-to-day, personal problems that men and women must face, as well as differences in the ways that they cope with these problems? What can be done to minimize the psychological impact of a community disaster such as an earthquake, tornado, or major flood or fire? What is the psychological impact of growing up in a city or in poverty, and how do people cope with those pressures?

SOCIAL PSYCHOLOGY *Social psychologists* believe that our thoughts, feelings, and behaviors are all greatly influenced by other people and the social situations in which we find ourselves. As we will see in Chapter 14, social psychologists are interested in answering such questions as: To what extent is a person likely to be influenced by other people? How might one go about changing a person's attitude about something? Do people tend to be attracted to other people who are similar to themselves or to people who are quite different? Do men and women typically play different social roles when in groups? Do men and women differ in the extent to which they are likely to be convinced by a persuasive argument? What causes prejudice, and how can it be reduced or eliminated?

INDUSTRIAL AND ORGANIZATIONAL (I/O) PSYCHOLOGY *Industrial and organizational (I/O) psychologists* apply the principles of psychology to the workplace. They are concerned with such practical issues as selecting and training personnel and improving productivity and working conditions. We will address these issues and others in Appendix B.

Applying Psychology

Careers in Psychology

What kinds of careers are open to psychology graduates? Community college graduates with associate's degrees in psychology are well qualified for paraprofessional positions in state hospitals, mental health centers, and other human service settings. Job responsibilities may include screening and evaluating new patients, recordkeeping, and assisting in consultation sessions.

Graduates with bachelor's degrees in psychology may find jobs assisting psychologists in mental health centers, vocational rehabilitation facilities, and correctional centers. They may also take positions as research assistants, teach psychology in high school, or find jobs in government or business.

For those who pursue advanced degrees in psychology—a master's degree or a doctorate—career opportunities span a wide range (Sternberg, 2017). Many doctoral psychologists join the faculties of colleges and universities. Others work in applied fields such as school, health, industrial, commercial, and educational psychology. Nearly half of doctoral psychologists are clinicians or counselors who treat people experiencing mental, emotional, or adaptational problems. Master's degree graduates in psychology often work as researchers at universities, in government, or for private companies. Students with a master's degree in industrial/organizational psychology are particularly sought by large corporations to work in personnel and human resource departments, while doctoral graduates in industrial/organizational psychology are hired into management or consulting positions in industry. Other graduates work in health and education.

Many students who major in psychology want to become therapists. For these students, there are five main career paths:

- A *psychiatrist* is a medical doctor who, in addition to 4 years of medical training, has completed 3 years of residency training in psychiatry, most of which is spent in supervised clinical practice. Psychiatrists specialize in the diagnosis and treatment of behavior disorders. In addition to providing psychotherapy, in many states, psychiatrists are the only mental health professionals who are licensed to prescribe medications.
- A *psychoanalyst* is a psychiatrist or psychologist who has received additional specialized training in psychoanalytic theory and practice, usually at a psychoanalytic institute that requires him or her to undergo psychoanalysis before practicing.
- *Clinical psychologists* assess and treat mental, emotional, and behavioral disorders, ranging from short-term crises to chronic disorders such as schizophrenia. They hold advanced degrees in psychology (a PhD or PsyD)—the result of a 4- to 6-year graduate program, plus a 1-year internship in psychological assessment and psychotherapy and at least 1 more year of supervised practice. With additional training, some states also permit clinical psychologists to prescribe medications for the treatment of mental disorders (see Chapter 13).
- *Counseling psychologists* help people cope with situational problems, such as adjusting to college, choosing a vocation, resolving marital problems, or dealing with the death of a loved one.
- *Social workers* may also treat psychological problems. They typically have a master's degree (MSW) or a doctorate (DSW). Social workers often work under the supervision of psychiatrists or clinical psychologists, although in some states they may be licensed to practice independently.

A free booklet, *Psychology: Scientific Problem Solvers, Careers for the Twenty-First Century*, is available online at www.apa.org/careers/resources/guides/careers.pdf. Point your browser to www.apa.org/careers/resources/index.aspx for more information about careers in psychology.

Two additional resources are well worth reading:

Eric Landrum and Stephen Davis have written an excellent book on *The Psychology Major: Career Options and Strategies for Success* (5th edition).

If you are interested in careers with a bachelor's degree in psychology, in addition to *The Psychology Major* you will find the book *Finding Jobs With a Psychology Bachelor's Degree: Expert Advice for Launching Your Career* by Eric Landrum very informative.

Review the **Summary Table**, and then try matching each subfield with its description.

Interactive

Summary Table Major Subfields of Psychology

Field of Psychology	Description
Developmental psychology	The study of how people grow and change physically, cognitively, emotionally, and socially, from the prenatal period through death. Includes *child*, *adolescent*, and *life-span* psychology.
Physiological psychology	Investigates the biological basis of behavior. Includes *neuroscience*, *biological psychology*, and *behavior genetics*.
Experimental psychology	Investigates basic psychological processes such as sensation and perception, memory, intelligence, learning, and motivation.
Personality psychology	Studies the differences between individuals on such traits as sociability, emotional stability, conscientiousness, and self-esteem.
Clinical and counseling psychology	Applies the principles of psychology to mental health and adjustment. *Clinical psychology* focuses on the diagnosis and treatment of mental disorders, while *counseling psychology* is more concerned with "normal" adjustment issues such as making difficult choices or coping with a troubled relationship.
Social psychology	Explores how society influences thoughts, feelings, and behavior.
Industrial and organizational (I/O) psychology	Applies the principles of psychology to the workplace.

Explore the Concept in "*Major Subfields of Psychology*"

Enduring Issues

LO 1.2 **Describe the five enduring issues that cut across the subfields of psychology.**

Given the broad range of careers and interests, what holds the subfields of psychology together as a distinct scientific discipline?

What do psychologists who study organizations, psychological disorders, memory and cognition, behavioral genetics, or changes across the life span have in common? All psychologists share a common interest in five enduring issues that override their areas of specialization and cut to the core of what it means to be human.

PERSON–SITUATION To what extent is behavior caused by such internal processes as thoughts, emotions, motives, attitudes, values, personality, and genes? In contrast, to what extent is behavior caused by such external factors as incentives, environmental cues, and the presence of other people? Put another way, are we masters of our fate or victims of circumstances? We will encounter these questions most directly in our consideration of behavior genetics, learning, emotion and motivation, personality, and social psychology.

NATURE–NURTURE To what extent are we a product of innate, inborn tendencies, and to what extent are we a reflection of experiences and upbringing? This is the famous "nature versus nurture" debate. For decades, psychologists have argued about the relative influence of heredity (genes) versus environment (experience) on thought and behavior. More recently, psychologists have begun studying the extent to which genetic differences only appear in specific environments and the extent to which certain experiences only affect people with particular genetic predispositions (Champagne, 2009). This complex issue surfaces most clearly in our discussions of behavior genetics, intelligence, development, personality, and abnormal psychology.

STABILITY–CHANGE Are the characteristics we develop in childhood more or less permanent and fixed, or do we change significantly over the course of our lives? Developmental psychologists are especially interested in these and other questions, as are psychologists who specialize in personality, adjustment, abnormal psychology, and therapy.

"My therapy is quite simple: I wag my tail and lick your face until you feel good about yourself again."

DIVERSITY–UNIVERSALITY Because we are all human, each person is like every other person. But in some respects, each person is only like certain other people. And in other respects, each of us is like no other person. Thus, anywhere humans exist there will be both similarity and diversity. Throughout this text, we will encounter these questions: Does our understanding of human behavior apply equally well to every human being? Does it apply only to men or just to women or only to particular racial or ethnic groups or particular societies (especially our own)? Do we perhaps need "different psychologies" to account for the wide diversity of human behaviors (Arnett, 2008)?

MIND–BODY Finally, how are mind and body connected? Many psychologists are fascinated by the relationship between what we experience (such as thoughts and feelings) and what our biological processes are (such as activity in the nervous system). This mind–body issue will arise most clearly in our discussions of the biological basis of behavior, sensation and perception, altered states of consciousness, emotion and motivation, adjustment and health psychology, and disorders and therapy.

These five issues represent enduring themes in the history of psychology. Depending on the events and intellectual climate of a given time period, one or another of these issues has assumed special prominence in the history of psychology. For example, at the beginning of the 21st century, the role of genetics (heredity) is receiving much greater attention than in the past. Diversity is also an issue of much greater concern, as is the role of biological processes.

Throughout this text, we will highlight the importance of these matters. Several times in each chapter we will call your attention to the way in which the topic under consideration reflects one of these issues. In this way, we will show the surprising unity and coherence within the diverse science of psychology.

Psychology as Science

LO 1.3 **Explain what psychology has in common with other sciences, how psychologists use the scientific method, and the difference between theories and hypotheses.**

What does psychology have in common with other sciences?

scientific method
An approach to knowledge that relies on collecting data, generating a theory to explain the data, producing testable hypotheses based on the theory, and testing those hypotheses empirically.

We have seen that psychologists share your interest in behavior and the mental processes that shape behavior. However, they approach these topics in a different way. Earlier we defined psychology as the science of behavior and mental processes. The key word in this definition is *science*. Psychologists rely on the **scientific method** when seeking to answer questions. They collect data through careful, systematic observation; attempt to explain what they have observed by developing theories; make new predictions based on those theories; and then systematically test those predictions through additional observations and experiments to determine whether they are correct. Thus, like all scientists, psychologists use the scientific method to describe, understand, predict, and, eventually, achieve some measure of control over what they study.

Let's see what this means by looking at how psychologists would approach the question of whether males are more aggressive than females. Some people believe that males are naturally more aggressive than females. Others say that this may be only a stereotype—or at least that it is not always true. Psychologists would want to know first: Do males and females actually differ in aggressive behavior? Hundreds of research studies have addressed this question, and the evidence seems conclusive: Although males and females do not differ significantly in feelings of anger, males are more physically and verbally aggressive than females (Archer, 2009). Males are usually

more physically aggressive than females in nonhuman species as well. Once psychologists have established that there are indeed sex differences in aggression, the next step is to attempt to explain those differences. A number of explanations are possible. For example, if you are a physiological psychologist, you might ascribe these differences to genetics or body chemistry. Developmental psychologists might look at the way children are taught to behave "like a boy" or "like a girl." Social psychologists might explain the differences in terms of cultural norms, which require males to "stand up for themselves" and hold that physical aggression isn't "feminine."

Males are more physically aggressive than females. Different areas within psychology have different explanations for why this is the case.

Each of these explanations stands as a **theory** about the causes of sex differences in aggression. And each theory allows you to make new **hypotheses**, or predictions, about the phenomenon in question. For example, if gender differences in aggression arise because males have higher levels of testosterone than females do, you would predict that extremely violent men should have higher levels of testosterone than do men who are generally nonviolent. If the differences reflect the ways in which children are raised, you would predict that there would be few differences between males and females raised in families where the parents avoided gender stereotypes. If sex differences in aggression reflect cultural norms, you would predict that within societies that encourage nonviolence and peaceful coexistence the difference in aggression across the sexes should be small.

theory

Systematic explanation of a phenomenon; it organizes known facts, allows us to predict new facts, and permits us to exercise a degree of control over the phenomenon.

hypotheses

Specific, testable predictions derived from a theory.

Each of these predictions or hypotheses can be tested through research, and the results should indicate whether one theory is better than another at accounting for known facts and predicting new facts. You will learn in Chapter 2 that indeed there is a relationship between testosterone and aggressiveness. In Chapter 9, you will see that parental behavior does have an effect on sex differences in aggression. In Chapter 8, you will also learn that indeed cultural norms do affect sex difference in aggressiveness among humans but that doesn't explain sex differences in nonhuman species.

Critical Thinking: Thinking Like a Scientist

LO 1.4 **Characterize critical thinking by its various steps.**

What does it mean to "think critically"?

Do you believe any of the following?

1. Gifted children are less well-adjusted than other children.
2. Opposites attract.
3. Subliminal messages on self-help audiotapes have beneficial effects.

Most of us believe devoutly in the virtue of common sense. If you answered yes to each of these three popular commonsense beliefs, you may be surprised to learn not only that these beliefs are wrong but also that many other common sense beliefs prove false when exposed to critical thinking.

What exactly is critical thinking? It is the process we use to examine the information we have and then, based on this inquiry, make judgments and decisions. When we think critically, we define problems, examine evidence, analyze assumptions—ours as well as those of others—consider alternatives, and ultimately find reasons to support or reject an argument.

To think critically, a person must adopt a certain state of mind, characterized by objectivity, caution, a willingness to challenge the opinions of others, and, perhaps

most difficult of all, a willingness to subject one's deepest beliefs to searching scrutiny. If all this sounds similar to the scientific method used by psychologists and other scientists, it is.

The ability to think critically is a learned behavior. To many people, including quite a few introductory psychology students, psychology seems to be based on nothing more than common sense thinly disguised by fancy jargon. As we have seen, however, psychology is actually based on data that are the result of carefully designed research. As you read about some of that research in this text, your own critical thinking skills may be sharpened. In fact, according to recent research, training in psychology can teach you to think critically, perhaps because psychology itself is often based on studies that subject commonsense beliefs to scientific scrutiny.

In the following video, you will learn that critical thinking doesn't come naturally. It takes practice to develop this skill.

