

# chapter

## Introduction to Psychology



### An Introduction to *The World of Psychology*

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- 1.2 What are the goals of psychology?

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**SURVEY:** Begin with a scan of the chapter elements including chapter outline, headings, learning objective questions, illustrations, photos, tables, and end-of-chapter summary and study guide. This process gives you an overview of the chapter's main points. When approaching each section of the chapter, use the survey method for previewing that section's major coverage and features.

## think about it

Here you are taking your first psychology course and wondering what it's all about. When you focus on the word *psychology*, what ideas spring to mind as you concentrate? Do terms such as *therapy*, *brain*, *psychological disorder*, *emotion*, and *hypnosis* come to mind? Your introductory psychology course will touch on all of these concepts, but it will also deal with questions that you may never have associated with psychology. For instance, you may be certain that children learn new languages more easily than adults do, but is this commonly held belief really true? We'll answer this question in Chapter 7. In Chapter 11 we'll take on the age-old question of whether men and women are really different by nature. And in Chapter 16 we'll explain how advertisements convince us to make certain purchases.

Over the next few weeks, you'll also learn that psychology can help you deal with pressing practical issues in your everyday life: How can you study more effectively? (You can start answering this one by reading the *Apply It* section on page 3.) How can you know which career is right for you? How can you stop feeling so stressed out all the time? These are the kinds of practical questions that a good understanding of psychology can help you answer. But just what is psychology?

Formally speaking, psychology is defined as the scientific study of behavior and mental processes. If you are like most people, you have made many observations about both and perhaps have developed a few of your own theories to explain them. From television, radio, or the Internet, you probably also have had some exposure to "expert" opinions on behavior and mental processes. So, let's begin your exploration of psychology with an assessment of how much you already know, or think you know, about the topic. Answer the following questions, and then check them against those answers given in the text after the quiz.

Indicate whether each statement is true (T) or false (F).

1. Once damaged, brain cells never work again.
2. All people dream during a night of normal sleep.
3. As the number of bystanders at an emergency increases, the time it takes for the victim to get help decreases.
4. Humans do not have a maternal instinct.
5. It's impossible for human beings to hear a watch ticking 20 feet away.
6. Eyewitness testimony is often unreliable.
7. Chimpanzees have been taught to speak.
8. Creativity and high intelligence do not necessarily go together.
9. When it comes to close personal relationships, opposites attract.
10. The majority of teenagers have good relationships with their parents.

You will probably be surprised to learn that so-called "common sense" has led you astray. All the odd-numbered items are false, and all the even-numbered items are true. So, common sense alone will not get you very far in your study of psychology. Learning all you can from this text is a good first step toward a better understanding of behavior and mental processes.

The book's features will help you learn because they are part of a *systematic*—that is, a goal-oriented, planned, and effortful—way of studying. Similarly, the procedures that scientists use are more likely to yield reliable answers to questions about behavior and mental processes than common sense because they are part of a systematic approach to what some philosophers deem to be the primary goal of science: to search for truth (Popper, 1972).



**QUESTION:** As you begin each chapter section, look over its preview questions in the chapter outline and in the chapter margins to get a sense of the topics being covered. In addition, add any initial questions you may have about the content and key terms for this section. Keep these questions in mind to help focus your reading of each section.

## An Introduction to *The World of Psychology*

As we just learned, **psychology** is formally defined as the scientific study of behavior and mental processes. But what makes psychology a science? Many people believe that a field is a science because of the nature of its body of knowledge. Few people question whether physics, for example, is a true science. But a science isn't a science because of its subject matter. A field of study qualifies as a science if it uses the *scientific method* to acquire knowledge.

### The Scientific Method

The **scientific method** consists of the orderly, systematic procedures that researchers follow as they identify a research problem, design a study to investigate the problem, collect and analyze data, draw conclusions, and communicate their findings. The scientific method is the most objective method known for acquiring knowledge (Christensen, 2007). The knowledge gained is dependable because of the method used to obtain it.

**psychology** The scientific study of behavior and mental processes.

### 1.1 What process do scientists use to answer questions about behavior and mental processes?

**scientific method** The orderly, systematic procedures that researchers follow as they identify a research problem, design a study to investigate the problem, collect and analyze data, draw conclusions, and communicate their findings.



### BEST PRACTICES FOR EFFECTIVE STUDYING

Decades of research on learning and memory have uncovered a number of strategies that you can use, in addition to the SQ3R method, to make your study time more efficient and effective.

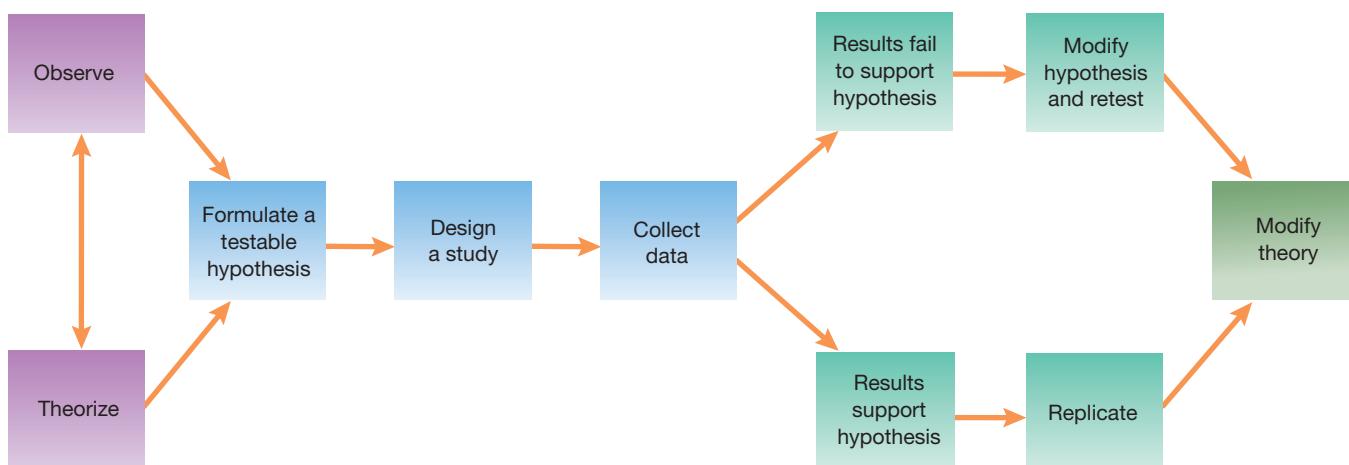
- Establish a quiet place, free of distractions, where you do nothing else but study. You can condition yourself to associate this environment with studying, so that entering the room or area will be your cue to begin work.
- Schedule your study time. Research on memory has proven that spaced learning is more effective than massed practice (cramming). Instead of studying for 5 hours straight, try five study sessions of 1 hour each.
- To be prepared for each class meeting, set specific goals for yourself each week and for individual study sessions. Your goals should be challenging but not overwhelming. If the task for an individual study session is manageable, it will be easier to sit down and face it. Completing the task you have set for yourself will give you a sense of accomplishment.
- The more active a role you play in the learning process, the more you will remember. Spend some of your study time reciting rather than rereading the material. One effective method is to use index cards

as flash cards. Write a key term or study question on the front of each card. On the back, list pertinent information from the text and class lectures. Use these cards to help you prepare for tests.

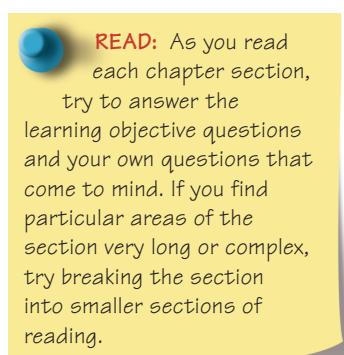
- *Overlearning* means studying beyond the point at which you can just barely recite the information you are trying to memorize. Review the information again and again until it is firmly locked in memory. If you are subject to test anxiety, overlearning will help.
- Forgetting takes place most rapidly within the first 24 hours after you study. No matter how much you have studied for a test, always review shortly before you take it. Refreshing your memory will raise your grade.
- Sleeping immediately after you study will help you retain more of what you have learned. If you can't study before you go to sleep, at least review what you studied earlier in the day. This is also a good time to go through your index cards.

Once you've mastered these study strategies, use them to improve your comprehension and success in all your courses.

**Watch** a video about Student Study Habits.  
[www.mypsychlab.com](http://www.mypsychlab.com)

**FIGURE 1.1** The Scientific Method

These are the steps involved in the scientific method.



**theory** A general principle or set of principles proposed to explain how a number of separate facts are related.

**hypothesis** A prediction about a relationship between two or more variables.

The scientific method includes the following steps (see **FIGURE 1.1**):

**OBSERVE AND THEORIZE.** The first step in the scientific method is an interactive one in which a researcher observes some phenomenon and *theorizes*, or develops a hunch, about what might have led to it. For instance, suppose a psychologist observes students playing video games on a big-screen TV in a student lounge and notices that the men tend to get higher scores than the women do. She might speculate that this gender difference results from differences in the amount of time that men and women spend playing video games. In other words, her hunch is that, in general, men get higher scores on video games because they practice more than women do. Such hunches are often derived from a psychological **theory**, a general principle or set of principles proposed to explain how a number of separate facts are related. In our example, the researcher's hunch seems to be based on a theory that emphasizes the role of experience in shaping behavior; that is, her theory proposes that the more experience people have doing something, the better they are at doing it.

**FORMULATE A HYPOTHESIS.** Based on her hunch about the cause of gender differences in video game scores, the researcher next comes up with a **hypothesis**, a prediction that can be tested *empirically*—that is, with data. Although the researcher's theory suggests many possible hypotheses, one, in particular, is key to understanding the contribution of practice to video game scores: *If males and females spend equal amounts of time practicing a game, their scores will be equal.*

**DESIGN A STUDY.** Next, to test the hypothesis about equal practice, the researcher designs a study in which she uses the same procedures to teach male and female students how to play a new video game. Then she allows them 30 minutes to practice it on their own. At the end of the practice session, she tells participants to play the game one more time and to try for the highest score possible.

**COLLECT DATA.** Once the researcher conducts her study, she collects the data that could be relevant to her hypothesis. First, she calculates an average score for male and female participants. Then she calculates the amount of time that participants actually spent practicing the game. This information could be critical in interpreting the study's results, because, even though each participant is allowed 30 minutes to practice, the researcher cannot assume that they will all practice an equal amount of time.

**APPLY RESULTS TO THE HYPOTHESIS.** If the researcher finds that the video game scores for males and females are equivalent, she can conclude that the data support her hypothesis; given the same amount of practice time, males and females will score

equally well. However, she cannot stop there. The researcher must repeat the study using the same procedures to determine whether her findings are a one-time phenomenon or if they are the result of a true, underlying psychological principle. This process is called **replication**.

On the other hand, if the researcher finds that males still get higher scores than females, she must concede that the results do not support her hypothesis and she must modify it. However, this is where the researcher's data on actual practice time may come in handy: If the data show that males spent more time engaged in actual practice than females did, the researcher can assert that the study's outcome supports her hypothesis after all. Still, she must modify her hypothesis to include a testable assertion about why the men in her study chose to practice more than the women did. If she hypothesizes that the practice difference was caused by the type of game used in the study, for example, in a subsequent study she would go on to examine how different types of games affect practice time.