Watch the Video "*The Challenge of Critical Thinking*"

Psychologists use a number of strategies in questioning assumptions and examining data. Here, we use the rules of psychological investigation to judge whether the previously mentioned assertion that "opposites attract" is correct:

- ***Define the problem or the question you are investigating.*** Do opposites attract each other?
- ***Suggest a theory or a reasonable explanation for the problem.*** People who are dissimilar balance each other in a relationship.
- ***Collect and examine all the available evidence.*** Be skeptical of people's self-reports, as they may be subjectively biased. If data conflict, try to find more evidence. Research on attraction yields no support for the idea that opposites attract, whereas many studies confirm that people of similar looks, interests, age, family background, religion, values, and attitudes seek each other.
- ***Analyze assumptions.*** Because balancing different people's strengths and weaknesses is a good way to form a group, you might assume it is a good basis for personal relationships as well, which would explain why people of opposite temperaments would be attracted to each other. Yet research evidence shows that such an assumption is false. Why should people of similar temperaments attract each other? One important reason is that they often belong to the same social circles. Research suggests proximity is a big factor in attraction.
- ***Avoid oversimplifying.*** Don't overlook the evidence that people of similar temperaments find living together rather difficult in some ways. For example, living with someone who is as tense as you are may be harder than living with someone of calm temperament—your opposite.

- ***Draw conclusions carefully.*** It seems safe to conclude that, in general, opposites don't attract, but there are specific exceptions to this general rule.
- ***Consider every alternative interpretation.*** People may cite cases that conflict with your conclusion. Remember, however, that their arguments are likely to be based on subjective observations and a far narrower database than researchers have used when studying this question.
- ***Recognize the relevance of research to events and situations.*** Let's say you have been thinking of dating someone whose temperament seems quite different from yours. You may decide, based on what you now know, not to rush into things but to go more slowly, testing your own observations against your knowledge of research findings. But because there are cases where opposites do attract, you may indeed find that person attractive.

Quiz Questions

1. Which of these is the modern, formal definition of psychology?
   a. Psychology is the scientific study of behavior and mental processes.
   b. Psychology is as much an art as a science.
   c. Psychology today studies only cognition and emotion.
   d. Psychology is the study of psychological disorders and treatment.
2. Which of these is among the five enduring issues of psychology?
   a. friends–family
   b. opportunity–disenfranchisement
   c. youth–age
   d. person–situation
3. A(n) _____ is a specific, testable prediction derived from a theory.
   a. phenomenon
   b. experiment
   c. hypothesis
   d. scientific method
4. You want to answer the question, "Do opposites really attract?" As a critical thinker using the scientific method, it is most important that you do which of the following?
   a. If data conflict, go with the largest data set.
   b. Be skeptical of self-reports as they may be biased.
   c. Collect a large number of self-reports.
   d. Try to simplify things as much as possible.
5. "The role of the frontal cortex in self-control." An article such as this would most likely be written by a:
   a. counseling psychologist.
   b. social psychologist.
   c. developmental psychologist.
   d. physiological psychologist.

The Growth of Psychology as a Science

LO 1.5 **Describe the emergence of scientific psychology in the late 19th and early 20th centuries.**

"Psychology has a long past, but a short history." What does that mean?

Prior to about the 5th century B.C.E., nobody thought much about trying to understand human thoughts and behavior. People regarded their mental processes with awe, assuming that thoughts and emotions were the work of spirits and gods. That all changed when Greek philosophers began to speculate about how the mind works, about where thoughts and feelings come from if not from the gods, and about how the mind might affect behavior. Socrates, Plato, and Aristotle each addressed in different ways such things as the nature of knowledge, reasoning, and emotion.

Jump ahead to the end of the Dark Ages and the beginnings of the scientific revolution, when René Descartes (1596–1650) took the position that the human mind, unlike the physical world, is not subject to laws. Moreover, though the mind is not observable, it controls the body; in turn, the body provides information for the mind. And indeed understanding

the relation between mind and body continues to challenge psychologists today, as we will see. Unlike Descartes, John Locke (1632–1704) believed that even the human mind operates according to laws. Moreover, in sharp contrast to Socrates and Plato, he said the human mind at the moment of birth is a *tabula rasa*, a "blank slate" that contains no innate knowledge. Rather, we gain knowledge through experience. Thomas Hobbes (1588–1679) went even further. He claimed that such things as "soul" and "spirit" and "mind" are meaningless. According to Hobbes, thoughts and experiences are simply by-products of the workings of our brain. In this respect, Hobbes anticipated the position of psychological behaviorists as we shall soon see. Charles Darwin (1809–1882) followed in Hobbes's path by asserting that while the mind is unobservable (and thus not a proper subject for scientific study), behavior is observable and thus open to scientific examination. Moreover, Darwin took the position that behavior evolves—behavior that contributes to the survival of a species tends to persist, while behavior that is detrimental to survival tends to disappear over time. Evolutionary psychologists today follow in that same tradition.

In the 1800s, a number of scholars began to explore ways in which researchers might begin to study the mind (Schwarz & Pfister, 2016). However, it was not until the late 1800s that the scientific method began to be applied systematically to questions that had puzzled philosophers for centuries. Only then did psychology come into being as a formal, scientific discipline. The history of psychology as a science can be divided into three main stages: the emergence of a science of the mind, the behaviorist decades, and the "cognitive revolution."

The "New Psychology": A Science of the Mind

LO 1.6 **Explain the roles voluntarism, structuralism, functionalism, and psychodynamic theory played in initially defining psychology as "a science of the mind."**

How did Wundt help to define psychology as a science of the mind?

Why did James think that sensation and perception alone couldn't explain behavior?

Why was Freud's theory of the unconscious shocking at the turn of the 20th century?

At the beginning of the 20th century, most university psychology programs were located in philosophy departments. But the foundations of the "new psychology"—the science of psychology—had been laid. Initially, psychology was defined as the study of mental processes. The primary method of collecting data was introspection or self-observation, which occurred in a laboratory or on an analyst's couch.

WILHELM WUNDT AND EDWARD BRADFORD TITCHENER: VOLUNTARISM AND STRUCTURALISM Most psychologists agree that psychology as a science was born in 1879, the year that Wilhelm Wundt founded the first psychological laboratory at the University of Leipzig in Germany. In the public eye, a laboratory identified a field of inquiry as "science" (Benjamin, 2000). At the outset, Wundt did not attract much attention; only four students attended his first lecture. By the mid-1890s, however, his classes were filled to capacity. Wundt was primarily interested in memory and *selective attention*—the process by which we determine what we are going to attend to at any given moment. Wundt used the term *voluntarism* to describe his view of psychology. He believed that attention is actively controlled by intentions and motives, and that this sets human attention apart from attention in other organisms. In turn, attention controls such other psychological processes as perceptions, thoughts, and memories. We will examine the role of attention more closely in Chapter 4 and Chapter 6, but for the moment it is sufficient to note that, in establishing a laboratory and insisting on measurement and experimentation, Wundt moved psychology out of the realm of philosophy and into the world of science.

One of Wundt's students was Edward Bradford Titchener. Titchener's ideas differed sharply in many respects from those of his mentor (Sundqvist, 2007). Titchener was impressed by recent advances in chemistry and physics, achieved by analyzing complex

compounds (molecules) in terms of their basic elements (atoms). Similarly, Titchener reasoned, psychologists should analyze complex experiences in terms of their simplest components. For example, when people look at a banana they immediately think, "Here is a fruit, something to peel and eat." But this perception is based on past experience. What we *see* is simply a long, yellow object.

In a search for the most fundamental elements, or "atoms," of thought, Titchener broke down consciousness into three basic elements: physical sensations (what we see), feelings (such as liking or disliking bananas), and images (memories of other bananas). Even the most complex thoughts and feelings, he argued, can be reduced to these simple elements. Titchener saw psychology's role as identifying these elements and showing how they can be combined and integrated—an approach known as **structuralism**. Although the structuralist school of psychology was relatively short-lived and has had little long-term effect, the study of perception and sensation continues to be very much a part of contemporary psychology, as you will see in Chapter 3.

structuralism
School of psychology that stresses the basic units of experience and the combinations in which they occur.

WILLIAM JAMES: FUNCTIONALISM One of the first academics to challenge structuralism was an American, William James. James argued that Titchener's "atoms of experience"—pure sensations without meaning—simply do not exist in real-life experience. Our minds are constantly weaving associations, revising experience, starting, stopping, and jumping back and forth in time. Perceptions, emotions, and images cannot be separated, James argued; consciousness flows in a continuous stream. If we could not recognize a banana, we would have to figure out what it was each time we saw one. James developed a **functionalist theory** that focused on how individuals use their perceptual abilities to adapt and function in their environment. This theory raised questions about learning, the complexities of mental life, the impact of experience on the brain, and humankind's place in the natural world that still seem current today. Although impatient with experiments, James shared Wundt and Titchener's belief that the goal of psychology was to analyze experience.

functionalist theory
Theory of mental life and behavior that is concerned with how an organism uses its perceptual abilities to function in its environment.

SIGMUND FREUD: PSYCHODYNAMIC PSYCHOLOGY Of all psychology's pioneers, Sigmund Freud is by far the best known—and the most controversial. A medical doctor, Freud was fascinated by the central nervous system. He spent many years conducting research in the physiology laboratory of the University of Vienna and only reluctantly became a practicing physician. After a trip to Paris, where he studied with a neurologist who was using hypnosis to treat nervous disorders, Freud established a private practice in Vienna in 1886. His work with patients convinced him that many nervous ailments are psychological, rather than biological, in origin. Freud's clinical observations led him to develop a comprehensive theory of mental life that differed radically from the views of his predecessors.

Freud held that human beings are not as rational as they imagine and that "free will," which was so important to Wundt, is largely an illusion. Rather, we are motivated by unconscious instincts and urges that are not available to the rational, conscious part of our mind. Other psychologists had referred to the unconscious, in passing, as a dusty warehouse of old experiences and information we could retrieve as needed. In contrast, Freud saw the unconscious as a dynamic cauldron of primitive sexual and aggressive drives, forbidden desires, nameless fears and wishes, and traumatic childhood memories. Although hidden from awareness, unconscious impulses press on the conscious mind and find expression in disguised or altered form, including dreams, mannerisms, slips of the tongue, and symptoms of mental illness, as well as in socially acceptable pursuits such as art and literature.

Freud's **psychodynamic theory** was controversial at the turn of the century. Many of Freud's Victorian contemporaries were shocked, not only by his emphasis on sexuality, but also by his suggestion that we are often unaware of our true motives and thus are not entirely in control of our thoughts and behavior. Conversely, members of the medical community in Vienna at that time generally held Freud's new theory in high regard, nominating him for the position of Professor Extraordinarious at the University of Vienna (Esterson, 2002). Freud's lectures and writings attracted considerable attention in the United States as well as in Europe; he had a profound impact on the arts and philosophy, as well as on psychology. As expanded and revised by his colleagues and successors, Freud's theories laid the foundation for the study of personality and psychological disorders, which we will discuss in Chapters 10, 12, and 13.

psychodynamic theories
Personality theories contending that behavior results from psychological factors that interact within the individual, often outside conscious awareness.

Redefining Psychology: The Study of Behavior

LO 1.7 **Explain how Watson and Skinner redefined the field of psychology.**

How was Watson's approach to human behavior different from that of Freud?

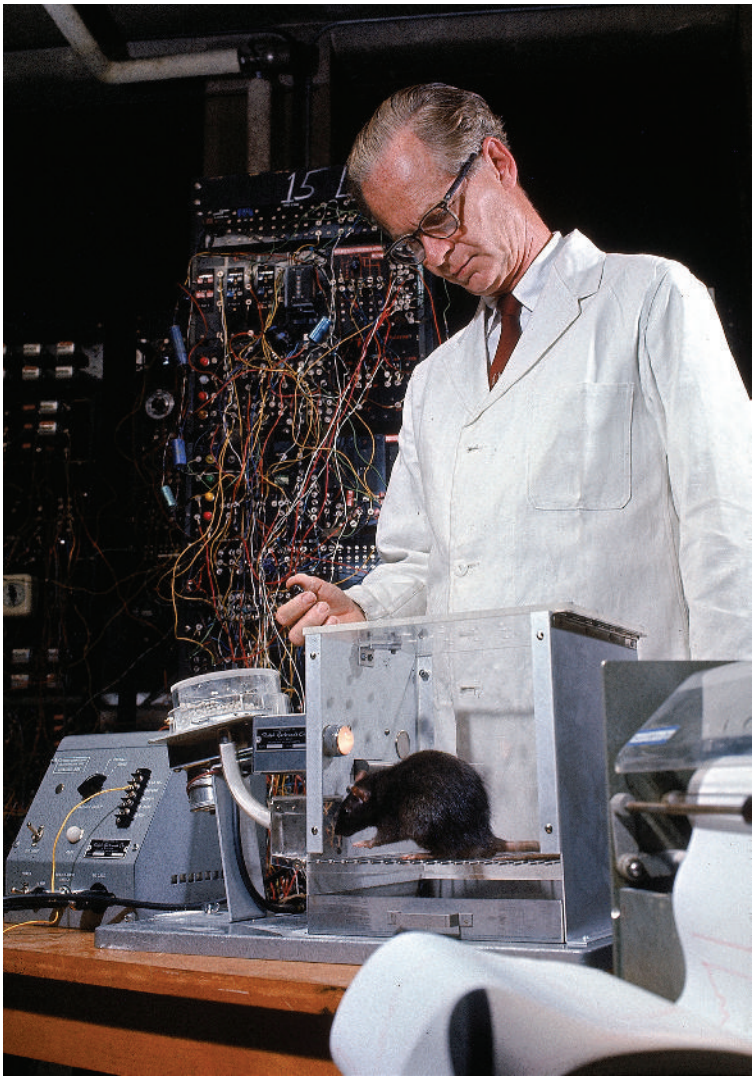
How did Skinner expand behaviorism?

We have seen that initially, psychology was defined as a science of the mind. At the beginning of the 20th century, however, a new generation of psychologists rebelled against this "soft" approach. The leader of the challenge was the American psychologist John B. Watson.

JOHN B. WATSON: BEHAVIORISM While Freud explored unconscious forces in Vienna, across the ocean, John B. Watson argued that the whole idea of mental life was superstition, a relic left over from the Middle Ages. As far as Watson was concerned, psychodynamic theory and psychoanalysis were "voodooism." In *Psychology as a Behaviorist Views It* (1913), Watson contended that you cannot see or even define consciousness any more than you can observe a soul. And if you cannot locate or measure something, it cannot be the object of scientific study. For Watson, psychology was the scientific study of observable, measurable behavior—and nothing more.

behaviorism
School of psychology that studies only observable and measurable behavior.

Watson's view of psychology became known as **behaviorism**. He came to believe that all mental experiences—thinking, feeling, awareness of self—are nothing more than physiological changes in response to accumulated experiences. According to him, experience can write virtually anything. He claimed that if he were able to completely control the environment, he could train any healthy infant to become any kind of adult he chose, physician, lawyer, artist, or even thief or beggar (J. B. Watson, 1924).



B.F. Skinner training rats in a Skinner Box, illustrating the principle of reinforcement by rewarding the rats with food when they press a lever.

Watson attempted to demonstrate that all psychological phenomena—even Freud's unconscious motivations—are the result of training. In one of the most infamous experiments in psychology's history, Watson attempted to create a fear response in an 11-month-old boy. "Little Albert" was a secure, happy baby who enjoyed new places and experiences. On his first visit to Watson's laboratory, Albert was delighted by a tame, furry white rat, but he became visibly frightened when Watson banged a steel bar with a hammer just behind the infant's head. On his second visit, Watson placed the rat near Albert, and the moment the baby reached out and touched the rat, Watson banged the hammer. After half a dozen pairings, little Albert began crying the instant the rat was introduced, without any banging. Further experiments found that Albert was frightened by anything white and furry—a rabbit, a dog, a sealskin coat, cotton wool, and Watson wearing a Santa Claus mask (J. B. Watson & Rayner, 1920; also see Beck, Levinson, & Irons, 2009; Powell, Digdon, Harris, & Smithson, 2014).

Watson was also interested in showing that fears could be eliminated by training. Mary Cover Jones, one of his graduate students, successfully retrained a boy who showed a fear of rabbits (not caused by laboratory training) to overcome this fear. Her technique, which involved presenting the rabbit at a great distance and then gradually bringing it closer while the child was eating, is similar to therapeutic techniques used by some psychologists today.

B. F. SKINNER: BEHAVIORISM REVISITED Following in the footsteps of Watson, B. F. Skinner became one of the leaders of the behaviorist school of psychology in the mid-20th century. Like Watson, Skinner fervently believed that psychologists should study only observable and measurable behavior. He, too, was primarily interested in changing behavior through training—and in discovering natural laws of

behavior in the process. But Skinner added a new element to the behaviorist repertoire: reinforcement. He rewarded his subjects for behaving the way he wanted them to behave. For example, an animal was put into a special cage and allowed to explore it. Eventually, the animal reached up and pressed a lever or pecked at a disk on the wall, whereupon a food pellet dropped into the box. Gradually, the animal learned that pressing the bar or pecking at the disk always brought food. Why did the animal learn this? It learned because it was *reinforced,* or rewarded, for doing so. Skinner thus made the animal an active agent in its own training.

The Cognitive Revolution

LO 1.8 **Describe what is meant by "the cognitive revolution" in psychology.**

How did Gestalt psychologists influence the way we think about perception?

What aspects of life do humanistic psychologists stress?

In the late 1960s, behaviorism began to loosen its grip on the field. On one hand, research on perception, personality, child development, interpersonal relations, and other topics that behaviorists had largely ignored raised questions they couldn't readily explain. On the other hand, research in other fields (especially anthropology, linguistics, neurobiology, and computer science) was shedding new light on the workings of the mind. Psychologists came to view behaviorism not as an all-encompassing theory, but as only one piece of the puzzle that played an important role in the development of psychology as a science (Moore, 2010). They began to look into the "black box" of the human mind and put more emphasis on humans (and other animals) as conscious, perceptive, and alert beings; that is, as active learners, rather than passive recipients of life's lessons.

THE PRECURSORS: GESTALT AND HUMANISTIC PSYCHOLOGY Even during the period that behaviorism dominated American psychology, not all psychologists had accepted behaviorist doctrines. Two schools that paved the way for the cognitive revolution were Gestalt psychology and humanistic psychology.

In Germany, psychologists Max Wertheimer, Wolfgang Köhler, and Kurt Koffka were all interested in perception, particularly in certain tricks that the mind plays on itself. For example, when we see a series of still pictures flashed at a constant rate (e.g., movies or "moving" neon signs), the pictures seem to move. Phenomena like these launched a new school of thought, **Gestalt psychology**. Roughly translated from German, *Gestalt* means "whole" or "form." When applied to perception, it refers to our tendency to see patterns, to distinguish an object from its background, to complete a picture from a few cues. We'll see in Chapter 3 that Gestalt psychology paved the way for the modern study of perception.

Gestalt psychology
School of psychology that studies how people perceive and experience objects as whole patterns.

During the same period, the American psychologist Abraham Maslow, who studied under Gestalt psychologist Max Wertheimer and anthropologist Ruth Benedict, developed a more holistic approach to psychology, in which feelings and yearnings play a key role. Maslow referred to **humanistic psychology** as the "third force"—beyond Freudian theory and behaviorism. Humanistic psychologists emphasize human potential and the importance of love, belonging, self-esteem and self-expression, peak experiences (when one becomes so involved in an activity that self-consciousness fades), and self-actualization (the spontaneity and creativity that result from focusing on problems outside oneself and looking beyond the boundaries of social conventions).

humanistic psychology
School of psychology that emphasizes nonverbal experience and altered states of consciousness as a means of realizing one's full human potential.

Humanistic psychology has made important contributions to the study of motivation and emotions (see Chapter 8), as well as to the subfields of personality and psychotherapy (Chapters 10 and 13). Although this doctrine has never been totally accepted by mainstream psychology, in recent years positive psychologists (whom we discuss further later in this chapter) have begun to reinvestigate some of the questions that humanistic psychologists raised a half century ago.

THE RISE OF COGNITIVE PSYCHOLOGY As behaviorism fell out of favor in the late 1960s, psychology began to come full circle in what can be described as a *cognitive revolution*—a shift away from a limited focus on behavior toward a broad interest in such

mental processes as memory, decision making, and information processing. The field evolved from a period in which consciousness was considered inaccessible to scientific inquiry to one in which researchers resumed investigating and theorizing about the mind—but now with new research methods and behaviorism's commitment to objective, empirical research. As a result of this shift in focus, even the definition of psychology changed. Psychology is still the study of human behavior, but psychologists' concept of "behavior" has been expanded to include thoughts, feelings, and states of consciousness (Glenberg, Witt, & Metcalfe, 2013).

cognitive psychology
School of psychology devoted to the study of mental processes in the broadest sense.

Cognitive psychology is the study of our mental processes in the broadest sense: thinking, feeling, learning, and remembering, for example. Cognitive psychologists are interested in the ways in which people acquire information; process that information using their cognitive "hardware" and "software"; and use the results to make sense out of the world, to solve problems, and so on.

In contrast to behaviorists, cognitive psychologists believe that mental processes can and should be studied scientifically. Although we cannot observe memories or thoughts directly, we can observe behavior and make inferences about the kinds of cognitive processes that underlie that behavior. For example, we can read a lengthy story to people and then observe what they remember from that story, the ways in which their recollections change over time, and the sorts of errors that they make in recall. On the basis of systematic research of this kind, we can gain insight into the cognitive processes underlying human memory (which we discuss in Chapter 6). Moreover, with the advent of new brain-imaging techniques (described in Chapter 2), cognitive psychologists have begun to address questions about the neurological mechanisms that underlie such cognitive processes as learning, memory, intelligence, and emotion, giving rise to the rapidly expanding field of *cognitive neuroscience* (Yarkoni, Poldrack, Van Essen, & Wager, 2010).

New Directions

LO 1.9 **Explain how evolutionary psychology and positive psychology are changing the focus of contemporary psychology.**

Where do evolutionary psychologists look for the roots of human behavior?

What new focus is positive psychology bringing to the study of human behavior?

Is there a single perspective dominating psychology today?

During much of the 20th century, psychology was divided into competing theoretical schools. Crossing theoretical lines was considered intellectual heresy. In the 21st century, by contrast, psychologists are more flexible in considering the merits of new approaches, combining elements of different perspectives as their interests or research findings dictate. As a result, new theories and initiatives are emerging.

evolutionary psychology
An approach to, and subfield of, psychology that is concerned with the evolutionary origins of behaviors and mental processes, their adaptive value, and the purposes they continue to serve.

EVOLUTIONARY PSYCHOLOGY As the name indicates, **evolutionary psychology** focuses on the origins of behavior patterns and mental processes, the adaptive value they have or had, and the functions they serve or served in our emergence as a distinct species (Buss, 2014). Evolutionary psychologists ask, how did human beings get to be the way we are? In what ways might the roots of behavior serve to promote the survival of the species?

Evolutionary psychologists study such diverse topics as perception, language, helping others (altruism), parenting, happiness, sexual attraction, mate selection, jealousy, morality, and violence (Buss, 2014; Confer et al., 2010). By studying such phenomena in different species, different habitats, different cultures, and in males and females, evolutionary psychologists seek to understand the basic programs that guide thinking and behavior.

We have said that cognitive psychologists tend to see the human mind as a "general-purpose" computer that requires software (experience) to process information. In contrast, many evolutionary psychologists see the mind as having "evolved psychological circuits" that predispose human beings to think and act in certain ways. Further, they contend that these fixed programs evolved thousands of years ago when our ancestors lived as hunter–gatherers, although the problem-solving strategies that benefited early humans may or may not be adaptive in the modern era. As stated by David Buss, one

of the foremost evolutionary psychologists, "Evolutionary psychology synthesizes modern evolutionary biology and psychology to penetrate some of life's deep mysteries: Why do many struggles center around sex? Why is social conflict pervasive? And what are the mechanisms of mind that define human nature?" (Buss, 2009, p. 140).

POSITIVE PSYCHOLOGY Another emerging perspective is **positive psychology**, which as we saw earlier traces its roots back to humanistic psychology, though the two perspectives differ in many ways (Waterman, 2013). According to this view, psychology should devote more attention to "the good life": the study of subjective feelings of happiness and well-being; the development of such individual traits as intimacy, integrity, leadership, altruism, and wisdom; and the kinds of families, cooperative lifestyles, work settings, and communities that encourage individuals to flourish (Snyder, Lopez, & Pedrotti, 2014).

Positive psychology seeks to understand more about ordinary human strengths and virtues such as altruism, tolerance, happiness, philanthropy, and wisdom. For instance, what factors led to the volunteerism displayed here by rescuers searching for tsunami survivors in Samoa?

positive psychology
An emerging field of psychology that focuses on positive experiences, including subjective well-being; self-determination; the relationship between positive emotions and physical health; and the factors that allow individuals, communities, and societies to flourish.

Positive psychologists argue that psychologists have learned a great deal about the origins, diagnosis, and treatment of mental illness but relatively little about the origins and nurturance of mental wellness. There have been many studies of prejudice and intergroup hostility, for example, but very few about tolerance and intergroup harmony. Today's positivists do not argue that psychologists should abandon their role in the science of healing. To the contrary, they support efforts to promote better, more widespread use of what psychologists have learned. But they argue that psychology has reached a point where building positive qualities should receive as much emphasis as repairing damage (Duckworth, Steen, & Seligman, 2005; Guðmundsdóttir, 2011).

MULTIPLE PERSPECTIVES OF PSYCHOLOGY TODAY Contemporary psychologists tend to see different perspectives as complementary, with each perspective contributing to our understanding of human behavior. Sometimes, these theoretical perspectives mesh and enhance each other beautifully; at other times, adherents of one approach challenge their peers, arguing for one viewpoint over others. But psychologists agree that the field advances only when new evidence is added to support or challenge existing theories.

Where Are the Women?

LO1.10 Describe the role of women in the history of psychology.

What obstacles did women face in the early years of psychology?

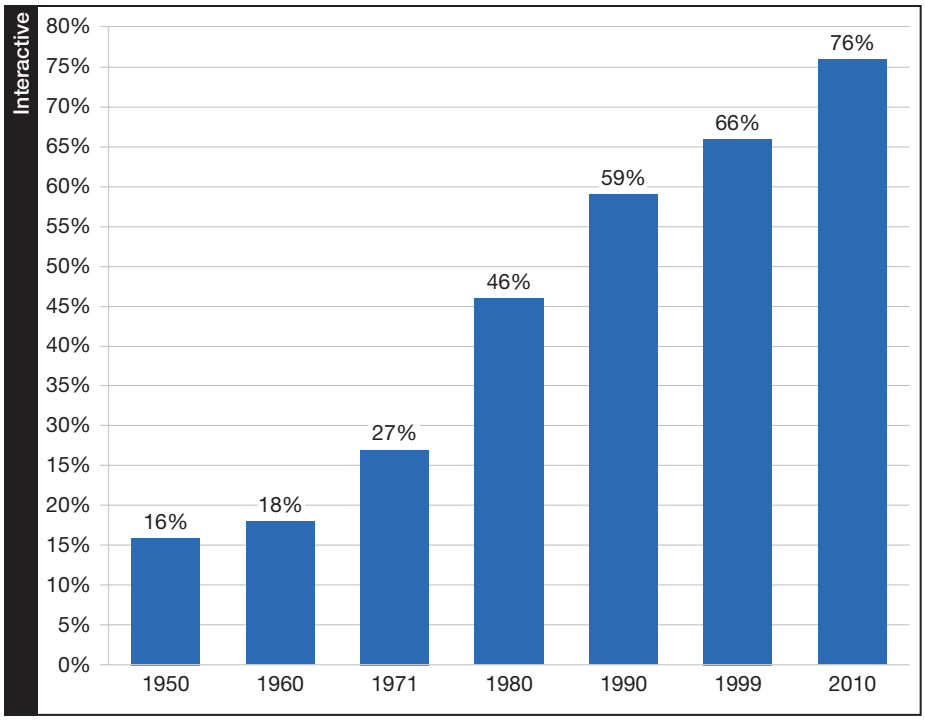
As you read the brief history of modern psychology, you may have concluded that the founders of the new discipline were all men. But did psychology really have only fathers and no mothers? If there were women pioneers in the field, why are their names and accomplishments missing from some historical accounts?