**replication** The process of repeating a study with different participants and preferably a different investigator to verify research findings.

## The Goals of Psychology

What goals do psychological researchers pursue when they plan and conduct their studies? Briefly put, the goals of psychology are to describe, explain, predict, and influence behavior and mental processes. Let's look at each goal in a bit more detail.

*Description* is usually the first step in understanding any behavior or mental process and is therefore important in a very new area of research or in the early stages of research. To attain this goal, researchers describe the behavior or mental process of interest as accurately and completely as possible. A description tells *what* occurred.

The second goal, *explanation*, requires an understanding of the conditions under which a given behavior or mental process occurs. Such an understanding often enables researchers to state the causes of the behavior or mental process they are studying. But researchers do not reach the goal of explanation until their results have been tested, retested, and confirmed. The way researchers confirm an explanation is by eliminating or ruling out other explanations. An explanation tells *why* a given event or behavior occurred.

The goal of *prediction* is met when researchers can specify the conditions under which a behavior or event is likely to occur. Once researchers can identify all the antecedent (prior) conditions required for a behavior or event to occur, they can predict that behavior or event.

The goal of *influence* is accomplished when researchers know how to apply a principle or change a condition in order to prevent unwanted occurrences or bring about desired outcomes.

*Review It* summarizes the goals of psychology and applies them to the video game hypothesis discussed earlier.

### 1.2 What are the goals of psychology?



▲ To achieve the goal of explaining road rage and the resulting violence—and perhaps eventually controlling it—psychological researchers might observe and describe the behavior of motorists under stressful conditions.

## review it ▾

### THE GOALS OF PSYCHOLOGY

| Goal        | Definition  | Example  |
|-------------|---|--|
| Description | Describe behavior or mental process as accurately as possible.  | Calculate average video game scores for males and females.   |
| Explanation | Suggest causes for behavior or mental processes of interest.  | Propose that males score higher on video games because they practice more than females do.                                 |
| Prediction  | Specify conditions under which behavior or mental process is likely to occur.   | Hypothesize that males and females will obtain equivalent video game scores if they practice the same amount of time.      |
| Influence   | Apply the results of a study to change a condition in order to bring about a desired real-world outcome or prevent an undesired real-world outcome. | Use the results of video game practice studies to develop games that can enhance females' achievement in math and science. |





**RECITE:** After reading each section (or part of a section), try to answer the preview questions and your own questions—aloud or in writing or both. It can be helpful to write a brief summary of the material to help solidify your understanding of each topic. If you have trouble answering any of the preview questions or summarizing the material, take a few minutes to reread the section before trying again. Compare your responses or written summaries to those in the Summary and Review at the end of each chapter.

Two types of research help psychologists accomplish the four goals just described: basic research and applied research. The purpose of **basic research** is to seek new knowledge and to explore and advance general scientific understanding. Basic research explores such topics as the nature of memory, brain function, motivation, and emotional expression. **Applied research** is conducted specifically for the purpose of solving practical problems and improving the quality of life. Applied research focuses on finding methods to improve memory or increase motivation, therapies to treat psychological disorders, ways to decrease stress, and so on. This type of research is primarily concerned with the fourth goal of psychology—*influence*—because it specifies ways and means of changing behavior.

These types of research have enabled psychologists to accumulate a vast knowledge base about behavior and mental processes. However, information alone doesn't necessarily advance our understanding of psychological phenomena. As we noted earlier, using knowledge acquired through the scientific method to develop theories can help us in the quest for understanding. With that in mind, we'll turn our attention to some early attempts at psychological theory-building and the schools of thought that arose from debates between the early theorists and their critics.

## remember it ▾

### AN INTRODUCTION TO THE WORLD OF PSYCHOLOGY

1. The orderly, systematic procedures scientists follow in acquiring a body of knowledge comprise the \_\_\_\_\_.
2. \_\_\_\_\_ is the process of repeating a study to determine whether the results were reliable.
3. The four goals of psychology are \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
4. Applied research addresses the \_\_\_\_\_ goal.

ANSWERS: 1. scientific method; 2. Replication; 3. description, explanation, prediction, influence; 4. influence

**basic research** Research conducted to seek new knowledge and to explore and advance general scientific understanding.

Explore the Psychology Timeline. [www.mypsychlab.com](http://www.mypsychlab.com)

### 1.3 What roles did Wundt and Titchener play in the founding of psychology?

**applied research** Research conducted specifically to solve practical problems and improve the quality of life.

## Exploring Psychology's Roots

If you were to trace the development of psychology from the beginning, you would need to start before the earliest pages of recorded history, beyond even the early Greek philosophers, such as Aristotle and Plato. However, it was not until experimental methods were applied to the study of psychological processes that psychology became recognized as a formal academic discipline. [Explore on MyPsychLab](#)

### Structuralism

Who were the “founders” of psychology? Historians acknowledge that three German scientists—Ernst Weber, Gustav Fechner, and Hermann von Helmholtz—were the first to systematically study behavior and mental processes. But it is Wilhelm Wundt (1832–1920) who is generally thought of as the “father” of psychology. Wundt’s vision for the new discipline included studies of social and cultural influences on human thought (Benjafield, 1996).

Wundt established a psychological laboratory at the University of Leipzig in Germany in 1879, an event considered to mark the birth of psychology as a formal academic discipline. Using a method called *introspection*, Wundt and his associates studied the perception of a variety of visual, tactile, and auditory stimuli, including the rhythm patterns produced by metronomes set at different speeds. Introspection as a research method involves looking inward to examine one’s own conscious experience and then reporting that experience.

Wundt’s most famous student, Englishman Edward Bradford Titchener (1867–1927), took the new field to the United States, where he set up a psychological

laboratory at Cornell University. He gave the name **structuralism** to this first formal school of thought in psychology, which endeavored to analyze the basic elements, or the structure, of conscious mental experience. Like Wundt before him, Titchener thought that consciousness could be reduced to its basic elements, just as water ( $H_2O$ ) can be broken down into its constituent elements—hydrogen (H) and oxygen (O). For Wundt, pure sensations—such as sweetness, coldness, or redness—were the basic elements of consciousness. And these pure sensations, he believed, combined to form perceptions.

The work of both Wundt and Titchener was criticized for its primary method, introspection. Introspection is not objective, even though it involves observation, measurement, and experimentation. When different introspectionists were exposed to the same stimulus, such as the click of a metronome, they frequently reported different experiences. Therefore, structuralism was not in favor for long. Later schools of thought in psychology were established, partly as a reaction against structuralism, which did not survive after the death of its most ardent spokesperson, Titchener. Nevertheless, the structuralists were responsible for establishing psychology as a science through their insistence that psychological processes could be measured and studied using methods similar to those employed by scientists in other fields.



▲ Even though these skydivers share the same sensations—the feeling of falling, the rush of air on their faces as they fall, and the sudden lurch of their parachutes opening—their reported introspections of the experience would probably differ.

**structuralism** The first formal school of thought in psychology, which endeavored to analyze the basic elements, or structure, of conscious mental experience.

## Functionalism

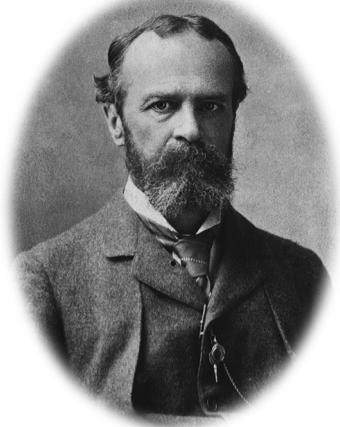
As structuralism was losing its influence in the United States in the early 20th century, a new school of psychology called functionalism was taking shape. **Functionalism** was concerned not with the structure of consciousness, but with how mental processes function—that is, how humans and animals use mental processes in adapting to their environment. The influential work of Charles Darwin (1809–1882), especially his ideas about evolution and the continuity of species, was largely responsible for an increasing use of animals in psychological experiments. Even though Darwin, who was British, contributed important seeds of thought that helped give birth to the new school of psychology, functionalism was primarily American in character and spirit.

The famous American psychologist William James (1842–1910) was an advocate of functionalism, even though he did much of his writing before this school of psychology emerged. James's best-known work is his highly regarded and frequently quoted textbook *Principles of Psychology*, published more than a century ago (1890). James taught that mental processes are fluid and have continuity rather than the rigid, or fixed, structure that the structuralists suggested. James spoke of the “stream of consciousness,” which, he said, functions to help humans adapt to their environment.

How did functionalism change psychology? Functionalism broadened the scope of psychology to include the study of behavior as well as mental processes. It also allowed the study of children, animals, and individuals with mental impairments, groups that could not be studied by the structuralists because they could not be trained to use introspection. Functionalism also focused on an applied, more practical use of psychology by encouraging the study of educational practices, individual differences, and adaptation in the workplace (industrial psychology).

### 1.4 Why is functionalism important in the history of psychology?

**functionalism** An early school of psychology that was concerned with how humans and animals use mental processes in adapting to their environment.



▲ William James was the first American psychologist.

## The Changing Face of Psychology

From its beginning until the mid-20th century, the field of psychology was shaped and dominated largely by White European and American males. For centuries, conventional thought had held that higher education was exclusively for White males, that women should rear children and be homemakers, and that minorities were best suited for manual labor. And, as Thomas Paine observed in his influential pamphlet *Common*

### 1.5 In what ways have women and minorities shaped the field of psychology, both in the past and today?



▲ During the 1880s, Christine Ladd-Franklin became one of the first women to complete a doctoral degree in psychology, although Johns Hopkins University refused to officially grant her the degree until the mid-1920s. Archives of the History of American Psychology—The University of Akron.

*Sense* (1776), “A long habit of not thinking a thing wrong, gives it a superficial appearance of being right.” However, beginning in the late 19th century, women and minorities overcame these prejudices to make notable achievements in and contributions to the study of psychology.

**PIONEERING WOMEN.** Christine Ladd-Franklin (1847–1930) completed the requirements for a Ph.D. at Johns Hopkins University in the mid-1880s but had to wait over 40 years before receiving her degree in 1926, when the university finally agreed to grant women doctoral degrees. Ladd-Franklin formulated a well-regarded, evolutionary theory of color vision.

In 1895, Mary Whiton Calkins (1863–1930) completed the requirements for a doctorate at Harvard. And even though William James described her as one of his most capable students, Harvard refused to grant the degree to a woman (Dewsbury, 2000). Undeterred, Calkins established a psychology laboratory at Wellesley College and developed the paired-associates test, an important research technique for the study of memory. She became the first female president of the American Psychological Association in 1905.

Margaret Floy Washburn (1871–1939) received her Ph.D. in psychology from Cornell University and later taught at Vassar College (Dewsbury, 2000). She wrote several books, among them *The Animal Mind* (1908), an influential book on animal behavior, and *Movement and Mental Imagery* (1916).