In fact, women have contributed to psychology from its beginnings. In the United States, women presented papers and joined the national professional association as soon as it was formed in 1892. Often, however, they faced discrimination. Some colleges and universities did not grant degrees to women, professional journals were reluctant to publish their work, and teaching positions were often closed to them. Despite these barriers, a number of early women psychologists made important contributions and were acknowledged by some of the men in the growing discipline.

In 1906, James McKeen Cattell published *American Men of Science*, which, despite its title, included a number of women, among them 22 female psychologists. Cattell rated three of these women as among the 1,000 most distinguished scientists in the country: Mary Whiton Calkins (1863–1930), for her analysis of how we learn verbal material and her contributions to self-psychology; Christine Ladd-Franklin (1847–1930), for her work in color vision; and Margaret Floy Washburn (1871–1939), for her pioneering research examining the role of imagery in thought processes and the experimental study of animal cognition. In addition, Mary Whiton Calkins was elected and served as the first female

Figure 1.1 Percentage of Women Recipients of PhDs in Psychology, 1950–2010.

SOURCE: *Summary Report: Doctorate Recipients from United States Universities (Selected Years).* National Research Council. Figure compiled by the American Psychological Association Research Office. Copyright © 2000. 1999 data from the National Research Foundation, 2002. 2010 data from Willyard, 2011.



president of the American Psychological Association (APA) in 1905, a position also held by Margaret Floy Washburn in 1921. However, because the doors to an academic career remained closed, other early female psychologists found positions in therapeutic and other nonacademic settings; pursued careers in allied professions, such as child development and education, which were considered acceptable fields for women; or gained recognition by collaborating on research projects and books with their spouses.

In recent decades, the situation has changed dramatically. The number of women who receive PhDs in psychology has grown by leaps and bounds. (See **Figure 1.1**.) Indeed, among members of the American Psychological Association, women now outnumber men (58% to 42%). No doubt some of this progress has resulted from the efforts of teachers of psychology to raise their students' awareness of the important accomplishments of female psychologists. Because female psychologists perform key research in all of the psychology subfields, you will find their work referred to throughout this text.

The relative absence of women from the history of psychology is only one aspect of a much bigger and more troubling concern: the relative inattention to human diversity that characterized psychology through most of the 20th century. Only recently have psychologists looked closely at the ways in which culture, gender, race, and ethnicity can affect virtually all aspects of human behavior. In the next section, we begin our examination of this important topic.

Quiz Questions

1. The emergence of psychology as a science in the 1900s can be seen as having occurred in the following three stages:

a. animism, dualism, tabula rasa.

b. science of the mind, the behaviorist decades, the cognitive revolution.

c. emergence of science, behaviorism, cognitive behaviorism.

d. Behavioral, Humanistic, Freudian.

2. "Historically, psychology has been focused on understanding mental illness. It is time to turn some of our attention to understanding human strengths and virtues, happiness, well-being, and wisdom." This quotation most accurately represents which of the following new directions in psychology?

a. cognitive psychology

b. evolutionary psychology

c. gestalt psychology

d. positive psychology

3. What does it mean to say "Psychology has a long past, but a short history"?
   a. Psychologists have conducted research for hundreds of years but only recently has that research provided insight into mental processes.
   b. Until the 20th century, psychology relied upon self-reports rather than rigorous scientific methods to gather data.
   c. For centuries, philosophers wondered about human nature but it was not until the late 1800s that the scientific method began to be applied to understanding psychology.
   d. Only recently, with the discovery of DNA, have psychologists been able to determine the causes of human behavior.
4. Following the rise of behaviorism, what led to a renewed interest in things we cannot observe directly, like thoughts, by the science of psychology?
   a. New research methods made the scientific study of mental processes possible.
   b. The theories of the behaviorists were proved wrong.
   c. It was proven that the unconscious mind is what shapes us.
   d. The public did not like the focus on behavior alone.
5. Which of the following led to the rise of behaviorism?
   a. Evidence that Titchener's three basic "atoms" were not the only elements of consciousness.
   b. Freud's theories were proved wrong.
   c. The belief that if you cannot measure something, it cannot be an object of scientific study.
   d. It was proven that the unconscious mind is what shapes us.

Human Diversity

LO1.11 Discuss the ways in which knowledge and awareness of human diversity can and does inform and enrich psychological study.

Understanding human diversity is essential. Our major cities are home to people from diverse backgrounds, with diverse values and goals, living side by side. But proximity does not always produce harmony; sometimes it leads to aggression, prejudice, and conflict. Understanding cultural, racial, ethnic, and gender differences in thinking and behavior gives us the tools to reduce some of these interpersonal tensions. Looking at human diversity from a scientific perspective will allow you to separate fact from fiction in your daily interactions. Moreover, once you understand how and why groups differ in their values, behaviors, approaches to the world, thought processes, and responses to situations, you will be better able to savor the diversity around you. Finally, the more you comprehend human diversity and realize that the vast majority of the world's population lives in conditions very different than those experienced by Americans, the more you will appreciate the many universal features of humanity such as those cited by the anthropologist Donald Brown (1991).

gender
The psychological and social meanings attached to being biologically male or female.

Understanding the wide range of human diversity in the world is essential to the study of psychology.

Gender

How are psychologists helping us to understand the differences between men and women?

Gender has many layers. The words *male* and *female* refer to one's biological makeup, the physical and genetic facts of being one sex or the other. Some scientists use the term *sex* to refer exclusively to biological differences in anatomy, genetics, or physical functioning, and **gender** to refer to the psychological and social meanings attached to being biologically male or female. Because distinguishing what is biologically produced from what is socially influenced is almost impossible, in our discussion of these issues, we will use the terms *sex* and *gender* interchangeably.

GENDER STEREOTYPES In the past, men and women led very different lives. That is no longer the case in many

societies. Yet, stereotypes about how the "typical male" or "typical female" looks and acts still lead to confusion and misunderstandings between the sexes. Beyond our stereotypes about what males and females "typically" are like, we have general beliefs about gender roles—that is, cultural expectations regarding acceptable behavior and activities for males and females, respectively. The study of gender similarities and differences has become part of mainstream psychology. Psychologists in virtually every subfield conduct research to determine whether their findings apply equally to males and females, and if not, why not. As we will see, **feminist theory** is not for women only.

feminist theory
Feminist theories offer a wide variety of views on the social roles of women and men, the problems and rewards of those roles, and prescriptions for changing those roles.

FEMINIST PSYCHOLOGY As the number of female psychologists has grown in recent decades (see **Figure 1.1**), so have their concerns about traditional psychological theories, research, and clinical practices. Feminist psychologists such as Carol Gilligan make three main points. As we have noted, much of the research supporting key psychological theories, such as moral development, was based on all-male samples. Second, reports of gender differences tend to focus on the extremes, exaggerating small differences and ignoring much greater similarities. Third, the questions that psychologists ask and the topics that they study reflect what they consider to be important; male and female psychologists differ to some extent in that regard.

Beyond research and theory, contemporary feminist psychology has begun to influence every facet of psychological practice by seeking mechanisms to empower women in the community, by advocating action to establish policies that advance equality and social justice, and by increasing women's representation in global leadership. Feminists also took the lead in urging other psychologists to recognize sexual orientation as simply another aspect of human diversity.

sexual orientation
Refers to the direction of one's sexual interest toward members of the same sex, the other sex, or both sexes.

SEXUAL ORIENTATION The term **sexual orientation** refers to whether a person is sexually attracted to members of the opposite sex (heterosexuality), the same sex (homosexuality), or both sexes (bisexuality). Division 44 of the American Psychological Association, "Society for the Psychological Study of Lesbian, Gay, Bisexual, and Transgender Issues," was founded in 1985 to promote research and education regarding sexual orientation, for psychologists as well as the general public. Psychologists have only just begun to investigate the many sensitive issues associated with this dimension of human diversity—including such topics as the origins of sexual orientation, brain differences between heterosexual and homosexual men, discrimination and aggression toward people with different sexual orientations (Nadal, 2011), and the ethical issues that may arise if genes that influence sexual orientation are identified.

Race and Ethnicity

Why are psychologists interested in racial and ethnic differences?

race
A subpopulation of a species, defined according to an identifiable characteristic (i.e., geographic location, skin color, hair texture, genes, facial features, and so forth).

Race is a biological term used to refer to a subpopulation whose members have reproduced exclusively among themselves and therefore are genetically similar and distinct from other members of the same species. Most people simply take for granted the idea that the human species can be divided into a number of distinct races (Asians, Africans, Caucasians, Native Americans, and so on). However, human beings have migrated, intermarried, and commingled so frequently over time that it is impossible to identify biologically separate races. Moreover, the criteria people use to differentiate among different races are arbitrary. In the United States, we assign people to different races primarily on the basis of skin color and facial features. In central Africa, members of the Tutsi and Hutu tribes see themselves as different races, although they are similar in skin color and facial features. In spite of these different definitions, most people continue to believe that racial categories are meaningful; as a result, race shapes people's social identities, their sense of self, their experiences in their own and other societies, and even their health.

ethnicity
A common cultural heritage—including religion, language, or ancestry—that is shared by a group of individuals.

Whereas racial categories are based on physical differences, **ethnicity** is based on cultural characteristics. An *ethnic group* is a category of people who have migrated to another country but still identify themselves—and are perceived by others—as distinctive because of a common homeland and history, language, religion, or traditional cultural beliefs and social practices. For example, Hispanic Americans may be Black, White, or any shade in between. What unites them is their language and culture. By the mid-1980s,

Thinking Critically About…

Psychology and Minority Students

Most ethnic minorities are underrepresented among psychology majors, in psychology postgraduate programs, and in the ranks of American psychologists. Strickland (2000) concluded that this is because a majority of psychology instructors and professors are White and because so many of the research studies students read about in introductory psychology are based on White-only participants.

1. Do you agree with Strickland? Why or why not?
2. What other reasons might explain why Whites are more likely than people of color to choose psychology as their main area of study and future career?
3. How might you go about determining whether those various explanations are valid? What kind of research evidence would lead you to favor one explanation over another?

there was sufficient interest among psychologists in ethnicity for the APA to create a new division (Division 45), devoted to the psychological study of culture, ethnicity, and race. Increasing numbers of psychologists are now studying why ethnicity is so important both in our country and in others and how individuals select or create an ethnic identity and respond to ethnic stereotypes.

Psychologists are working to uncover and overcome biases in psychological research that are related to gender, race, and ethnicity. The field of psychology is broadening its scope to probe the full range and richness of human diversity, and this text mirrors that expansive and inclusive approach. We will consider the problem of bias in psychological research more fully later in the chapter.

Culture

How does culture contribute to human diversity?

"Humans are a cultural species" (Heine & Norenzayan, 2006, p. 251). A **culture** provides modes of thinking, acting, and communicating; ideas about how the world works and why people behave as they do; beliefs and ideals that shape our individual dreams and desires; information about how to use and improve technology; and, perhaps most important, criteria for evaluating what natural events, human actions, and life itself mean. All large, complex modern societies also include subcultures—groups whose values, attitudes, behavior, and vocabulary or accent distinguish them from the cultural mainstream. Most Americans participate in a number of subcultures as well as in mainstream culture.

culture
The tangible goods and the values, attitudes, behaviors, and beliefs that are passed from one generation to another.

Many of the traits we think of as defining us as human—especially language, morals, and technology—are elements of culture. Even one's sense of self is dependent on culture and subculture. In **cross-cultural research**, psychologists examine the way cultures and subcultures affect behavior. For example, cross-cultural research on motivation and emotions, personality, and self-esteem has called attention to a broad distinction between *individualistic cultures* (which value independence and personal achievement) and *collectivist cultures* (which value interdependence, fitting in, and harmonious relationships). Moreover, cross-cultural studies have had a significant impact on the study of gender. Anthropologist Margaret Mead's classic work, *Sex and Temperament in Three Primitive Societies* (1935), is still cited by feminists and others as showing that definitions of masculinity and femininity are not biological givens, but are instead created by cultures and learned by their members along with other cultural norms, which makes them subject to change. Finally, in our increasingly multicultural society, psychologists are now dealing with diverse clients, research participants, and students. To meet this challenge, psychologists and other mental health professionals have been working to educate and train "culturally competent" professionals (Fung, Andermann, Zaretsky, & Lo, 2008; Whealin & Ruzek, 2008).

cross-cultural research
Research involving the exploration of the extent to which people differ from one culture to another.

Throughout this text, we will explore similarities and differences among individuals and groups of people. For example, we will examine differences in personality characteristics and intelligence; also, we will look at similarities in biological functioning and developmental stages. In most chapters, we will examine research on males and females, members of different racial and ethnic groups, and cross-cultural studies.

Quiz Questions

1. Understanding how and why groups differ in their values, behaviors, approaches to the world, thought processes, and responses to situations—in other words, understanding human _____—gives us tools to reduce interpersonal tensions.
   a. genetics
   b. innate behavior
   c. diversity
   d. universal features

2. Samuel is sexually attracted to both men and women. Samuel's _____ is bisexual.
   a. sexual orientation
   b. sex
   c. stereotype
   d. gender identity

3. Which of the following is a reason feminist theory has been important in expanding traditional psychological theories?
   a. It has led to the understanding that men and women are so similar that it's easy to apply knowledge about one gender to the experiences of another.
   b. It has helped reinforce traditional gender roles so that psychologists can focus on other topics.
   c. It has led to the understanding that gender is fixed.
   d. It examines similarities and differences and puts a spotlight on gender stereotypes.

4. Which of the following is *not* a compelling reason for why psychologists should study human diversity?
   a. because our society is made up of so many different kinds of people
   b. because diversity psychology is one of the major subdivisions of psychology
   c. to help identify what humans have in common
   d. to help solve interpersonal tensions based on misunderstandings of other people

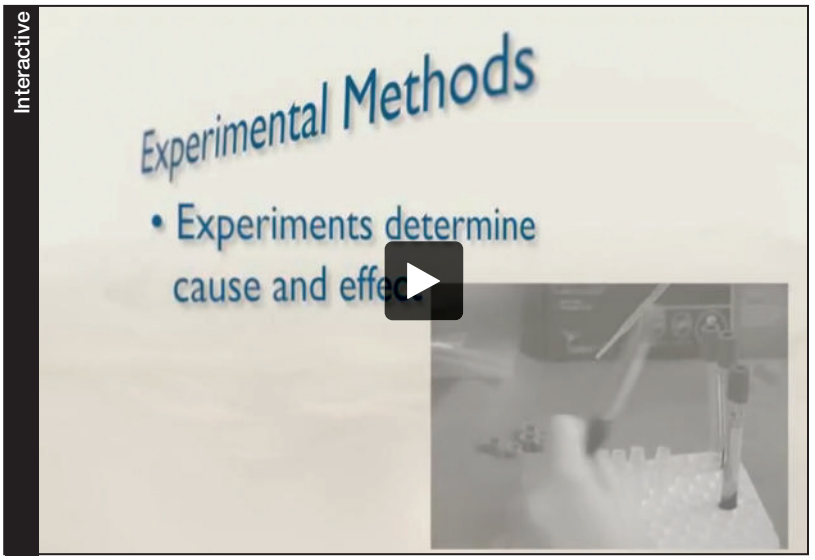
5. _____ is a biological term used to refer to a subpopulation whose members have reproduced exclusively among themselves, while _____ is based on cultural characteristics.
   a. Sex; gender
   b. Gender; sex
   c. Race; ethnicity
   d. Sexual orientation; sex

Research Methods in Psychology

LO1.12 **Describe the characteristics, strengths, and weaknesses of naturalistic observation, case studies, surveys, and correlational research.**

What are some of the research methods that psychologists use in their work?

To collect data systematically and objectively, psychologists use a variety of research methods. In the accompanying video, you will learn to describe descriptive methods, correlational designs, and experimental methods.



Watch the Video "*Research Methods*"

Naturalistic Observation

Why is a natural setting sometimes better than a laboratory for observing behavior?

Psychologists use **naturalistic observation** to study human or animal behavior in its natural context. One psychologist with this real-life orientation might observe behavior in a school or a factory; another might observe animals in the wild rather than viewing them in captivity. The primary advantage of naturalistic observation is that the behavior observed in everyday life is likely to be more natural, spontaneous, and varied than that observed in a laboratory.

naturalistic observation
Research method involving the systematic study of animal or human behavior in natural settings rather than in the laboratory.

Naturalistic observation is not without its drawbacks. Psychologists using naturalistic observation have to take behavior as it comes. They cannot suddenly yell "Freeze!" when they want to study in more detail what is going on, although, in the near future, smartphones may make that unnecessary (Carpenter, Wycoff, & Trull, 2016; Miller, 2012; Raento, Oulasvirta, & Eagle, 2009). Nor can psychologists tell people to stop what they are doing because it is not what the psychologists are interested in researching. Moreover, simply describing one's impressions of "a day in the life" of a particular group or the way that different people behave in the same setting is not science. Observers must measure behavior in a systematic way, for example, by devising a form that enables them to check what people are doing at planned timed intervals.

The main drawback in naturalistic observation is **observer bias**. Even psychologists who are trained observers may subtly distort what they see to make it conform to what they were hoping to see. For this reason, contemporary researchers often use video that can be analyzed and scored by other researchers who do not know what the study is designed to find out. Another potential problem is that psychologists may not observe or record behavior that seems to be irrelevant. Therefore, many observational studies employ a team of trained observers who pool their notes. This strategy often generates a more complete picture than one observer could draw alone.

observer bias
Expectations or biases of the observer that might distort or influence his or her interpretation of what was actually observed.

Despite these disadvantages, naturalistic observation is a valuable tool. After all, real-life behavior is what psychology is all about. Naturalistic observation often provides new ideas and suggests new theories, which can then be studied more systematically and in more detail in the laboratory. This method also helps researchers maintain their perspective by reminding them of the larger world outside the lab.

Case Studies

When can a case study be most useful?

A second research method is the **case study**: a detailed description of one person or a few individuals. A case study usually includes real-life observation, interviews, scores on various psychological tests, and whatever other measures the researcher considers revealing. For example, the Swiss psychologist Jean Piaget developed a comprehensive theory of cognitive development by carefully studying each of his three children as they grew and changed during childhood. Other researchers have tested Piaget's theory with experiments involving larger numbers of children, both in our own culture and in others. (See Chapter 9.)

case study
Intensive description and analysis of a single individual or just a few individuals.

Like naturalistic observation, case studies can provide valuable insights that can be useful for forming hypotheses but they also can have significant drawbacks. Observer bias is as much a problem here as it is with naturalistic observation. Moreover, because each person is unique, we cannot confidently draw general conclusions from a single case. Nevertheless, case studies figure prominently in psychological research. For example, the famous case of Phineas Gage, who suffered severe and unusual brain damage, led researchers to identify the front portion of the brain as important for the control of emotions and the ability to plan and carry out complex tasks. (See Chapter 2.)

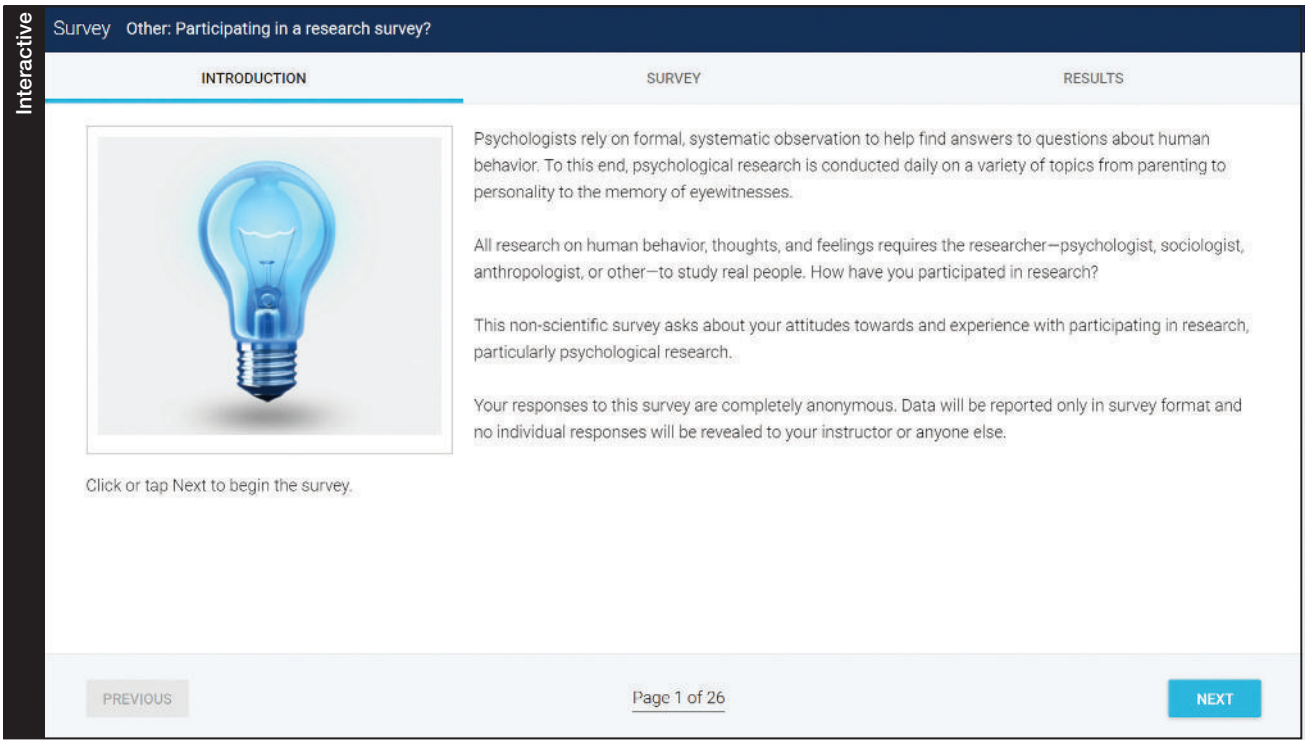
Surveys

What are some of the benefits of survey research?

In some respects, surveys address the shortcomings of naturalistic observation and case studies. In **survey research**, a carefully selected group of people is asked a set of predetermined

survey research
Research technique in which questionnaires or interviews are administered to a selected group of people.

questions in face-to-face interviews or in questionnaires. Surveys, even those with a low-response rate, can generate a great deal of interesting and useful information at relatively low cost, but for results to be accurate, researchers must pay close attention to the survey questions (Saris & Gallhofer, 2014). In addition, the people surveyed must be selected with great care and be motivated to respond to the survey thoughtfully and carefully. For example, asking parents, "Do you ever use physical punishment to discipline your children?" may elicit the socially correct answer, "No." Asking "When was the last time you spanked your child?" is more likely to elicit honest responses because the question is specific and implies that most parents use physical punishment—the researcher is merely asking when. At the same time, survey researchers must be careful not to ask leading questions, such as "Most Americans approve of physical punishment; do you?" Guaranteeing anonymity to participants in a survey can also be important. Get a sense of appropriate question types and what it's like to participate in a survey in the following activity.



Weigh in on the Survey "*Participating in a Research Survey*"

Naturalistic observations, case studies, and surveys can provide a rich set of raw data that describes behaviors, beliefs, opinions, and attitudes. But these research methods are not ideal for making predictions, explaining, or determining the causes of behavior. For these purposes, psychologists use more powerful research methods, as we will see in the next two sections.

Correlational Research

What is the difference between correlation and cause and effect?

correlational research
Research technique based on the naturally occurring relationship between two or more variables.

A psychologist, under contract to the U.S. Air Force, is asked to predict which applicants for a pilot-training program will make good pilots. An excellent approach to this problem would be **correlational research**. The psychologist might select several hundred trainees, give them a variety of aptitude and personality tests, and then compare the results with their performance in training school. This approach would tell him whether some characteristic or set of characteristics is closely related to, or correlated with, eventual success as a pilot.

Suppose that the psychologist finds that the most successful trainees score higher than the unsuccessful trainees on mechanical aptitude tests and that they are also cautious people who do not like to take unnecessary risks. The psychologist has

discovered that there is a *correlation*, or relationship, between these traits and success as a pilot trainee. If these correlations are confirmed in new groups of trainees, then the psychologist could recommend with some confidence that the Air Force consider using these tests to select future trainees.

Correlational data are useful for many purposes, but they do not permit the researcher to explain cause and effect. This important distinction is often overlooked. Correlation means that two phenomena seem to be related: When one goes up, the other goes up (or down). In our pilot trainee example, high scores on tests of mechanical aptitude and caution predict success as a pilot trainee. But correlation does not identify the direction of influence. Does the tendency to shy away from taking risks make a trainee a good pilot? Or is the reverse true: Learning to be a skillful pilot makes people cautious? Or is there some unknown factor that causes people to be both cautious and capable of acquiring the different skills needed in the cockpit? Although the psychologist has *described a relation* between skill as a pilot and two other characteristics, he has no basis for drawing conclusions about cause and effect.

Can the experiences we have as children actually increase intelligence? Researchers might want to study the relationship between stimulating activities, such as frequent visits to science museums, and children's IQ scores. The relationship between the two may show a correlation, but researchers would not conclude from a correlational study that such experiences alone would cause a change in a child's IQ.

Despite limitations, correlational research often sheds light on important psychological phenomena. In this text, you will come across many examples of correlational research. As you will learn, these interesting findings allow us to make some predictions, but psychologists want to move beyond simply making predictions. To explain the causes of psychological phenomena, psychologists most often use experimental research.

Experimental Research

LO1.13 Describe the differences between independent and dependent variables and between control groups and experimental groups.

What kinds of research questions are best studied by experimental research?

A psychology instructor notices that on Monday mornings, most students in her class do not remember materials as well as they do later in the week. She has discovered a relationship between the day of the week and memory for course-related material. On the basis of this correlation, she could predict that every Monday thereafter, the students in her class will not absorb material as well as on other days. But she wants to go beyond simply predicting her students' behavior. She wants to understand or explain why their memories are poorer on Mondays than on other days of the week.

As a result of her own experiences and some informal interviews with students, she suspects that students stay up late on weekends and that their difficulty remembering information presented on Mondays is due to lack of sleep. This theory appears to make sense, but the psychologist wants to prove that it is correct. To determine whether lack of sleep actually affects cognitive performance, she turns to the **experimental method**.

experimental method
Research technique in which an investigator deliberately manipulates selected events or circumstances and then measures the effects of those manipulations on subsequent behavior.

Beyond selecting participants—people she can observe to test her hypothesis—the psychologist then needs to know which participants are sleep deprived. Everyone in the experiment, she decides, will be kept awake until 4:00 A.M. and then awakened at 7:00 A.M. By manipulating the amount of time the participants sleep, the psychologist is introducing and controlling an essential element of the experimental method: an **independent variable**.

independent variable
In an experiment, the variable that is manipulated to test its effects on the other, dependent variables.

Next, she needs to know how well the students remember new information after they are deprived of sleep. For this, she designs a memory task made up of geometric shapes, each labeled with a nonsense word. She gives students half an hour to learn the names from this page, then takes it away and asks them to assign those same labels to

dependent variable
In an experiment, the variable that is measured to see how it is changed by manipulations in the independent variable.

geometric shapes on a new page. Performance on the memory task (the number of correct answers) thus becomes the **dependent variable**. According to the psychologist's hypothesis, changing the independent variable (the amount of sleep) should also change the dependent variable (performance on the memory task). Her prediction is that this group of participants, who get no more than 3 hours of sleep, should do quite poorly on the memory test.