**AFRICAN AMERICANS AND OTHER GROUPS.** Francis Cecil Sumner (1895–1954) was a self-taught scholar. In 1920, without benefit of a formal high school education, he became the first African American to earn a Ph.D. in psychology, from Clark University. This feat was accomplished “in spite of innumerable social and physical factors mitigating against such achievements by black people in America” (Guthrie, 1998, p. 177). Sumner translated more than 3,000 articles from German, French, and Spanish. He chaired the psychology department at Howard University and is known as the “father” of African American psychology.

Albert Sidney Beckham (1897–1964), another African American psychologist, conducted some impressive early studies on intelligence and showed how it is related to success in numerous occupational fields. Beckham also established the first psychological laboratory at an African American institution of higher learning—Howard University.

More recently, African American psychologist Kenneth Clark (1914–2005) achieved national recognition for his writings on the harmful effects of racial segregation. His work affected the Supreme Court ruling that declared racial segregation in U.S. schools to be unconstitutional (Benjamin & Crouse, 2002). His wife, Mamie Phipps Clark (1917–1983), also achieved recognition when the couple published their works on racial identification and self-esteem, which are regarded as classics in the field (Lal, 2002).

Hispanic American George Sánchez (1906–1972) conducted studies on bias in intelligence testing during the 1930s (Sánchez, 1932, 1934). He pointed out that both cultural differences and language differences work against Hispanic students when they take IQ tests.

Native American and Asian American psychologists have made important contributions to psychological research as well. Moreover, they are the fastest growing minority groups in the field of psychology. The percentage of doctorates awarded to individuals in both groups more than doubled from the mid-1970s to the mid-1990s (National Science Foundation, 2000). One contemporary Native American psychologist, Marigold Linton, is known for her research examining autobiographical memory. In 1999, Richard Suinn, an eminent researcher in behavioral psychology, became the first Asian American president of the American Psychological Association (APA).

Today, more women than men obtain degrees in psychology, and minority group representation is growing (NCES, 2006, 2008). However, there continues to be a gap between the proportion of minorities in the U.S. population and their representation among professional psychologists (APA, 2000). Consequently, the APA and other organizations have established programs to encourage minority enrollment in graduate programs in psychology.



▲ Kenneth (1914–2005) and Mamie (1917–1983) Clark's research examining self-esteem in African American children was cited in the 1954 U.S. Supreme Court decision *Brown v. Board of Education* that led to the desegregation of public schools in the United States.

**remember it ▾****EXPLORING PSYCHOLOGY'S ROOTS**

1. Classify each of the following people and concepts as being associated with (a) Wundt, (b) structuralism, and/or (c) functionalism. (Hint: Some items apply to more than one.)
  - (1) James
  - (2) based on Darwin's theory of evolution
  - (3) stream of consciousness
  - (4) elements of experience
  - (5) Titchener
  - (6) introspection
  - (7) became prominent in the early 20th century
  
2. Match each of the following individuals with his or her contribution to psychology.
 

|                          |                             |
|--------------------------|-----------------------------|
| <input type="checkbox"/> | (1) Francis Cecil Sumner    |
| <input type="checkbox"/> | (2) Mary Whiton Calkins     |
| <input type="checkbox"/> | (3) Kenneth Clark           |
| <input type="checkbox"/> | (4) Christine Ladd-Franklin |
| <input type="checkbox"/> | (5) George Sánchez          |

ANSWERS: 1. (1) c., (2) c., (3) c., (4) a., b., (5) b., (6) a., b., (7) c.; 2. (1) c., (2) a., (3) d., (4) e., (5) b.



## Schools of Thought in Psychology

Why don't we hear about structuralism and functionalism today? In the early 20th century, the debate between the two points of view sparked a veritable explosion of theoretical discussion and research examining psychological processes. The result was the appearance of new theories that were better able to explain behavior and mental processes. The foundations of the major schools of thought in the field were established during that period and continue to be influential today.

### Behaviorism

Psychologist John B. Watson (1878–1958) looked at the study of psychology as defined by the structuralists and functionalists and disliked virtually everything he saw. In his article “Psychology as the Behaviorist Views It” (1913), Watson proposed a radically new approach to psychology, one that rejected the subjectivity of both structuralism and functionalism. This new school redefined psychology as the “science of behavior.” Termed **behaviorism** by Watson, this school of psychology confines itself to the study of behavior because behavior is observable and measurable and, therefore, objective and scientific. Behaviorism also emphasizes that behavior is determined primarily by factors in the environment.

Behaviorism was the most influential school of thought in American psychology until the 1960s. It is still a major force in modern psychology, in large part because of the profound influence of B. F. Skinner (1904–1990). Skinner agreed with Watson that concepts such as mind, consciousness, and feelings are neither objective nor measurable and, therefore, not appropriate subject matter for psychology. Furthermore, Skinner argued that these concepts are not needed in order to explain behavior. One can explain behavior, he claimed, by analyzing the conditions that are present before a behavior occurs and then analyzing the consequences that follow the behavior.

Skinner's research on *operant conditioning* emphasized the importance of reinforcement in learning as well as in shaping and maintaining behavior. He maintained that any behavior that is reinforced (followed by pleasant or rewarding consequences) is more likely to be performed again. Skinner's work has had a powerful influence on modern psychology. You will read more about operant conditioning in Chapter 5.

**behaviorism** The school of psychology founded by John B. Watson that views observable, measurable behavior as the appropriate subject matter for psychology and emphasizes the key role of environment as a determinant of behavior.

### 1.6 How do behaviorists explain behavior and mental processes?



▲ Behaviorist B. F. Skinner claimed that any behavior is best understood by analyzing the conditions that are present before it occurs and by analyzing the consequences that follow the behavior. How would you apply this concept to the behavior of using an umbrella?

### 1.7 What do psychoanalytic psychologists believe about the role of the unconscious?

**psychoanalysis** (SY-ko-ah-NAL-ih-sis) The term Freud used for both his theory of personality and his therapy for the treatment of psychological disorders; the unconscious is the primary focus of psychoanalytic theory.

### Psychoanalysis

Sigmund Freud (1856–1939), whose life and work you will study in Chapter 13, developed a theory of human behavior based largely on case studies of his patients. Freud's theory, **psychoanalysis**, maintains that human mental life is like an iceberg. The smallest, visible part of the iceberg represents the conscious mental experience of the individual. But underwater, hidden from view, floats a vast store of unconscious impulses, wishes, and desires. Freud insisted that individuals do not consciously control their thoughts, feelings, and behavior; these are instead determined by unconscious forces.

Freud believed that the unconscious is the storehouse for material that threatens the conscious life of the individual—disturbing sexual and aggressive impulses as well as traumatic experiences that have been repressed, or pushed down, to the unconscious. Once there, rather than resting quietly (out of sight, out of mind), the unconscious material festers and seethes.

The overriding importance that Freud placed on sexual and aggressive impulses caused much controversy both inside and outside the field of psychology. The most notable of Freud's famous students—Carl Jung, Alfred Adler, and Karen Horney—broke away from their mentor and developed their own theories of personality. These three and their followers are often collectively referred to as *neo-Freudians*.

The general public has heard of such concepts as the unconscious, repression, rationalization, and the Freudian slip. Such familiarity has made Sigmund Freud a larger-than-life figure rather than an obscure Austrian doctor resting within the dusty pages of history. Although Freud continues to influence popular culture, the volume of research on psychoanalysis has continued to diminish steadily (Robins et al., 1999). Still, the psychoanalytic approach continues to be influential, although in a form that has been modified considerably over the past several decades by the neo-Freudians.

### 1.8 According to Maslow and Rogers, what motivates human behavior and mental processes?

**humanistic psychology** The school of psychology that focuses on the uniqueness of human beings and their capacity for choice, growth, and psychological health.

### Humanistic Psychology

Humanistic psychologists reject with equal vigor (1) the behaviorist view that behavior is determined by factors in the environment and (2) the pessimistic view of the psychoanalytic approach, that human behavior is determined primarily by unconscious forces. **Humanistic psychology** focuses on the uniqueness of human beings and their capacity for choice, growth, and psychological health.

Abraham Maslow (1908–1970) and other early humanists, such as Carl Rogers (1902–1987), pointed out that Freud based his theory primarily on data from his disturbed patients. By contrast, the humanists emphasize a much more positive view of human nature. They maintain that people are innately good and that they possess free will. The humanists believe that people are capable of making conscious, rational choices, which can lead to personal growth and psychological health.

As you will learn in Chapter 13, Maslow proposed a theory of motivation that consists of a hierarchy of needs. He considered the need for *self-actualization* (developing to one's fullest potential) to be the highest need on the hierarchy. Carl Rogers developed what he called *person-centered therapy*, an approach in which the client, or patient, directs a discussion focused on his or her own view of a problem rather than on the therapist's analysis. Rogers and other humanists also popularized group therapy as part of the human potential movement. Thus, the humanistic perspective continues to be important in research examining human motivation and in the practice of psychotherapy.

### 1.9 What is the focus of cognitive psychology?

**cognitive psychology** The school of psychology that views humans as active participants in their environment; studies mental processes such as memory, problem solving, reasoning, decision making, perception, language, and other forms of cognition.

### Cognitive Psychology

Cognitive psychology grew and developed partly in response to strict behaviorism, especially in the United States (Robins et al., 1999). **Cognitive psychology** views humans not as passive recipients who are pushed and pulled by environmental forces, but as active participants who seek out experiences, who alter and shape those experiences, and who use mental processes to transform information in the course of their own cognitive development. It studies mental processes such as memory, problem solving, reasoning, decision making, perception, language, and other forms of cognition. Historically, modern cognitive psychology is derived from two streams of

thought: one that began with a small group of German scientists studying human perception in the early 20th century and another that grew up alongside the emerging field of computer science in the second half of the century.

**GESTALT PSYCHOLOGY.** *Gestalt psychology* made its appearance in Germany in 1912. The Gestalt psychologists, notably Max Wertheimer, Kurt Koffka, and Wolfgang Köhler, emphasized that individuals perceive objects and patterns as whole units and that the perceived whole is more than the sum of its parts. The German word *Gestalt* roughly means “whole, form, or pattern.”

To support the Gestalt theory, Wertheimer, the leader of the Gestalt psychologists, performed his famous experiment demonstrating the *phi phenomenon*. In this experiment, two light bulbs are placed a short distance apart in a dark room. The first light is flashed on and then turned off just as the second light is flashed on. As this pattern of flashing the lights on and off continues, an observer sees what appears to be a single light moving back and forth from one position to another. Here, said the Gestaltists, is proof that people perceive wholes or patterns rather than collections of separate sensations.

When the Nazis came to power in Germany in the 1930s, the Gestalt school disbanded, and its most prominent members emigrated to the United States. Today, the fundamental concept underlying Gestalt psychology—that the mind *interprets* experiences in predictable ways rather than simply reacts to them—is central to cognitive psychologists’ ideas about learning, memory, problem solving, and even psychotherapy.

**INFORMATION-PROCESSING THEORY.** The advent of the computer provided cognitive psychologists with a new way to conceptualize mental structures and processes known as *information-processing theory*. According to this view, the brain processes information in sequential steps, in much the same way as a computer does serial processing—that is, one step at a time. However, just as modern technology has changed computers and computer programs, cognitive psychologists also have changed their models. For example, many contemporary researchers are examining the human memory system’s capacity for *parallel processing*, the management of multiple bits of information at once, a type of information processing that is commonly used in today’s computers (Bajic & Rickard, 2009; Sung, 2008).