Watch the following video, which shows the independent and dependent variables in a classic experiment.

Watch the Video "*Experiments: Independent vs. Dependent Variables*"

experimental group
In a controlled experiment, the group subjected to a change in the independent variable.

control group
In a controlled experiment, the group not subjected to a change in the independent variable; used for comparison with the experimental group.

To be sure that her experiment measures only the effects of inadequate sleep, the experimenter creates another group, containing equal numbers of males and females of the same ages and with the same college board scores. The first group, the **experimental group**, will be subjected to the experimenter's manipulation of the independent variable—amount of sleep. Members of the second group, the **control group**, will be allowed to go to sleep whenever they please. If the only consistent difference between the two groups is the amount of sleep they get, the experimenter can be much more confident that differences in test performance are due to the length of time they slept the night before. If the same results are obtained with other groups of students and at other colleges, she can be even more confident in her conclusions.

The experimental method is a powerful tool, but it, too, has limitations. First, many intriguing psychological variables, such as love, hatred, or grief, do not readily lend themselves to experimental manipulation. And even if it were possible to induce such strong emotions as part of a psychological experiment, this treatment would raise serious ethical questions. In some cases, psychologists may use animals rather than humans for experiments. But some subjects, such as the ability to remember historical facts or group problem solving, cannot be studied with other species. Second, because experiments are conducted in an artificial setting, participants—whether human or nonhuman animals—may behave differently than they would in real life.

The accompanying **Summary Table** groups the main advantages and disadvantages of each of the research methods we have discussed. Because each method has drawbacks, psychologists often use more than one method to study a single problem.

A Replication Crisis?

How repeatable are the results of psychological research?

A "replication crisis" sounds a bit like the title of a spy novel, but it's not quite that exciting. To replicate something means to reproduce it. Recall the researcher who was studying characteristics of good military pilots. We mentioned that the researcher should confirm his findings with a new group of trainees before making a recommendation

Summary Table Basic Methods of Research

	Research Method	Advantages	Limitations
Naturalistic observation	Behavior is observed in the environment in which it occurs naturally.	Provides a great deal of firsthand behavioral information that is more likely to be accurate than reports after the fact. The participant's behavior is more natural, spontaneous, and varied than behaviors taking place in the laboratory. A rich source of hypotheses as well.	The presence of an observer may alter the participants' behavior; the observer's recording of the behavior may reflect a preexisting bias; and it is often unclear whether the observations can be generalized to other settings and other people.
Case studies	Behavior of one person or a few people is studied in depth.	Yields a great deal of detailed descriptive information. Useful for forming hypotheses.	The case(s) studied may not be a representative sample. This method can be time consuming and expensive. Observer bias is a potential problem.
Surveys	A large number of participants are asked a standard set of questions.	Enables an immense amount of data to be gathered quickly and inexpensively.	Sampling biases can skew results. Poorly constructed questions can result in answers that are ambiguous, so data are not clear. Accuracy depends on ability and willingness of participants to answer questions honestly.
Correlational research	This approach employs statistical methods to examine the relationship between two or more variables.	May clarify relationships between variables that cannot be examined by other research methods. Allows prediction of behavior.	This method does not permit researchers to draw conclusions regarding cause-and-effect relationships.
Experimental research	One or more variables are systematically manipulated, and the effect of that manipulation on other variables is studied.	Because of strict control of variables, offers researchers the opportunity to draw conclusions about cause-and-effect relationships.	The artificiality of the lab setting may influence subjects' behavior; unexpected and uncontrolled variables may confound results; many variables cannot be controlled and manipulated.

to the Air Force. And the researcher studying sleep and memory would like to confirm that the same results are obtained with other students and other colleges in order to be more confident that inadequate sleep really does impair memory.

Reproducibility is central to all sciences (Open Science Collaboration, 2015). But in the past decade, concern began to grow that very few studies in the life sciences and social sciences were being replicated—in large part because there are few incentives for scientists to simply repeat what someone else has already done (Open Science Collaboration, 2015). In turn, that raised the possibility that perhaps many of the results of psychological research might not hold up if the studies were repeated (Pashler & Wagenmakers, 2012). The issue was brought to a head in 2015 when a group of psychologists attempted to repeat 100 studies published in 2008. They failed to confirm the results of those studies 64% of the time (Open Science Collaboration, 2015).

There are a number of reasons research may not lead to reproducible results (Maxwell, Lau, & Howard, 2015; Open Science Collaboration, 2015). Moreover, a number of psychologists believe that there is no crisis, that the concern is overblown (Pashler & Harris, 2012; Winerman, 2016). Others believe that the 2015 study was deeply flawed and that "the reproducibility of psychological science is quite high" (Gilbert, King, Pettigrew, & Wilson, 2016, p. 1037). Although the debate continues, researchers and journal editors are taking the opportunity to improve reproducibility and to achieve a better balance between original research and replication (Dovido, 2016; Lindsay, 2015; Schmidt, 2016; Wright & Sweeney, 2016).

Multimethod Research

What does multimethod research allow psychologists to do?

Suppose that a psychologist were interested in studying creativity. She would probably combine several of the methods we have described. She might begin her research by giving a group of college students a creativity test that she had invented to measure their capacity to discover or produce something new and to look for *correlations* among the students' scores on her test, their grades, and their scores on commonly used intelligence tests. Then, she might spend several weeks *observing* a college class and *interviewing* teachers, students, and parents to correlate classroom behavior and the interview data with the students' scores on the creativity test. She might then go on to test some of her

ideas with an *experiment* by using a group of students as participants. Her findings at any point in this research program might prompt her to revise her creativity test or her understanding of creativity. Eventually, her research might provide new insights into the nature of creativity and its relationship to other mental abilities.

The Importance of Sampling

LO1.14 Differentiate between random and representative samples, and describe the factors that can influence a research study.

How can sampling affect the results of a research study?

One obvious drawback to every form of research is that it is usually impossible to include everyone as participants. No one could expect to study the responses of all individuals who suffer from the irrational fears known as phobias or to record the maternal behavior of all female monkeys. No matter what research method is used, researchers almost always have to study a small **sample**, or subset of the population, and then use the results of that limited study to generalize about larger populations. For example, the psychology instructor who studied the effect of lack of sleep on memory assumed that her results would apply to other students in her classes (past and future), as well as to students in other classes and at other colleges.

sample
A subgroup of a population.

How realistic are these assumptions? How confident can researchers be that the results of research conducted on a relatively small sample apply to the much larger population from which the sample was drawn? (See "Thinking Critically About . . . Internet Users.") Note that in the early 20th century, the great majority of research studies were conducted by White male professors at American universities, using White male American college students as participants. This arrangement was not a conscious or deliberate decision to study just one particular group. As in the medical community and in other sciences and prestigious professions in Europe and North America, psychology took for granted that what was true of White Western males would be true for other people as well. One critical history of psychology during this period was entitled *Even the Rat Was White!* (Guthrie, 1976).

The process of examining and overcoming past assumptions and biases has been slow and uneven, but a new appreciation of human diversity is taking shape (Crisp, 2010; van de Vijver, 2013). Psychologists have begun to question early assumptions that the results of research conducted with White male participants would also apply to women, to people of other racial and ethnic groups, and to people of different cultures. Similarly, do feminist theories, developed by and tested primarily with White, college-educated women, apply to women of color? Research often indicates that the answer to such questions is no.

Social scientists have several techniques to improve the generalizability of their results. One technique is to select participants at random from the larger population. For example, the researcher studying pilot trainees might begin with an alphabetical list of all trainees and then select every third name on the list to be in his study. These participants would constitute a **random sample** from the larger group of trainees because every trainee had an equal chance of being chosen for the study.

random sample
Sample in which each potential participant has an equal chance of being selected.

Another way to make sure that conclusions apply to the larger population is to pick a **representative sample** of the population being studied. For example, researchers looking for a representative cross section of Americans would want to ensure that the proportion of males and females in the study matched the national proportion, that the number of participants from each state matched the national population distribution, and so on. The importance of sampling has received a great deal of attention recently as psychologists have become increasingly sensitive to the great diversity among humans.

representative sample
Sample carefully chosen so that the characteristics of the participants correspond closely to the characteristics of the larger population.

Finally, scientists can repeat their research with groups that are quite different from their original sample. If they obtain the same results with the new samples, they can have greater confidence that their findings apply to a more diverse group of people.

Thinking Critically About…

Internet Users

"Sad, Lonely World Discovered in Cyberspace"

"Isolation Increases with Internet Use"

"Online and Bummed Out"

What's behind these headlines that appeared in various publications during the fall of 1998 while the Internet was still relatively new in our culture? Researchers had found that—as these publications phrased it—"using the Internet can cause isolation, loneliness, and depression"; "the Internet is actually bad for some people's psychological well-being"; and "greater use of the Internet leads to shrinking social support and happiness" (Kraut et al., 1998).

As a critical thinker, you should ask a number of questions about these headlines. Who was studied? How did the researchers determine Internet use? How did they measure such things as isolation, loneliness, depression, social support, and happiness? Did the researchers actually conduct a genuine experiment, manipulating the independent variable of Internet use and observing its effect on the dependent variables, or did they use some other, less powerful research design? If the latter, how do they know that Internet use caused any changes they might have observed?

The answers should motivate you to be far more cautious than the headline writers about what the research actually showed. To begin with, the researchers studied 256 people from only 93 families in Pittsburgh, and 20 of the families and 87 of the people dropped out before the study was completed. Also, households with preexisting Internet connections were excluded. Are you confident that the results from this sample can be generalized as broadly as the mass media did?

Because this was not a true experiment with an experimental group and a control group, is it possible that the Internet users were already unusually lonely or isolated or depressed? If so, how might Internet use affect these individuals?

Going further, the researchers actually tracked Internet use through software on the computer. To measure social involvement and psychological well-being, however, they relied entirely on *self-report measures*. Does this reliance on self-reports cause you to be cautious about the results of the research? How do we know whether these reports were accurate? (You might read ahead to Chapter 10 where we discuss concerns about research that relies heavily on self-reports.)

If you relied solely on the headlines, you might conclude that the study found dramatic differences between Internet users and nonusers. In fact, the most that could be said is that heavier users of the Internet showed very slight declines in some aspects of self-reported social involvement and only slight increases in self-reported feelings of loneliness and depression. Moreover, even those slight negative effects disappeared over time (Kraut et al., 2002). And as you might expect, more recent research indicates that greater Internet use is associated with various positive

outcomes (M. Ito et al., 2009; Kraut & Kiesler, 2003). For example, Mizuko Ito and her colleagues conducted a 3-year study of computer use among young people. They concluded "Today's youth may be coming of age and struggling for autonomy and identity as did their predecessors, but they are doing so amid new worlds for communication, friendship, play, and self-expression. . . . Online spaces enable youth to connect with peers in new ways. . . . In both friendship-driven and interest-driven online activity, youth create and navigate new forms of expression and rules for social behavior. . . . New media allow for a degree of freedom and autonomy for youth that is less apparent in a classroom setting . . . while hanging out online, youth are picking up basic social and technological skills they need to fully participate in contemporary society. . . ." (M. Ito et al., 2009, pp. 1–3). Though you may find the results of this research more closely match your own experiences, don't fail to be a critical thinker! What questions would you ask about the sample and the methods by which Ito and her colleagues collected their data? Do their conclusions apply to Internet use today?

You should always ask yourself questions about sampling and research methods when you read accounts of psychological research in the mass media. And in fairness, they are questions these researchers themselves have raised although they rarely appear in reports in the popular media.

1. What other questions about this research would you add to the ones already mentioned?
2. If you read sensationalistic headlines about another research topic, such as obesity and social activity, or parenting and juvenile crime, how would you go about learning the details of the research, so you could answer your own critical thinking questions?

Quiz Questions

1. Which of these is a major benefit of naturalistic observation as a research method?
   a. Researchers tend to record all of what they see, so potentially relevant details are not likely to be overlooked.
   b. Naturalistic observation has the least risk of observer bias.
   c. The behavior observed in everyday life is likely to be more natural, spontaneous, and varied than that observed in a laboratory.
   d. Researchers don't need to be specially trained to learn how to observe their environment.
2. Why is it important to distinguish between correlation and cause and effect?
   a. Two variables can be related to each other, but that does not imply that one causes the other.
   b. Correlated variables are not statistically significant.
   c. When one variable causes another, that doesn't mean that the variables are necessarily related, only that they occur in tandem.
   d. Studies that look for cause and effect run the risk of asking leading questions, which yield unreliable answers.
3. To ensure that the results of a particular study apply to a larger population, researchers use _____ or _____ samples.
   a. random; naturalistic
   b. random; representative
   c. representative; independent
   d. experimental; independent
4. In an experiment to test the effects of sleep deprivation on test performance, a researcher who manipulates the amount of sleep that participants get is controlling the _____.
   a. control group
   b. experimental group
   c. dependent variable
   d. independent variable
5. Which of the following is an advantage of case studies?
   a. They yield a great deal of detailed information that can be useful for forming hypotheses.
   b. They offer researchers the opportunity to draw conclusions about cause-and-effect relationships.
   c. They prevent the presence of an observer from altering the person's behavior.
   d. They enable an immense amount of information to be gathered quickly and inexpensively.

Ethics and Psychology: Research on Humans and Animals

LO1.15 Identify key ethical issues in psychological research with humans and nonhumans.

Are there ethical guidelines for conducting psychological research?

What objections have been raised regarding research on animal subjects?

If the college or university you attend has a research facility, you may have a chance to participate in a psychology experiment. You will probably be offered a small sum of money or class credit to participate. But you may not learn the true purpose of the experiment until after it's over. Is this deception necessary to the success of psychology experiments? And what if the experiment causes you discomfort? Before answering, consider the ethical debate that flared up in 1963 when Stanley Milgram published the results of several experiments he had conducted (Perry, 2013).