A central idea of information-processing theory, which it shares with Gestalt psychology, is that the brain interprets information rather than just responding to it. For example, consider this statement: *The old woman was sweeping the steps.* If information-processing researchers ask people who have read the sentence to recall whether it includes the word *broom*, a majority will say that it does. According to information-processing theorists, rules for handling information lead us to find associations between new input, such as the statement about a woman sweeping, and previously acquired knowledge, such as our understanding that brooms are used for sweeping. As a result, most of us construct a memory of the sentence that leads us to incorrectly recall that it includes the word *broom*.

Designing computer programs that can process human language in the same way as the human brain is one of the goals of research on *artificial intelligence*. Today, such research represents one of the most important applications of information-processing theory.

**COGNITIVE PSYCHOLOGY TODAY.** Over the past 100 years or so, cognitive psychologists have carried out studies that have greatly increased our knowledge of the human memory system and the mental processes involved in problem solving. Moreover, the principles discovered in these experiments have been used to explain and study all kinds of psychological variables—from gender role development to individual differences in intelligence. As a result, cognitive psychology is currently recognized as one of the most prominent schools of psychological thought (Robins et al., 1999).



▲ Is this person having a bad day? The perceptual processes described by the Gestalt psychologists are observable in everyday life. We often put frustrating events—such as getting up late and then having a flat tire—together to form a “whole” concept, such as “I’m having a bad day.”

**Gestalt psychology** The school of psychology that emphasizes that individuals perceive objects and patterns as whole units and that the perceived whole is more than the sum of its parts.

**information-processing theory** An approach to the study of mental structures and processes that uses the computer as a model for human thinking.

### 1.10 What is the main idea behind evolutionary psychology?

► According to evolutionary psychology, natural selection has provided infants and caregivers with a built-in genetic predisposition to form an emotional attachment to one another because such bonds help infants survive.

### Evolutionary Psychology

Why do you think all healthy babies form attachments to their primary caregivers? Why do you think most men prefer mates who are younger than they are? These are the kinds of questions that interest *evolutionary psychologists*. **Evolutionary psychology** focuses on how the human behaviors required for survival have adapted in the face of environmental pressures over the long course of evolution (Archer, 1996). As such, evolutionary psychology draws heavily upon Charles Darwin's theory of natural selection. Darwin's theory asserts that individual members of a given species who possess characteristics that help them survive are the most likely to pass on the genes underlying those characteristics to subsequent generations. As a result, traits that support individual survival become universal in the species; that is, every individual member of the species has them. For example, every human being possesses the capacity to acquire language. Natural selection would explain this universality as the result of the survival advantage conferred upon humans by having an efficient means of communicating information from one person to another.



**evolutionary psychology** The school of psychology that studies how humans have adapted the behaviors required for survival in the face of environmental pressures over the long course of evolution.

### 1.11 How is biological psychology changing the field of psychology?

**biological psychology** The school of psychology that looks for links between specific behaviors and equally specific biological processes that often help explain individual differences.

Evolutionary psychology has been called, simply, a combination of evolutionary biology and cognitive psychology (Barker, 2006; Evans & Zarate, 2000). Two widely recognized proponents of evolutionary psychology, Leda Cosmides and John Tooby, hold that this perspective combines the forces of evolutionary biology, anthropology, cognitive psychology, and neuroscience. They explain that an evolutionary perspective can be applied to any topic within the field of psychology (Tooby & Cosmides, 2005). For example, one of the most influential evolutionary psychologists, David Buss, and his colleagues have conducted a number of fascinating studies examining men's and women's patterns of behavior in romantic relationships (1999, 2000a, 2000b, 2001, 2008). You'll read more about Buss's work and that of his critics in Chapter 11.

### Biological (Physiological) Psychology

Sometimes students are confused about the difference between evolutionary psychology and **biological psychology** (also referred to as *physiological psychology*). After all, many think, isn't evolution "biological" in nature? Yes, it is, but evolutionary psychology provides explanations of how certain biologically based behaviors came to be common in an entire species. Consequently, it focuses on *universals*, traits that exist in every member of a species. For instance, language is a human universal.

By contrast, biological psychologists look for links between specific behaviors and particular biological factors that often help explain *individual differences*. They study the structures of the brain and central nervous system, the functioning of neurons, the delicate balance of neurotransmitters and hormones, and the effects of heredity to look for links between these biological factors and behavior. For example, the number of ear infections children have in the first year of life (a *biological* individual difference) is correlated with learning disabilities in the elementary school years (a *behavioral* individual difference) (Golz et al., 2005).

Many biological psychologists work under the umbrella of an interdisciplinary field known as **neuroscience**. Neuroscience combines the work of psychologists, biologists, biochemists, medical researchers, and others in the study of the structure and function of the nervous system. Important findings in psychology have resulted from this work. For example, researchers have learned that defects in nerve cell membranes interfere with the cells' ability to make use of brain chemicals that help us control body

**neuroscience** An interdisciplinary field that combines the work of psychologists, biologists, biochemists, medical researchers, and others in the study of the structure and function of the nervous system.

movement (Kurup & Kurup, 2002). These findings shed light on the physiological processes underlying serious neurological disorders such as Parkinson's disease and help pharmacological researchers in their efforts to create more effective medications for these disorders. And the recently completed map of the human genome promises to provide new explanations for many mental illnesses (Plomin et al., 2003).

### The Sociocultural Approach

How do your background and cultural experiences affect your behavior and mental processing? Just as important as the current trend toward biological explanations is the growing realization among psychologists that social and cultural forces may be as powerful as evolutionary and physiological factors. The **sociocultural approach** emphasizes social and cultural influences on human behavior and stresses the importance of understanding those influences when interpreting the behavior of others. For example, several psychologists (e.g., Tweed & Lehman, 2002) have researched philosophical differences between Asian and Western cultures that may help explain cross-national achievement differences. (You will learn more about their findings in Chapter 7.) Other socioculturally oriented psychologists have done studies that challenge the view that Asians are a "model minority" whose cultural values enable most or all of them to attain high levels of achievement no matter what kinds of environmental obstacles (e.g., poverty) are present in their lives (Lew, 2006).

Social and cultural influences on behavior are often studied within the broader context of a *systems perspective*. The primary idea behind the systems approach is that multiple factors work together holistically; that is, their combined, interactive influences on behavior are greater than the sum of the individual factors that make up the system. A good example of the systems approach may be found in a theory proposed by psychologist Gerald Patterson and his colleagues that explains how variables interact to predispose some teenagers to antisocial behavior (Granic & Patterson, 2006). This systems approach argues that poverty (a sociocultural factor), for example, is predictive of juvenile delinquency, but, in and of itself, it is insufficient to produce the behavior. As a result, most teens from poor families do not engage in antisocial behavior. However, poverty may function as part of a system of influential variables that includes disengagement from school, association with peers who encourage antisocial behavior, lack of parental supervision, and a host of other variables to increase the risk of antisocial behavior for individual teenagers. At the same time, these variables interact to maintain themselves and, in some cases, to create a multigenerational cycle. For instance, disengagement from school increases the likelihood that teenagers will live in poverty when they reach adulthood. Poverty, in turn, increases the chances that they will have to work long hours, rendering them less able to supervise their own children's behavior, thus putting another generation at risk for antisocial behavior.

**1.12** What kinds of variables interest psychologists who take a sociocultural approach?

**sociocultural approach** The view that social and cultural factors may be just as powerful as evolutionary and physiological factors in affecting behavior and mental processing and that these factors must be understood when interpreting the behavior of others.



◀ A sociocultural approach helps psychologists explain cross-cultural differences in behavior. For example, how would a transaction like this one be different if it took place in New York City?

### 1.13 What are psychological perspectives, and how are they related to an eclectic position?

#### psychological perspectives

General points of view used for explaining people's behavior and thinking, whether normal or abnormal.

### Psychological Perspectives and Eclecticism

The views of modern psychologists are frequently difficult to categorize into traditional schools of thought. Thus, rather than discussing schools of thought, it is often more useful to refer to **psychological perspectives**—general points of view used for explaining people's behavior and thinking, whether normal or abnormal. So, for example, a psychologist may adopt a behavioral perspective without necessarily agreeing with all of Watson's or Skinner's ideas. What is important is that the psychologist taking such a view will explain behavior in terms of environmental forces.

The major perspectives in psychology today and the kinds of variables each emphasizes in explaining behavior are as follows:

- *Behavioral perspective*—environmental factors
- *Psychoanalytic perspective*—emotions, unconscious motivations, early childhood experiences
- *Humanistic perspective*—subjective experiences, intrinsic motivation to achieve self-actualization
- *Cognitive perspective*—mental processes
- *Evolutionary perspective*—inherited traits that enhance adaptability
- *Biological perspective*—biological structures, processes, heredity
- *Sociocultural perspective*—social and cultural variables

*Review It* lists these perspectives along with an illustration of how each might explain a student's poor performance on exams.

### review it ▾

#### MAJOR PERSPECTIVES IN PSYCHOLOGY

| Perspective    | Emphasis   | Explanation of a Student's Poor Performance on Exams  |
|----------------|--|---|
| Behavioral     | The role of environment in shaping and controlling behavior  | The student has not been reinforced for getting good grades in the past.  |
| Psychoanalytic | The role of unconscious motivation and early childhood experiences in determining behavior and thought | An unresolved early childhood emotional trauma is distracting the student from academic work.   |
| Humanistic     | The importance of an individual's subjective experience as a key to understanding his or her behavior  | Studying for exams does not fit into the student's definition of a meaningful life.   |
| Cognitive      | The role of mental processes—i.e. perception, thinking, and memory—that underlie behavior              | The student does not use effective learning strategies such as the SQ3R method.   |
| Evolutionary   | The roles of inherited tendencies that have proven adaptive in humans                                  | The student believes that studying is unimportant because potential mates are more interested in the student's physical appearance and capacity for social dominance than they are in grades. |
| Biological     | The role of biological processes and structures, as well as heredity, in explaining behavior           | An inappropriate level of emotional arousal (i.e., test anxiety) is preventing the student from performing at an optimal level.   |
| Sociocultural  | The roles of social and cultural influences on behavior  | Not wanting to be perceived as a "nerd," the student studies just enough to avoid failing.  |

Psychologists need not limit themselves to only one perspective or approach. Many take an *eclectic* (or integrative) *position*, choosing a combination of approaches to explain a particular behavior (Norcross, Karpiak, & Lister, 2005). For example, a psychologist may explain a behavior in terms of both environmental factors and unconscious motivation. A child's unruly behavior in school may be seen as maintained by teacher attention (a behavioral explanation) but as initially caused by an emotional reaction to a family event such as divorce (a psychoanalytic explanation). By adopting multiple perspectives, psychologists are able to devise more complex theories and research studies, resulting in improved treatment strategies. In this way, their theories and studies can more closely mirror the behavior of real people in real situations.

### remember it ▾

### SCHOOLS OF THOUGHT IN PSYCHOLOGY

1. Match the school of psychology with its major emphasis:
 

|                          |   |                                  |   |
|--------------------------|---|----------------------------------|---|
| <input type="checkbox"/> | (1) the scientific study of behavior                                      | a. Gestalt                       | A(n) _____ psychologist would be interested in the relationship between hormones and aggressive behavior.                         |
| <input type="checkbox"/> | (2) the perception of whole units or patterns                             | b. humanistic                    | 4. Which of the following statements represent an eclectic position?  |
| <input type="checkbox"/> | (3) the study of the unconscious  | c. cognitive                     | a. Individual differences in aggression are genetic, but parents and teachers can teach highly aggressive children to be less so. |
| <input type="checkbox"/> | (4) the use of the computer as a model for human cognition                | d. behaviorism                   | b. Children who are highly aggressive have not received enough punishment for their inappropriate behavior.                       |
| <input type="checkbox"/> | (5) the uniqueness of human beings and their capacity for personal growth | e. information-processing theory | c. Aggressive children are probably using aggression to release pent-up feelings of frustration.                                  |
| <input type="checkbox"/> | (6) the study of mental processes   | f. psychoanalysis                | d. Going through a trauma like parental divorce may lead to increased aggression in children because they are feeling anxious.    |
2. A(n) \_\_\_\_\_ psychologist would be interested in whether attachment is a universal feature of infant-caregiver relations.

ANSWERS: 1. (1) d, (2) a, (3) f, (4) e, (5) b, (6) c; 2. evolutionary; 3. biological;



## Thinking about Theories and Research

Whenever we discuss theories, students want to know which are "true" and which are "false." However, psychologists and other scientists don't think about theories in this way. Instead, they evaluate theories in terms of their usefulness with regard to the scientific method. Remember, the scientific method involves a systematic approach to finding answers to important questions and is an integral part of our everyday thinking. Still, we can all benefit from practicing it to a greater extent than we ordinarily do. By practicing scientific thinking, we can develop a set of tools to use when we are confronted by sensational media reports about the results of a new study.

### Evaluating Theories

### 1.14 How do psychologists evaluate theories?

Sometimes students wonder why we should bother with theories. Why not just report the facts, many ask. As you learned earlier in the chapter, theories provide us with explanations for facts, so they are indispensable to the scientific method. Clearly, though, some theories do a better job of explaining data than others. There are several criteria for determining this, what makes one theory useful and another less so.

The degree to which a theory leads to testable hypotheses is perhaps the most important criterion for judging its usefulness. When you use this standard to think about the theories discussed so far, those of behaviorists and cognitive psychologists appear more useful than those of psychoanalysts and humanists. B. F. Skinner's prediction that reinforcement increases behavior, for example, is far more testable than Maslow's claim that self-actualization is the highest of all human needs.

Useful theories also lead to the development of solutions to real-world problems. For instance, research based on the information-processing model has resulted in the

development of practical strategies for improving memory. Similarly, even though psychoanalytic and humanistic theories have been criticized for lacking testability, they have produced a number of beneficial psychotherapies.

Hypotheses and practical applications are important, but a theory that possesses *heuristic value* is useful even if it falls short in these two areas. A theory that has heuristic value stimulates debate among psychologists and motivates both proponents and opponents of the theory to pursue research related to it. In other words, a theory that possesses heuristic value makes people think and spurs their curiosity and creativity.

All the theories discussed so far earn high marks for their heuristic value. In fact, even if a theory has limited empirical support, professors who teach introductory psychology are justified in including it in the course if it has been of heuristic importance in the field. This is why we still teach about the structuralists and functionalists, and why we continue to rate Freud's theory as one of the most important in the field. Moreover, such theories usually affect students in the same way that they affect psychologists—that is, learning about them stimulates students' thinking about behavior and mental processes. Thus, introducing these theories helps professors achieve one of their most important instructional goals, that of motivating students to think critically.

### 1.15 How can critical thinking be used to interpret media reports of psychological research?

## Evaluating Research

Another important goal of most professors who teach introductory psychology is to equip students with the intellectual tools needed to evaluate claims based on psychological research. Living in the Information Age, we are bombarded with statistics and claims of all types every day. For instance, a few years back the news media carried a number of reports warning parents of young children that watching too much television in the early years of life might lead to attention deficit/hyperactivity disorder (ADHD) later in childhood (Clayton, 2004). These warnings were based, reporters said, on a scientific study that was published in the prestigious journal *Pediatrics*. How can a person who is not an expert on the subject in question evaluate claims such as these?

The thinking strategies used by psychologists and other scientists can help us sift through this kind of information. **Critical thinking**, the foundation of the scientific method, is the process of objectively evaluating claims, propositions, and conclusions to determine whether they follow logically from the evidence presented. When we engage in critical thinking, we exhibit these characteristics:

- *Independent thinking*. When thinking critically, we do not automatically accept and believe what we read or hear.
- *Suspension of judgment*. Critical thinking requires gathering relevant and up-to-date information on all sides of an issue before taking a position.
- *Willingness to modify or abandon prior judgments*. Critical thinking involves evaluating new evidence, even when it contradicts preexisting beliefs.

### Explore on MyPsychLab

Applying the first of these three characteristics to the television-ADHD study requires recognizing that the validity of any study is not determined by the authority of its source. Prestigious journals—or psychology textbooks for that matter—shouldn't be regarded as sources of fixed, immutable truths. In fact, learning to question accepted “truths” is important to the scientific method itself. For example, for many years scientists believed that the brain did not develop any new nerve cells after birth. However, once the technology became available to directly study neuronal development, researchers who were willing to challenge the status quo found that the brain produces new nerve cells throughout the life span (Gould et al., 1999).

The second and third characteristics of critical thinking, suspension of judgment and willingness to change, may require abandoning some old habits. If you are like most people, you respond to media reports about research on the basis of your own personal experiences, a type of evidence scientists call *anecdotal evidence*. For instance, in response to the media report about television and ADHD, a person might say, “I agree with that study because my cousin has such severe ADHD that he had to drop out of high school, and he was always glued to the television when he was little.” Another might counter, “I don’t agree with that study because I watched a lot of television when I was a kid, and I don’t have ADHD.”



Suspension of judgment requires that you postpone either accepting or rejecting the study's findings until you have accumulated more evidence. It might involve determining what, if any, findings have been reported by other researchers regarding a possible link between television viewing and ADHD. Analysis of other relevant studies can help to create a comprehensive picture of what the entire body of research says about the issue. Ultimately, when enough evidence has been gathered, a critical thinker must be willing to abandon preconceived notions and prior beliefs that conflict with it.

Critical thinking strategies can also help us recognize **pseudoscience**, the distortion of theories and/or research for the purpose of supporting some kind of claim. There is no widely accepted definition of pseudoscience that clearly distinguishes it from true science (McNally, 2003). However, there are several telltale signs that critical thinkers can use to identify pseudoscientific claims (Lilienfeld, Lynn, & Lohr, 2004).

 Watch on MyPsychLab

Imagine, for example, seeing a television commercial for "Rememberitol," a (fictitious) nutritional supplement that claims to improve memory function. The ad consists of a series of video clips showing people in situations where they are trying to remember something. One clip features an older woman who has forgotten where she parked her car. Another shows a college student trying to study. Yet another shows a middle-aged man trying to remember a phone number. The voice-over says: "Rememberitol boosts memory function by stimulating your brain's memory cells. Rememberitol keeps these cells alert and ready to latch on to information you need to remember whenever it comes along."

In the next series of clips, satisfied Rememberitol customers make statements such as, "I thought I was developing Alzheimer's disease, but thanks to Rememberitol, I'm back to my old self again," and "My GPA went from 2.5 to 4.0 after I started taking Rememberitol," and "I missed a big sale because I couldn't remember my client's phone number. Thanks to Rememberitol, that'll never happen again." Finally, a woman wearing a white coat and standing in a laboratory is introduced as a "distinguished memory researcher." She states that her studies show that Rememberitol improves memory function and that viewers can access her results at Rememberitol.com.

Frankly, few of us would be fooled by the Rememberitol ad and we would file it away in our mind's "too good to be true" folder. But what is it about the ad that makes it pseudoscientific? There are three strong indicators (Lilienfeld et al., 2004). First, the phrase "your brain's memory cells" gives Rememberitol the appearance of having some basis in science. Second, the "distinguished memory researcher" directs viewers' attention only to research that supports the claims of Rememberitol's makers. An authentic scientific presentation of research would also point to studies showing that nutritional supplementation does not improve memory function (e.g., DeKosky et al., 2008). So, like the phrase "your brain's memory cells," the researcher's endorsement employs the symbols of science but lacks its substance. Finally, the ad offers anecdotal evidence in support of its claims, a type of evidence that, as we noted earlier, is subjective and unreliable.

As you can see, when it comes to knowing how to interpret the research findings we hear and read about, critical thinking strategies are a useful intellectual tool. Understanding the methods that scientists use can provide us with still more help in evaluating media reports about research. In the next few sections we will introduce you to several of those methods.

**remember it ▾**

**THINKING ABOUT THEORIES AND RESEARCH**

1. A theory that generates debate among psychologists is said to have \_\_\_\_\_ value.
2. Useful theories provide researchers with \_\_\_\_\_ hypotheses.
3. Willingness to change one's prior beliefs is a component of critical thinking about research. (true/false)
4. Critical thinking about media reports of research requires some familiarity with \_\_\_\_\_.
5. Using scientific-sounding terms to convince consumers that a product is supported by research is a feature of \_\_\_\_\_.



**descriptive research methods** Research methods that yield descriptions of behavior.

### 1.16 How do psychological researchers use naturalistic and laboratory observation?

**naturalistic observation** A descriptive research method in which researchers observe and record behavior in its natural setting, without attempting to influence or control it.



▲ Naturalistic observation plays an important role in studies of animal behavior.

**laboratory observation** A descriptive research method in which behavior is studied in a laboratory setting, where researchers can exert more control and use more precise equipment to measure responses.

**case study** A descriptive research method in which a single person or a small number of individuals are studied in great depth, usually over an extended period of time.

### 1.17 What are the advantages and disadvantages of the case study?

## Descriptive Research Methods

What is the simplest kind of research? Research that involves direct observation is usually easy to perform and often provides the clearest results. **Descriptive research methods** yield descriptions of behavior and include naturalistic and laboratory observation, the case study, the survey, and the correlational method.

### Naturalistic and Laboratory Observation

Have you ever sat in an airport or shopping mall and simply watched what people were doing? Such an activity is quite similar to **naturalistic observation**, a descriptive research method in which researchers observe and record behavior in its natural setting, without attempting to influence or control it. The major advantage of naturalistic observation is the opportunity to study behavior in normal settings, where it occurs more naturally and spontaneously than it does under artificial and contrived laboratory conditions. Sometimes, naturalistic observation is the only feasible way to study behavior. For example, there is no other way to study how people typically react during disasters such as earthquakes and fires.