Milgram hired people to participate in what he said was a learning experiment. In a typical session, a young man would arrive at the laboratory to participate. He was met by a stern-faced researcher in a lab coat; another man in street clothes was sitting in the waiting room. The researcher explained that he was studying the effects of punishment on learning. When the two men drew slips out of the hat, the participant's slip said "teacher." The teacher watched as the "learner" was strapped into a chair and an electrode attached to his wrist. Then the teacher was taken into an adjacent room and seated at an impressive-looking "shock generator" with switches from 15 to 450 volts (V), labeled "Slight Shock," "Very Strong Shock," up to "Danger: Severe Shock," and, finally, "XXX." The teacher's job was to read a list of paired words, which the learner would attempt to memorize and

repeat. The teacher was instructed to deliver a shock whenever the learner gave a wrong answer and to increase the intensity of the shock each time the learner made a mistake. At 90 V, the learner began to grunt; at 120 V, he shouted, "Hey, this really hurts!" At 150 V, he demanded to be released, and at 270 V, his protests became screams of agony. Beyond 330 V, the learner appeared to pass out. If the teacher became concerned and asked whether he could stop, the experimenter politely but firmly replied that he was expected to continue, that this experiment was being conducted in the interest of science.

In reality, Milgram was studying obedience, not learning. He wanted to find out whether ordinary people would obey orders to cause another person pain. As part of his research, Milgram (1974) described the experiment to 110 psychiatrists, college students, and middle-class adults, and he asked them at what point they thought participants would stop. Members of all three groups guessed that most people would refuse to continue beyond 130 V and that no one would go beyond 300 V. The psychiatrists estimated that only one in a thousand people would continue to the XXX shock panel. Astonishingly, 65% of Milgram's participants administered the highest level of shock, even though many worried aloud that the shocks might be causing serious damage to the learners.

To find out what he wanted to know, Milgram had to deceive his participants. The stated purpose of the experiment—to test learning—was a lie. The "learners" were Milgram's accomplices, who had been trained to act as though they were being hurt; the machines were fake; and the learners received no shocks at all (Milgram, 1963). But, critics argued, the "teachers"—the real subjects of the study—were hurt. Not only did most voice concern, but also they showed clear signs of stress: They sweated, bit their lips, trembled, stuttered, or in a few cases, broke into uncontrollable nervous laughter. Critics also worried about the effect of the experiment on the participants' self-esteem. How would you like to be compared with the people who ran the death camps in Nazi Germany? (In Chapter 14, we will describe a 2009 study that attempted to replicate the Milgram study without raising the same ethical concerns.)

Although the design of this experiment was not typical of the vast majority of psychological experiments, it sparked such a public uproar that the APA reassessed its ethical guidelines, which were first published in 1953. A new code of ethics on psychological experimentation was approved. The code is assessed each year and periodically revised to ensure that it adequately protects participants in research studies. In addition to outlining the ethical principles guiding research and teaching, the code spells out a set of ethical standards for psychologists who offer therapy and other professional services, such as psychological testing.

The APA code of ethics requires that researchers obtain informed consent from participants and stipulates the following:

- Participants must be informed of the nature of research in clearly understandable language.
- Informed consent must be documented.
- Risks, possible adverse effects, and limitations on confidentiality must be spelled out in advance.
- If participation is a condition of course credit, equitable alternative activities must be offered.
- Participants cannot be deceived about aspects of the research that would affect their willingness to participate, such as risks or unpleasant emotional experiences.
- Deception about the goals of the research can be used only when absolutely necessary to the integrity of the research.

In addition, psychological researchers are required to follow the U.S. government's Code of Federal Regulations, which includes an extensive set of regulations concerning the protection of human participants in all kinds of research. Failure to abide by these federal regulations may result in the termination of federal funding for the researcher and penalties for the research institution.

An example of the ethical use of animals in psychological research.

Animal Research

In recent years, serious questions have also been raised about the ethics of using animals in psychological research (Herzog, 2005). Psychologists study animal behavior to shed light on human behavior. Crowding mice into small cages, for example, has yielded valuable insights into the effects of overcrowding on humans. Animals are used in experiments in which it would be clearly unethical to use human participants—such as studies involving brain lesions (requiring cutting into the brain). In fact, much of what we know about sensation, perception, drugs, emotional attachment, and the neural basis of behavior is derived from animal research (Ringach & Jentsch, 2009). Yet, animal protectionists and others question whether it is ethical to use nonhuman animals, which cannot give their consent to serve as subjects in psychological research (Greek & Greek, 2010).

Before you watch the next video, think about why ethics might be important to a psychological study.

Watch the Video "*Ethics in Animal Research*"

In its "Ethical Principles of Psychologists and Code of Conduct," the American Psychological Association (2010) has defined the standards that apply to the use of animals in research:

a. Psychologists acquire, care for, use, and dispose of animals in compliance with current federal, state, and local laws and regulations, and with professional standards.

b. Psychologists trained in research methods and experienced in the care of laboratory animals supervise all procedures involving animals and are responsible for ensuring appropriate consideration of their comfort, health, and humane treatment.

c. Psychologists ensure that all individuals under their supervision who are using animals have received instruction in research methods and in the care, maintenance, and handling of the species being used, to the extent appropriate to their role. (See also Standard 2.05, Delegation of Work to Others.)

d. Psychologists make reasonable efforts to minimize the discomfort, infection, illness, and pain of animal subjects.

e. Psychologists use a procedure subjecting animals to pain, stress, or privation only when an alternative procedure is unavailable and the goal is justified by its prospective scientific, educational, or applied value.

f. Psychologists perform surgical procedures under appropriate anesthesia and follow techniques to avoid infection and minimize pain during and after surgery.

g. When it is appropriate that an animal's life be terminated, psychologists proceed rapidly, with an effort to minimize pain and in accordance with accepted procedures.

Those principles have been expanded by the APA's Committee on Animal Research and Ethics (CARE) into a full set of guidelines for psychologists who use animals in research (American Psychological Association, 2011).

Quiz Questions

1. Which of the following is a part of the American Psychological Association (APA) code of ethics regarding psychological experiments?
   a. Participants in research studies must be 18 or older.
   b. Participants must be informed about the nature of the research only when the experiment's methods are potentially harmful.
   c. Deception about the goals of the research can be used only when absolutely necessary to the integrity of the research.
   d. Deception about the goals of the research can never be used.
2. According to the APA code of ethics, are researchers who use animals in experiments ever allowed to subject those animals to pain or stress?
   a. Yes, but only when an alternative procedure is unavailable and the goal is justified by its prospective scientific, educational, or applied value.
   b. No, the APA does not condone the use of animals in research in any circumstance.
   c. Yes, but only if the animals are given appropriate anesthesia and no other procedure is available.
   d. The APA does not issue guidelines on the use of animals in research.
3. Which psychologist's controversial 1963 experiment involved participants being told to administer increasingly intense shocks to other participants?
   a. Kenneth Clark
   b. Jean Piaget
   c. Al Maisto
   d. Stanley Milgram
4. Your classmate Jared says he does not need to be concerned about ethical standards for his naturalistic observation study because he won't be manipulating any variables. On the basis of what you have learned from this chapter, your reply should be:
   a. "You're right. Ethical guidelines don't apply to naturalistic studies."
   b. "You're wrong. All psychological research is subject to ethical guidelines."
   c. "If your research is not funded by the federal government, then you're right."
   d. "You're right. Only laboratory experiments must conform to ethics standards."
5. Which of the following is true regarding the use of animals in psychological research?
   a. Studies involving animals have shed very little light on human behavior.
   b. Some people question whether it is ever ethical to use nonhuman animals in psychological research.
   c. Animals can be used as long as they are not subjected to pain, stress, or privation.
   d. The APA code of ethics for research on animals is the same as the code for research on humans.

Chapter Review

What Is Psychology?

"Most psychologists study mental and emotional problems and work as psychotherapists." Is this statement true or false? **Psychology** is the scientific study of behavior and mental processes. Through its many subdivisions, its proponents seek to describe and explain human thoughts, feelings, perceptions, and actions.

Developmental psychologists are concerned with processes of growth and change over the life course, from the prenatal period through old age and death. *Physiological psychologists* focus on the biological basis of the body's neural and chemical systems, studying how these affect thoughts, emotions, and behavior. *Experimental psychologists* investigate basic psychological processes, such as learning, memory, sensation, perception, cognition, motivation, and emotion. *Personality psychologists* look at the differences among people in such traits as sociability, anxiety, aggressiveness, and self-esteem. *Clinical* and *counseling psychologists* specialize in the diagnoses and treatment of psychological disorders, whereas *social psychologists* focus on how other people and social situations influence thoughts and actions. *Industrial* and *organizational psychologists* apply the principles of psychology to the workplace.

Given the broad range of careers and interests, what holds the subfields of psychology together as a distinct scientific discipline? Five enduring issues or fundamental themes unify the various subfields of psychology:

- Person–Situation: To what extent is behavior caused by processes inside the person as opposed to factors outside the individual?
- Nature–Nurture: How do genes and experiences interact to influence behavior?
- Stability–Change: To what extent do we stay the same as we develop and how much do we change?
- Diversity–Universality: In what ways do people differ in how they think and act?
- Mind–Body: What is the relationship between experiences such as thoughts and feelings and biological processes?

What does psychology have in common with other sciences? Like the other sciences, psychology relies on the **scientific method** to find answers to questions. This method involves careful observation and collection of data, the development of **theories** about relationships and causes, and the systematic testing of **hypotheses** (or predictions) to disprove invalid theories.

Critical Thinking

What does it mean to "think critically"? Thinking critically means that you think like a scientist. You base your beliefs on solid evidence, analyze assumptions, avoid oversimplifying, and draw conclusions carefully.

The Growth of Psychology as a Science

"Psychology has a long past, but a short history." What does that mean? The roots of psychology can be found among the Greek philosophers (particularly Socrates, Plato, and Aristotle) who first began to speculate about how the mind works, about where thoughts and feelings come from, and about the relationship between the mind and behavior.

The 17th century witnessed renewed interest in human thought and its relationship to behavior. Rene Descartes, John Locke, Thomas Hobbes, and Charles Darwin took very different positions on the nature of the mind, the source of knowledge, and the relationship between the mind and the brain. It was not until the late 19th century that the tools of science were applied to answering such questions.

How did Wundt help to define psychology as a science of the mind? Why did James think that sensation and perception alone couldn't explain behavior? Why was Freud's theory of the unconscious shocking at the turn of the 20th century? Wilhelm Wundt established the first psychology laboratory in 1879 at the University of Leipzig in Germany. His use of experiment and measurement marked the beginnings of psychology as a science. One of his students, Edward Titchener, established a perspective called **structuralism**, which was based on the belief that psychology's role was to identify the basic elements of experience and how they combine.

In his perspective known as **functionalism**, American psychologist William James criticized structuralism, arguing that sensations cannot be separated from the mental associations that allow us to benefit from past experiences. James believed that our rich storehouse of ideas and memories is what enables us to function in our environment.

The **psychodynamic theories** of Sigmund Freud, his colleagues, and successors added another new dimension to psychology: the idea that much of our behavior is governed by unconscious conflicts, motives, and desires.

How was Watson's approach to human behavior different from that of Freud? How did Skinner expand behaviorism? John B. Watson, a spokesman for **behaviorism**, argued that psychology should concern itself only with observable, measurable behavior.

B. F. Skinner's beliefs were similar to those of Watson, but he added the concept of reinforcement or reward. In this way, he made the learner an active agent in the learning process.

How did Gestalt psychologists influence the way we think about perception? What aspects of life do humanistic psychologists stress? According to **Gestalt psychology**, perception depends on the human tendency to see patterns, to distinguish objects from their backgrounds, and to complete pictures from a few clues. In this emphasis on wholeness, the Gestalt school differed radically from structuralism.

Humanistic psychology, with its focus on meaning, values, and ethics, emphasizes the goal of reaching one's fullest potential. **Cognitive psychology** is the study of mental processes in the broadest sense, focusing on how people perceive, interpret, store, and retrieve information. Unlike behaviorists, cognitive psychologists believe that mental processes can and should be studied scientifically. This view has dramatically changed American psychology from its previous behaviorist focus.

Where do evolutionary psychologists look for the roots of human behavior? What new focus is positive psychology bringing to the study of human behavior? Is there a single perspective dominating psychology today? **Evolutionary psychology** focuses on the functions and adaptive value of various human behaviors and the study of how those behaviors have evolved. **Positive psychology** studies subjective feelings of happiness and well-being; the development of individual traits such as integrity and leadership; and the settings that encourage individuals to flourish. Most contemporary psychologists do not adhere to a single school of thought. They believe that different theories can often complement one another and together enrich our understanding of human behavior.

What obstacles did women face in the early years of psychology? Although psychology has profited from the contributions of women from its beginnings, women often faced discrimination: Some colleges and universities did not grant degrees to women, professional journals were often reluctant to publish their work, and teaching positions were often closed to them. In recent decades, the situation has changed dramatically.

Human Diversity

How are psychologists helping us to understand the differences between men and women? **Feminist theory** explores the differences and similarities in thought and behavior between the two sexes or **genders**. Culturally generated beliefs regarding these differences are called *gender stereotypes*. Psychologists are trying to determine the hereditary and cultural causes of gender differences as well as the origins of sexual orientation.

Why are psychologists interested in racial and ethnic differences? **Race**, a biological term, refers to subpopulations that are genetically similar. **Ethnicity** involves a shared cultural heritage based on common ancestry, which can affect norms of behavior.

How does culture contribute to human diversity? The intangible aspects of **culture**—the beliefs, values, traditions, and norms of behavior that a particular people share—make an

important contribution to human diversity. Because many subcultural groups exist, psychology must take both inter- and cross-cultural influences into account.

Research Methods in Psychology

What are some of the research methods that psychologists use in their work? Psychologists use naturalistic observation, case studies, surveys, correlational research, and experiments to study behavior and mental processes.