Naturalistic observation has its limitations, however. Researchers must wait for events to occur; they cannot speed up or slow down the process. And because they have no control over the situation, researchers cannot reach conclusions about cause-effect relationships. Another potential problem with naturalistic observation is *observer bias*, which is a distortion in researchers' observations. Observer bias can result when researchers' expectations about a situation cause them to see what they expect to see or to make incorrect inferences about what they observe. Let's say, for example, that you're a psychologist studying aggression in preschool classrooms. You have decided to count every time a child hits or pushes another child as an aggressive act. Your decision to label this type of physical contact between children as "aggressive" may cause you to notice more such acts and label them as "aggressive" than you would if you were casually watching a group of children play. The effects of observer bias can be reduced substantially when two or more observers view the same behavior. So, if you and another observer independently count, say, 23 aggressive acts in an hour of free play, the findings are considered unbiased. If, on the other hand, you see 30 such acts and the other observer records only 15,

there is some kind of bias at work. In such situations, observers usually clarify the criteria for classifying behavior and repeat the observations. Using videotapes can also help eliminate observer bias because behavior can be reviewed several times prior to making classification decisions.

Another method of studying behavior involves observation that takes place not in its natural setting, but in a laboratory. Researchers using **laboratory observation** can exert more control and use more precise equipment to measure responses. Much of what is known about sleep or the human sexual response, for example, has been learned through laboratory observation. However, like other research methods, laboratory observation has limitations. For one, laboratory behavior may not accurately reflect real-world behavior. For example, in sleep studies, some of the behavior people display while asleep in the laboratory may not occur in their homes. As a result, conclusions based on laboratory findings may not generalize beyond the walls of the laboratory itself. Another disadvantage is that building, staffing, equipping, and maintaining research laboratories can be expensive.

### The Case Study

The **case study**, or case history, is another descriptive research method used by psychologists. In a case study, a single person or a small number of individuals are studied in great depth, usually over an extended period of time. A case study involves the use of observations, interviews, and sometimes psychological testing. Exploratory in

nature, the case study's purpose is to provide a detailed description of some behavior or disorder. This method is particularly appropriate for studying people who have uncommon psychological or physiological disorders or brain injuries. Many case studies are written about patients being treated for such problems. In some instances, the results of detailed case studies have provided the foundation for psychological theories. In particular, the theory of Sigmund Freud was based primarily on case studies of his patients.

Although the case study has proven useful in advancing knowledge in several areas of psychology, it has certain limitations. Researchers cannot establish the cause of behavior observed in a case study, and observer bias is a potential problem. Moreover, because so few individuals are studied, researchers do not know how applicable, or generalizable, their findings may be to larger groups or to different cultures.

## Survey Research ▶

Have you ever been questioned about your voting behavior or about the kind of toothpaste you prefer? If you have, chances are that you were a participant in another kind of research study. The **survey** is a descriptive research method in which researchers use interviews and/or questionnaires to gather information about the attitudes, beliefs, experiences, or behaviors of a group of people. The results of carefully conducted surveys have provided valuable information about drug use, sexual behavior, and the incidence of various mental disorders.

**SELECTING A SAMPLE.** Researchers in psychology rarely conduct studies using all members of a group. For example, researchers interested in studying the sexual behavior of American women do not survey every woman in the United States. (Imagine trying to interview about 140 million people!) Instead of studying the whole **population** (the entire group of interest to researchers, to which they wish to apply their findings), researchers select a sample for study. A **sample** is a part of a population that is studied in order to reach conclusions about the entire population.

Perhaps you have seen a carton of ice cream that contains three separate flavors—chocolate, strawberry, and vanilla—packed side by side. To properly sample the carton, you would need a small amount of ice cream containing all three flavors in the same proportions as in the whole carton—a representative sample. A **representative sample** mirrors the population of interest—that is, it includes important subgroups in the same proportions as they are found in that population (see the *Try It* on page 20). A *biased sample*, on the other hand, does not adequately reflect the larger population.

The best method for obtaining a representative sample is to select a *random sample* from a list of all members of the population of interest. Individuals are selected in such a way that every member of the larger population has an equal chance of being included in the sample. Using random samples, polling organizations can accurately represent the views of the American public with responses from as few as 1,000 people (O'Brien, 1996).

**INTERVIEWS AND QUESTIONNAIRES.** Survey results can be affected by the questions' wording and the context for the survey (Schwartz, 1999). Also, the truthfulness of the responses can be affected by characteristics of the interviewers, such as their gender, age, race, ethnicity, religion, social class, and accent. In general, people are most inhibited when they give personal information to interviewers who are of the

**survey** A descriptive research method in which researchers use interviews and/or questionnaires to gather information about the attitudes, beliefs, experiences, or behaviors of a group of people.

**population** The entire group of interest to researchers, to which they wish to generalize their findings; the group from which a sample is selected.

**sample** A part of a population that is studied in order to reach conclusions about the entire population.

**1.18** How do researchers ensure that survey results are useful?



▲ Is the Hilton family *representative* of the general population of families in the United States? Why or why not?



▲ Internet surveys allow psychologists to gather lots of data from large numbers of respondents in a very short period of time. But how representative of the general population are people who respond to Internet surveys? How representative are they of Internet users in general? Questions such as these remain to be answered.

**representative sample** A sample that mirrors the population of interest; it includes important subgroups in the same proportions as they are found in that population.



### CAN SMALL SAMPLES REALLY BE REPRESENTATIVE?

Sometimes students have a hard time believing that 1,000 people or so can represent the entire population of the United States. This activity will help you see that small samples can be representative. You probably know that, when you flip a coin, the chance of getting a head or a tail is 50%. This probability is based on an infinite number of coin tosses. But how well does tossing the coin twice represent that whole population of tosses—that is, an infinite number of tosses? If a sample of two tosses (or  $n = 2$ , as a statistician would express it) doesn't represent the whole population, what about a sample of 5 or 10 or 15 or 20? To answer such a question, you have to take repeated samples of the same size. Toss a coin twice ( $n = 2$ ), and then write the number of heads and tails in the column labeled Sample 1. Repeat the process four more times, recording your results under Sample 2 the second time, under Sample 3 the third time,

and so on, until you have a total of five samples, each of which consists of two coin tosses. When the  $n = 2$  row is completely filled in, calculate the overall percentages of heads and tails. Next, use the same process to collect data on samples of  $n = 5$ ,  $n = 10$ ,  $n = 15$ , and  $n = 20$ , until you have filled the table with data.

You can see that, as  $n$  gets larger, the overall percentages of heads and tails become more balanced (closer to 50/50). However, notice also that  $n = 20$  isn't much better than  $n = 15$ , and it took a lot longer to collect five samples of 20 coin tosses each. In other words, there wasn't much gain in representativeness for the extra cost in time and energy. So, small samples can be representative, and increasing the size of a sample doesn't always pay off when costs are balanced against benefits.

| Sample size | Sample 1 |   | Sample 2 |   | Sample 3 |   | Sample 4 |   | Sample 5 |   | Overall percentages |   |
|-------------|----------|---|----------|---|----------|---|----------|---|----------|---|---------------------|---|
|             | H        | T | H        | T | H        | T | H        | T | H        | T | H                   | T |
| $n = 2$     |          |   |          |   |          |   |          |   |          |   |                     |   |
| $n = 5$     |          |   |          |   |          |   |          |   |          |   |                     |   |
| $n = 10$    |          |   |          |   |          |   |          |   |          |   |                     |   |
| $n = 15$    |          |   |          |   |          |   |          |   |          |   |                     |   |
| $n = 20$    |          |   |          |   |          |   |          |   |          |   |                     |   |

same age but the opposite sex. Survey researchers, therefore, must select interviewers who have personal characteristics that are appropriate for the intended respondents.

Questionnaires can be completed more quickly and less expensively than interviews, especially when respondents can fill them out in their homes or online. The Internet offers psychologists a fast and inexpensive way of soliciting participants and collecting questionnaire data, and Internet surveys often generate large numbers of responses (Azar, 2000). For example, an Internet survey posted by researchers who wanted to collect data about suicidal feelings attracted more than 38,000 respondents from all over the world (Mathy, 2002). However, such surveys have problems, including technical glitches that sometimes prevent respondents from completing a questionnaire. Moreover, the sample is often biased in that it represents only the population of Internet users who choose to participate in online research, *not* the general population or even the population of Internet users. The critical point to remember is that surveys in which respondents *choose* whether or not to participate—rather than being selected through some kind of random process—are not scientific.

**ADVANTAGES AND DISADVANTAGES OF SURVEY RESEARCH.** If conducted properly, surveys can provide highly accurate information. They can also track changes in attitudes or behavior over time. For example, Johnston and others (2001) have tracked drug use among high school students since 1975. However, large-scale surveys can be costly and time-consuming. Another important limitation of survey research is that respondents may provide inaccurate information. False information can result from a faulty memory or a desire to please the interviewer. Respondents may try to present themselves in a good light (a phenomenon called the *social desirability response*), or they

may even deliberately mislead the interviewer. Finally, when respondents answer questions about sensitive subjects, such as sexual behavior, they are often less candid in face-to-face interviews than in self-administered or computerized questionnaires (Tourangeau et al., 1997).

### The Correlational Method

Perhaps the most powerful descriptive method available to psychologists is the **correlational method**, a method used to establish the degree of relationship (correlation) between two characteristics, events, or behaviors. A group is selected for study, and the variables of interest are measured for each participant. For example, one researcher might examine the relationship between attainment of a college degree and subsequent income. Another might look for a correlation between the amount of time students devote to studying and their grade point averages.

Correlations are not just important to scientists, but they are also common in our everyday thinking. For example, what is the relationship between the price of a new car and the social status you gain from owning it? Isn't it true that as price goes up, status goes up as well? And isn't status one of the variables that many people take into account when buying a new car? As this example illustrates, correlations are part of our everyday lives, and we often use them in decision making.

When scientists study correlations, they apply a statistical formula to data representing two or more variables to obtain a *correlation coefficient*. A **correlation coefficient** is a numerical value that indicates the strength and direction of the relationship between two variables. A correlation coefficient ranges from +1.00 (a perfect positive correlation) to .00 (no relationship) to -1.00 (a perfect negative correlation). The number in a correlation coefficient indicates the relative strength of the relationship between two variables—the higher the number, the stronger the relationship. Therefore, a correlation of -.85 is stronger than a correlation of +.64.

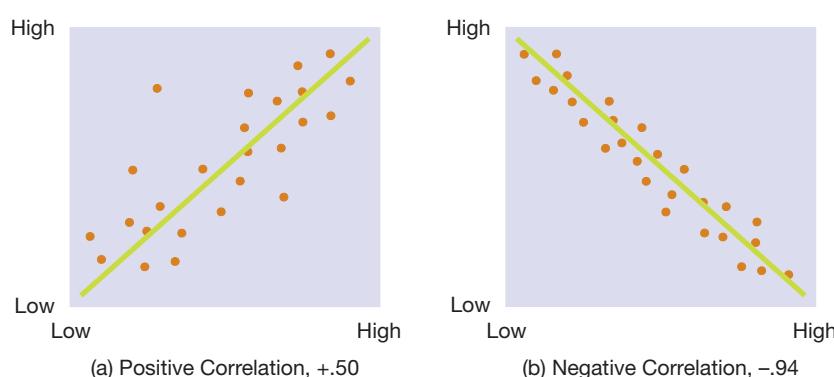
The sign of a correlation coefficient (+ or -) indicates whether the two variables vary in the same or opposite directions. A positive correlation indicates that two variables vary in the same direction, like the price of a car and its associated social status. As another example, there is a positive though weak correlation between stress and illness. When stress increases, illness is likely to increase; when stress decreases, illness tends to decrease (see **FIGURE 1.2**).

A negative correlation means that an increase in the value of one variable is associated with a decrease in the value of the other variable. For example, as mileage accu-

**1.19** What are the strengths and weaknesses of the correlational method?

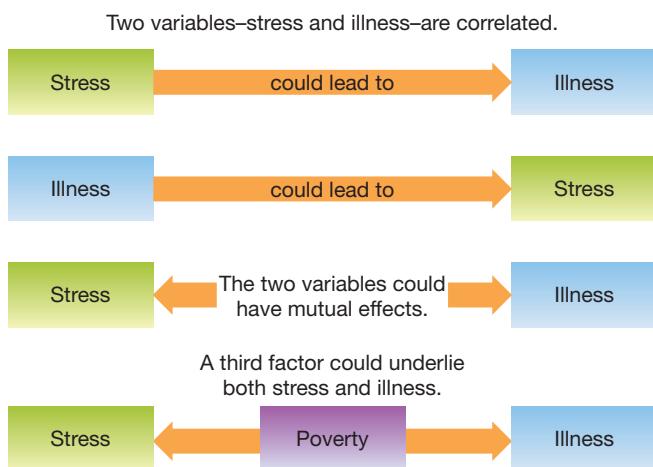
**correlational method** A research method used to establish the degree of relationship (correlation) between two characteristics, events, or behaviors.

**correlation coefficient** A numerical value that indicates the strength and direction of the relationship between two variables; ranges from +1.00 (a perfect positive correlation) to -1.00 (a perfect negative correlation).



**FIGURE 1.2** Positive and Negative Correlations

Here are two graphs showing positive and negative correlations. (a) When positively correlated scores on two variables are graphed, the points fall along a line that rises from left to right. This graph might represent two variables such as amount of time spent studying and grades on an exam. As study time goes up, exam grades go up as well. (b) When negatively correlated scores on two variables are graphed, the points follow a line that declines from left to right. This graph might represent two variables such as amount of time spent watching television and grades on an exam. As TV time goes up, grades go down.

**FIGURE 1.3** Correlation Does Not Prove Causation

A correlation between two variables does not prove that a cause-effect relationship exists between them. There is a correlation between stress and illness, but that does not mean that stress necessarily causes illness. Both stress and illness may result from another factor, such as poverty or poor general health.

mulates on a car's odometer, the less reliable it becomes. And there is a negative correlation between the number of cigarettes people smoke and the number of years they can expect to live. (For more information about correlation coefficients, see Appendix A.)

Does the fact that there is a correlation between two variables indicate that one variable causes the other? No. For instance, when two variables such as stress and illness are correlated, we cannot conclude that stress makes people sick. It might be that illness causes stress, or that a third factor such as poverty or poor general health causes people to be more susceptible to both illness and stress, as shown in **FIGURE 1.3**.

So, you might be thinking, if a researcher can't draw cause-effect conclusions, why do correlational studies? There are three reasons. One reason is that it is sometimes impossible, for ethical reasons, to study variables of interest using more direct methods. Scientists can't ethically ask pregnant women to drink alcohol just so they can find out whether it causes birth defects. The only option available in such cases is the correlational method. Researchers have to ask mothers about their drinking habits and note any association with birth defects in their

babies. Knowing the correlation between prenatal alcohol consumption and the incidence of birth defects helps scientists make predictions about what may happen when pregnant women consume alcohol.

Another reason for using the correlational method is that many variables of interest to psychologists cannot be manipulated. Everyone wants to know whether biological sex (whether one is male or female) causes the differences we observe in men's and women's behavior. But we can't assign individuals to become male or female as we might ask them to take a drug or a placebo. Again, the only option is to study the correlations between biological sex and particular variables of interest, such as cognitive functioning and personality.

Finally, correlational studies can often be done fairly quickly. By contrast, as you will learn in the section that follows, *experiments* can be time-consuming and complex. Still, the benefit of taking the time and trouble to carry out an experiment is that the researcher can draw conclusions about cause-effect relationships between variables.  **Explore on MyPsychLab**

 **Explore** Correlations Do Not Show Causation. [www.mypsychlab.com](http://www.mypsychlab.com)

## remember it ▾

### DESCRIPTIVE RESEARCH METHODS

- Which descriptive research method would be best for studying each of the following topics?
  - (1) attitudes toward racial profiling
  - (2) gender differences in how people position themselves and their belongings in the library
  - (3) physiological changes that occur during sleep
  - (4) the effects of oxygen deprivation during delivery on infant brain development
- One problem with the \_\_\_\_\_ is that it often does not generalize to individuals other than the subject of the study.
- In order to be useful, a survey must be based on a \_\_\_\_\_ sample.
- The \_\_\_\_\_ is a number describing the strength and direction of a relationship between two variables.
- In positive correlations, two variables move in \_\_\_\_\_.
- In negative correlations, two variables move in \_\_\_\_\_.
- The closer a correlation coefficient is to +1.0 or -1.0, the \_\_\_\_\_ the relationship between two variables.

ANSWERS: 1. (1) d, (2) a, (3) b, (4) c; 2. case study; 3. representative; 4. correlation coefficient; 5. the same direction; 6. opposite directions; 7. stronger

## The Experimental Method

What comes to mind when you hear the word *experiment*? Many people use the word to refer to any kind of study. Among psychologists, though, the term *experiment* refers only to one kind of study, the kind in which researchers seek to determine the causes of behavior.

### Experiments and Hypothesis Testing

The **experimental method**, or the experiment, is the *only* research method that can be used to identify cause-effect relationships. An experiment is designed to test a **causal hypothesis**—a prediction about a cause-effect relationship between two or more variables. A **variable** is any condition or factor that can be manipulated, controlled, or measured. One variable of interest to you is the grade you will receive in this psychology course. Another variable that probably interests you is the amount of time you will spend studying for this course. Do you suppose there is a cause-effect relationship between the amount of time students spend studying and the grades they receive? Consider two other variables: alcohol consumption and aggression. Alcohol consumption and aggressive behavior are often observed occurring at the same time. But can we assume that alcohol consumption *causes* aggressive behavior?

Alan Lang and his colleagues (1975) conducted a classic experiment to determine if alcohol consumption itself increases aggression or if the beliefs or expectations about the effects of alcohol cause the aggressive behavior. The participants in the experiment were 96 male college students who were classified as heavy social drinkers. Half the students were given plain tonic to drink; the other half were given a vodka-and-tonic drink in amounts sufficient to raise their blood alcohol level to .10, which is higher than the .08 level that is the legal limit for intoxication in most states. Participants were assigned to four groups:

- Group 1: Expected alcohol, received only tonic
- Group 2: Expected alcohol, received alcohol mixed with tonic
- Group 3: Expected tonic, received alcohol mixed with tonic
- Group 4: Expected tonic, received only tonic

You might think that heavy social drinkers could detect the difference between plain tonic and a one-to-five mixture of vodka and tonic. But during a preliminary study, drinkers could distinguish between the two with no more than 50% accuracy (Marlatt & Rohsenow, 1981).

After the students had consumed the designated amount, the researchers had an accomplice, who posed as a participant, purposely provoke half the students by belittling their performance on a difficult task. All the students then participated in a learning experiment, in which the same accomplice posed as the learner. The subjects were told to administer an electric shock to the accomplice each time he made a mistake on a decoding task. Each participant was allowed to determine the intensity and duration of the “shock.” (Although the students thought they were shocking the accomplice, no shocks were actually delivered.) The researchers measured the aggressiveness of the students in terms of the duration and the intensity of the shocks they chose to deliver.

What were the results of the experiment? As you might imagine, the students who had been provoked gave the accomplice stronger shocks than those who had not been provoked. But the students who drank the alcohol were not necessarily the most aggressive. Regardless of the actual content of their drinks, the participants who thought they were drinking alcohol gave significantly stronger shocks, whether provoked or not, than those who assumed

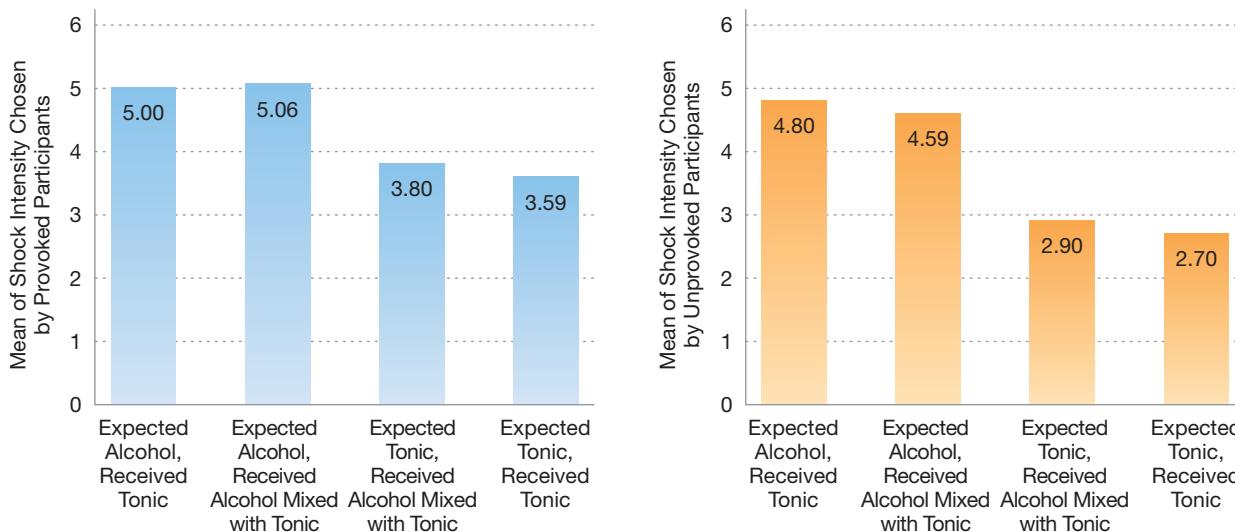
**1.20** Why do researchers use experiments to test hypotheses about cause-effect relationships?

**experimental method** The only research method that can be used to identify cause-effect relationships between two or more conditions or variables.

**causal hypothesis** A prediction about a cause-effect relationship between two or more variables.



▲ Under what conditions might the happy, party mood of these young drinkers turn aggressive?



**FIGURE 1.4** The Mean Shock Intensity Chosen by Provoked and Unprovoked Participants

In the Lang experiment, participants who thought they were drinking alcohol chose to give significantly stronger shocks, whether provoked or not, than those who believed they were drinking only tonic.

Source: Data from Lang et al. (1975).

they were drinking only tonic (see FIGURE 1.4). The researchers concluded that it was the *expectation* of drinking alcohol, not the alcohol itself, that caused the students to be more aggressive.

### 1.21 How do independent and dependent variables differ?

**independent variable** In an experiment, a factor or condition that is deliberately manipulated in order to determine whether it causes any change in another behavior or condition.