Why is a natural setting sometimes better than a laboratory for observing behavior? Psychologists use **naturalistic observation** to study behavior in natural settings. Because there is minimal interference from the researcher, the behavior observed is likely to be more accurate, spontaneous, and varied than behavior studied in a laboratory. Researchers using this method must be careful to avoid **observer bias**.

When can a case study be most useful? Researchers conduct a **case study** to investigate in depth the behavior of one person or a few persons. This method can yield a great deal of detailed, descriptive information that is useful for forming hypotheses, but is vulnerable to observer bias and overgeneralization of results.

What are some of the benefits of survey research? **Survey research** generates a large amount of data quickly and inexpensively by asking a standard set of questions of a large number of people. Great care must be taken, however, in the wording of questions and in the selection of respondents.

What is the difference between correlation and cause and effect? **Correlational research** investigates the relation, or correlation, between two or more variables. Although two variables may be *related* to each other, that does not imply that one *causes* the other.

What kinds of research questions are best studied by experimental research? An **experiment** is called for when a researcher wants to draw conclusions about cause and effect. In an experiment, the impact of one factor can be studied while all other factors are held constant. The factor whose effects are being studied is called the **independent variable** because the researcher is free to manipulate it at will. The factor on which there is apt to be an impact is called the **dependent variable**. Usually, an experiment includes both an **experimental group** of **participants** and a **control group** for comparison purposes. Often, a neutral person records data and scores results, so **experimenter bias** doesn't creep in.

How repeatable are the results of psychological research? Although reproducibility is central to all sciences, there are a number of reasons why research may not always lead to reproducible results. Though there is considerable evidence that the reproducibility of psychological research is high, researchers and journal editors are atttempting to improve it.

What does multimethod research allow psychologists to do? Many psychologists overcome the limitations of using a single research method by using multiple methods to study a single problem.

How can sampling affect the results of a research study? Regardless of the research method used, psychologists usually study a small **sample** of subjects and then generalize their results to larger populations. Proper sampling is critical to ensure that results have broader application. **Random samples**, in which each potential participant has an equal chance of being chosen, and **representative samples**, in which subjects are chosen to reflect the general characteristics of the population as a whole, are two ways of doing this.

Ethics and Psychology: Research on Humans and Animals

Are there ethical guidelines for conducting psychological research? What objections have been raised regarding research on animal subjects? The APA has a code of ethics for conducting research involving human participants or animal subjects. Researchers must obtain informed consent from study participants. Participants must be told in advance about the nature and possible risks of the research. People should not be pressured to participate.

Although much of what we know about certain areas of psychology has come from animal research, the practice of experimenting on animals has strong opponents because of the pain and suffering that are sometimes involved. Although APA and the federal government have issued guidelines for the humane treatment of laboratory animals, many animal rights advocates argue that the only ethical research on animals is naturalistic observation.

Test Yourself

1. The three key terms that constitute the definition of psychology are _____.
   - **a.** cognition, attitudes, and brain function
   - **b.** scientific, behavior, and mental processes
   - **c.** therapy, behavior problems, and mental illness
   - **d.** cognition, human motivation, and thinking
2. If a psychologist gave one group of rats extra handling and an enriched environment and deprived a second group of rats, then measured how quickly each group learned a maze, he or she would be engaged in:
   - **a.** correlational research.
   - **b.** naturalistic observation.
   - **c.** field research.
   - **d.** a controlled experiment.
3. Critical thinkers are willing to _____.
   - **a.** subject their own deeply held beliefs to scrutiny
   - **b.** accept common knowledge
   - **c.** look at similarities but not differences in a problem
   - **d.** accept the opinions of established experts in a field

4. Which of the following statements is true?
   a. Women were prevented from joining the American Psychological Association when it was first formed.
   b. Historically, women more often than men have been participants in psychological research.
   c. Historically, some colleges refused to grant degrees in psychology to women.
   d. Women still receive less than half the PhDs in psychology.

5. Freud's psychodynamic theory emphasized the importance of:
   a. the unconscious.
   b. conditioning.
   c. emotions.
   d. reinforcement.

6. If you subscribe to this school of psychology, you believe that psychology is the study of only what is observable and measurable. This historical and modern perspective is better known as _____.
   a. functionalism
   b. psychoanalysis
   c. gestalt psychology
   d. behaviorism

7. Alessio believes that men's and women's gender roles are the result of biological adaptations in our deep ancestry. Women cared for children and men hunted and defended territory, he says, so it makes sense that, even today, women should be responsible for domestic duties and men should work outside the home. Alessio is using theories based in _____ to explain his views on gender roles.
   a. feminist theory
   b. evolutionary psychology
   c. behavioral adaptation
   d. gender studies

8. We cannot understand human behavior without also understanding:
   a. animal cognition and behavior.
   b. how little human diversity there is.
   c. the influence of culture on human diversity.
   d. that culture has little influence on human psychology.

9. In contrast to experimental studies, correlational studies are generally characterized by which of the following?
   a. They are more likely to use a biased sample.
   b. They are unsuitable for drawing inferences about causality.
   c. They require many fewer people to participate as subjects.
   d. They take a longer time to carry out.

10. Consider the following experiment. Children are drawn from high-, middle-, and low-income households. All the children are divided into two groups. One group watches *Sesame Street* on TV every day for a month. The other group watches cartoons. Both groups are then given a test that measures creativity. In this study, the independent variable is:
    a. There is no independent variable; this is a correlational study.
    b. the children's socioeconomic class.
    c. the children's scores on the creativity test.
    d. what the children watch on TV.

11. DeShawn is researching the effects of brain lesions on depression. For ethical reasons, he is not able to cut into the brains of study participants. What is one research method that DeShawn might consider that could shed light on this problem without violating APA ethical guidelines?
    a. using animals as test subjects
    b. telling participants that he's actually studying productivity
    c. paying volunteers more for their consent to have surgery
    d. performing the tests on children whose parents have given consent

12. The American Psychological Association's Code of Ethics governing research requires which of the following?
    a. All research participants must be over the age of 18.
    b. Drugs cannot be used in studies of psychological disorders.
    c. Informed consent must be documented.
    d. An equal number of males and females must be included.

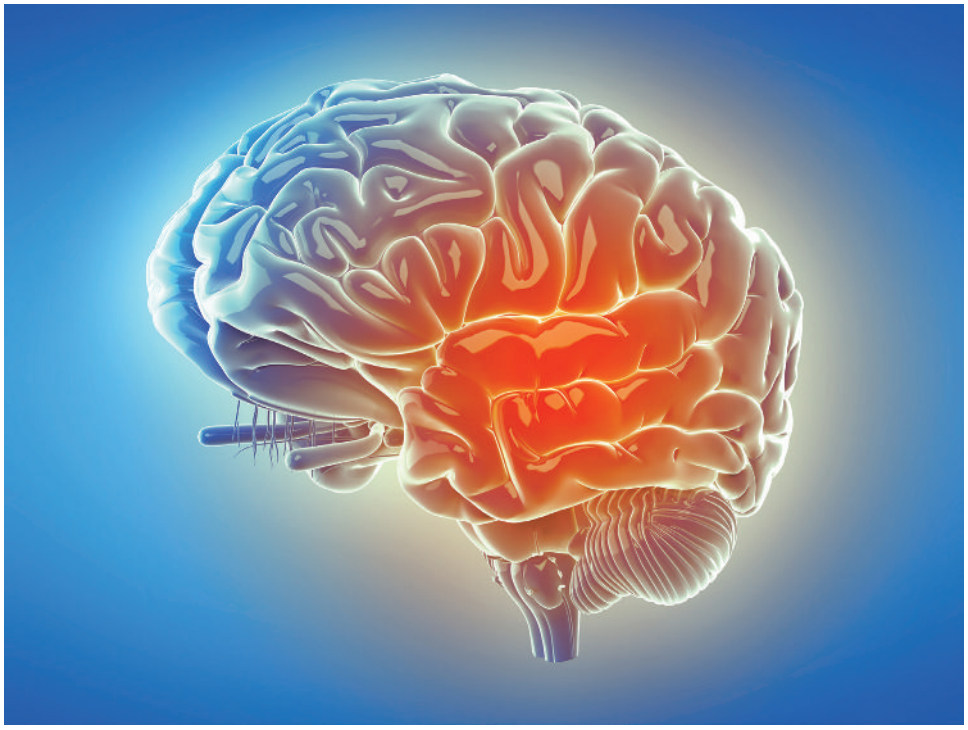
13. Marlisa is a researcher who is studying brain MRIs of patients with severe anxiety. She hopes to identify exactly how brain chemistry changes during an anxiety attack. Marlisa is working in which field of psychology?
    a. counseling psychology
    b. neural conditioning
    c. cognitive development
    d. neuropsychology

14. When every member of a population has an equal chance of being chosen for a study, the individuals who are selected to participate constitute a(n) _____ sample.
    a. random
    b. independent
    c. significant
    d. representative

15. Is there a single perspective dominating psychology today?
    a. Yes. As the influence of Freudian psychodynamic theory declined, evolutionary psychology took its place as the dominant mode of study today.
    b. No. Psychologists are more flexible in considering new approaches and combining elements of different perspectives.
    c. Yes. Behaviorism, as developed by John B. Watson, remains unchallenged as the most comprehensive psychological perspective in the early 21st century.
    d. No. Although the emerging field of positive psychology is exciting, not many psychologists are adhering to it.

Chapter 2

The Biological Basis of Behavior



Learning Objectives

LO 2.1 Define and differentiate between *psychobiology* and *neuroscience*. Describe a typical neuron. Distinguish among afferent neurons, efferent neurons, association neurons, mirror neurons, and glial cells.

LO 2.2 Describe how neurons transmit information, including the concepts of resting potential, polarization, action potential, graded potential, threshold of excitation, and the all-or-none law.

LO 2.3 Describe the parts of the synapse.

LO 2.4 Explain the role of neurotransmitters in the synapse.

LO 2.5 Explain neuroplasticity and neurogenesis.

LO 2.6 Identify the parts of the brain and the nervous system.

LO 2.7 Explain what is meant by "hemispheric specialization" and the functional differences between the two cerebral hemispheres.

LO 2.8 Discuss how microelectrode techniques, macroelectrode techniques, structural imaging, and functional imaging provide information about the brain.

LO 2.9 Explain how the spinal cord works.

LO 2.10 Identify the peripheral nervous system, and contrast the functions of the somatic and autonomic nervous systems.

LO 2.11 Explain the differences between the sympathetic and the parasympathetic nervous systems.

LO 2.12 Describe the endocrine glands and the way their hormones affect behavior.

LO 2.13 Distinguish between behavior genetics and evolutionary psychology.

LO 2.14 Define *genetics*. Differentiate among genes, chromosomes, and DNA.

LO 2.15 Describe what is meant by dominant and recessive genes, polygenic inheritance, and genotype versus phenotype.

LO 2.16 Describe the human genome and what can be learned by studying it.

LO 2.17 Compare and contrast strain studies, selection studies, family studies, twin studies, and adoption studies as sources of information about the effects of heredity.

LO 2.18 Identify the key ethical issues that arise as society gains more control over genetics.

LO 2.19 Describe how evolutionary psychologists view the influence of natural selection on human social behavior.

If you observed 5-year-old Nico, you would never guess how different he is from other children. People are enchanted by his infectious smile and friendly conversation. He shows an aptitude for creating computer graphics and his ability to use language is well above average. Nico also interacts well with other children. In fact, the only thing unusual about him is a slight limp and some difficulty in using his left arm. This is amazing because, inside, Nico is not at all like other children. Nico, you see, has only half a brain (Battro, 2006).

He was not born with this condition. What Nico was born with is a left *hemiplegia*, or partial paralysis on the left side of his body. Despite this, he learned to walk at age 1½. But as he approached his second birthday, he began to suffer epileptic seizures. Over time, the seizures became much worse and Nico would frequently lose consciousness during them. Tests revealed an area on the right side of his brain where the seizures started and spread. Medications were useless in calming this area's erratic electrical activity; so when Nico was age 3½, his parents authorized surgical removal of the afflicted region. After this treatment failed, his desperate parents reluctantly agreed to a much more radical procedure—removal of the entire right half of Nico's brain.

Wouldn't the impact of this surgery be devastating, adversely affecting all of Nico's thinking and behavior? Remarkably, it was not. Nico's epileptic seizures immediately stopped and he fully retained his ability to speak. Within a few days, he was up and walking, displaying his typical good humor. How could this be when removing half a brain entails removing about 50 billion brain cells? The answer lies in some extraordinary traits possessed by the human brain: its complexity and plasticity.

The human brain is enormously complex. Its 100 billion cells, on average, interconnect to form a multitude of pathways and networks. In addition, although the two sides of the brain constantly work together, they are not symmetrical in terms of their specialized tasks. For example, in most people, the left side of the brain houses language abilities while the right side excels at certain nonverbal skills, especially spatial ones like those needed to assemble a puzzle. This is why removal of Nico's right brain had virtually no effect on his use of language.

But most important of all to Nico's recovery is the fact that the brain of a very young child is remarkably adaptable, or *plastic*. The left side of Nico's brain readily took over most of the functions that the right side was designed to perform. This shift probably began even before his operation and intensified after the right half of his brain was removed, demonstrating that although the brain is the command center of the body, it also responds to sensory and environmental feedback. As a result, for Nico, half a brain is enough.

psychobiology
The area of psychology that focuses on the biological foundations of behavior and mental processes.

neuroscience
The study of the brain and the nervous system.

The journey through the brain that you will take in this chapter is part of the branch of psychology known as **psychobiology**, which deals with the biological bases of behavior and mental processes. Psychobiology overlaps with a much larger interdisciplinary field of study called **neuroscience**, which specifically focuses on the study of the brain and the nervous system. Many psychobiologists who study the brain's influence on behavior call themselves *neuropsychologists*.