**dependent variable** The factor or condition that is measured at the end of an experiment and is presumed to vary as a result of the manipulations of the independent variable(s).

→ Simulate Distinguishing Independent and Dependent Variables. [www.mypsychlab.com](http://www.mypsychlab.com)

### 1.22 Why are experimental and control groups necessary?

**experimental group** In an experiment, the group that is exposed to an independent variable.

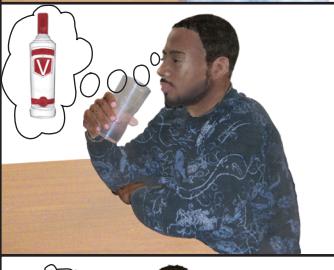
### Independent and Dependent Variables

Recall that experiments test hypotheses about cause and effect. Examples of such hypotheses include “Studying causes good grades” and “Taking aspirin causes headaches to go away.” Note that each hypothesis involves two variables: One is thought to be the cause (studying, taking aspirin), and the other is thought to be affected by the cause. These two kinds of variables are found in all experiments. An experiment has at least one **independent variable**—a variable that the researcher believes causes a change in some other variable. The researcher deliberately manipulates the independent variable (hypothesized cause) in order to determine whether it causes any change in another behavior or condition. Sometimes the independent variable is referred to as the *treatment*. The Lang experiment had two independent variables: the alcoholic content of the drink and the expectation of drinking alcohol.

The second type of variable found in all experiments, the one that the hypothesis states is affected by the independent variable, is the **dependent variable**. It is measured at the end of the experiment and is presumed to vary (increase or decrease) as a result of the manipulations of the independent variable(s). Researchers must provide operational definitions of all variables in an experiment—that is, they must specify precisely how the variables will be observed and measured. In the Lang study, the dependent variable—aggression—was operationally defined as the intensity and duration of the “shocks” the participants chose to deliver to the accomplice. → Simulate on MyPsychLab

### Experimental and Control Groups

Most experiments are conducted using two or more groups of participants. There must always be at least one **experimental group**—a group of participants who are exposed to the independent variable, or the treatment. The Lang experiment used three experimental groups (see FIGURE 1.5).

| What Participants Expected  | What Participants Received   |
|---|--|
|    | Experimental group 1:<br>Expected alcohol,<br>received tonic                       |
|    | Experimental group 2:<br>Expected alcohol,<br>received alcohol<br>mixed with tonic |
|   | Experimental group 3:<br>Expected tonic,<br>received alcohol<br>mixed with tonic   |
|  | Control group:<br>Expected tonic,<br>received tonic                                |

**FIGURE 1.5** Experimental and Control Groups in the Lang Experiment

The Lang experiment included three experimental groups and one control group.

Most experiments also have a **control group**—a group that is similar to the experimental group and is also measured on the dependent variable at the end of the experiment, for purposes of comparison. The control group is exposed to the same experimental environment as the experimental group but is not given the treatment. The fourth group in the Lang study was exposed to neither of the two independent variables; that is, this group did not expect alcohol and did not receive alcohol. Because this group was similar to the experimental groups and was exposed to the same experimental environment, it served as a control group.

You may be wondering why a control group is necessary. Couldn't an experimenter just expose one group to the independent variable and see if there was a change? While this approach is sometimes used, it is usually preferable to have a control group because people and their behaviors often change without intervention. Having a control group reveals what kinds of changes happen "naturally" and provides a way of separating the effect of the independent variable from such changes. Say, for example, you want to find out if a certain medication relieves headaches. You could just find some people with headaches, give them the medication, and then find out how many still have headaches an hour later. But some headaches go away without treatment. So if the medication appears to work, it may only be because a number of headaches went away on their own. Having a control group allows you to know whether the medicine relieves headaches in addition to those that disappear without treatment.

**control group** In an experiment, a group similar to the experimental group that is exposed to the same experimental environment but is not given the treatment; used for purposes of comparison.

### 1.23 What kinds of factors introduce bias into experimental studies?

#### confounding variables

Factors or conditions other than the independent variable(s) that are not equivalent across groups and could cause differences among the groups with respect to the dependent variable.

**selection bias** The assignment of participants to experimental or control groups in such a way that systematic differences among the groups are present at the beginning of the experiment.

**random assignment** The process of selecting participants for experimental and control groups by using a chance procedure to guarantee that each participant has an equal probability of being assigned to any of the groups; a control for selection bias.

**placebo effect** The phenomenon that occurs in an experiment when a participant's response to a treatment is due to his or her expectations about the treatment rather than to the treatment itself.

**placebo** (pluh-SEE-bo) An inert or harmless substance given to the control group in an experiment as a control for the placebo effect.

**experimenter bias** A phenomenon that occurs when a researcher's preconceived notions or expectations in some way influence participants' behavior and/or the researcher's interpretation of experimental results.

#### double-blind technique

A procedure in which neither the participants nor the experimenter knows who is in the experimental and control groups until after the data have been gathered; a control for experimenter bias.

## Sources of Bias in Experimental Research

Can the researcher always assume that the independent variable is the cause of some change in the dependent variable? Not necessarily. Sometimes an experiment is affected by **confounding variables**—factors or conditions other than the independent variable that are not equivalent across groups and that could cause differences among the groups with respect to the dependent variable. By conducting their experiment in a laboratory, Lang and his colleagues were able to control environmental conditions such as extreme noise or heat, which could have acted as confounding variables by increasing aggressive responses. Three additional sources of confounding variables that must be controlled in all experiments are selection bias, the placebo effect, and experimenter bias.

**SELECTION BIAS.** Why can't researchers allow participants to choose to be in either the experimental or control group? Such a procedure would introduce *selection bias* into a study. **Selection bias** occurs when participants are assigned to experimental or control groups in such a way that systematic differences among the groups are present at the beginning of the experiment. If selection bias occurs, then differences at the end of the experiment may not reflect the change in the independent variable but may be due to preexisting differences in the groups. To control for selection bias, researchers must use **random assignment**. This process consists of selecting participants by using a chance procedure (such as drawing the names of participants out of a hat) to guarantee that each participant has an equal probability of being assigned to any of the groups. Random assignment maximizes the likelihood that the groups will be as similar as possible at the beginning of the experiment. If there were pre-existing differences in students' levels of aggressiveness in the Lang experiment, random assignment would have spread those differences across all the groups.

**THE PLACEBO EFFECT.** Can participants' expectations influence an experiment's results? Yes. The **placebo effect** occurs when a participant's response to a treatment is due to his or her expectations about the treatment rather than to the treatment itself. Suppose a drug is prescribed for a patient and the patient reports improvement. The improvement could be a direct result of the drug, or it could be a result of the patient's expectation that the drug will work. Studies have shown that sometimes patients' remarkable improvement can be attributed solely to the power of suggestion—the placebo effect.

In drug experiments, the control group is usually given a **placebo**—an inert or harmless substance such as a sugar pill or an injection of saline solution. To control for the placebo effect, researchers do not let participants know whether they are in the experimental group (receiving the treatment) or in the control group (receiving the placebo). If participants getting the real drug or treatment show a significantly greater improvement than those receiving the placebo, then the improvement can be attributed to the drug rather than to the participants' expectations about the drug's effects. In the Lang experiment, some students who expected alcohol mixed with tonic were given only tonic. The tonic without alcohol functioned as a placebo, allowing researchers to measure the effect of the expectations alone in producing aggression.

**EXPERIMENTER BIAS.** What about the experimenter's expectations? **Experimenter bias** occurs when researchers' preconceived notions or expectations become a self-fulfilling prophecy and cause the researchers to find what they expect to find. A researcher's expectations can be communicated to participants, perhaps unintentionally, through tone of voice, gestures, or facial expressions. These communications can influence the participants' behavior. Expectations can also influence a researcher's interpretation of the experimental results, even if no influence occurred during the experiment. To control for experimenter bias, researchers must not know which participants are assigned to the experimental and control groups until after the research data are collected and recorded. (Obviously, someone assisting the researcher does know.) When neither the participants nor the researchers know which participants are getting the treatment and which are in the control group, the experiment is using the **double-blind technique**.

## Limitations of the Experimental Method

You now know that experiments provide information about cause-effect relationships. But what are their limitations? For one thing, researchers who use the experimental method are able to exercise strict control over the setting, but the more control they exercise, the more unnatural and contrived the research setting becomes. And the more unnatural the setting becomes, the less generalizable findings may be to the real world. Another important limitation of the experimental method is that its use is either unethical or impossible for research in many areas of interest to psychologists. Some treatments cannot be given to human participants because their physical or psychological health would be endangered or their constitutional rights violated.

What happens when we apply our knowledge about the problems associated with the experimental method to the results of Lang's study? Can we conclude that people in general tend to be more aggressive when they believe they are under the influence of alcohol? Before reaching such a conclusion, we must consider several factors: (1) All participants in this experiment were male college students. We cannot be sure that the same results would have occurred if females or males of other ages had been included. (2) The participants in this experiment were classified as heavy social drinkers. Would the same results have occurred if nondrinkers, moderate social drinkers, or alcoholics had been included? To apply this experiment's findings to other groups, researchers would have to replicate, or repeat, the experiment using different populations of subjects. (3) The amount of alcohol given to the students was just enough to bring their blood alcohol level to .10. We cannot be sure that the same results would have occurred if they had consumed more or less alcohol.

*Review It* summarizes the different types of research methods we've discussed in this chapter.

**1.24** What are the limitations of the experimental method?

### review it ▾ RESEARCH METHODS IN PSYCHOLOGY

| Method                                  | Description   | Advantages   | Limitations  |
|---|---|--|--|
| Naturalistic and laboratory observation | Observation and recording of behavior in its natural setting or in a laboratory.  | Behavior studied in everyday setting is more natural. A laboratory setting allows for precise measurement of variables. Can provide basis for hypotheses to be tested later. | Resercher's expectations can distort observations (observer bias). In a natural setting the researcher has little or no control over conditions. Laboratory observations may not generalize to real-world settings, and they can be expensive. |
| Case study                              | In-depth study of one or a few individuals using observation, interview, and/or psychological testing.  | Source of information for rare or unusual conditions or events. Can provide a basis for hypotheses to be tested later.   | May not be generalizable. Does not establish cause of behavior. Subject to misinterpretation by the researcher.  |
| Survey                                  | Interviews and/or questionnaires used to gather information about attitudes, beliefs, experiences, or behaviors of a group of people.             | Can provide accurate information about large numbers of people. Can track changes in attitudes and behavior over time.   | Responses may be inaccurate. Sample may not be representative. Characteristics of the interviewer may influence responses. Can be costly and time-consuming.   |
| Correlational method                    | Method used to determine the relationship (correlation) between two events, characteristics, or behaviors.  | Can assess strength of the relationship between variables and can often be done quickly. Provides a basis for prediction.  | Does not demonstrate cause and effect.   |
| Experimental method                     | Random assignment of participants to groups. Manipulation of the independent variable(s) and measurement of the effect on the dependent variable. | Enables identification of cause-effect relationships.  | Laboratory setting may inhibit natural behavior of participants. Findings may not be generalizable to the real world. In some cases, experiment is unethical or impossible.  |



**remember it ▾****THE EXPERIMENTAL METHOD**

1. The \_\_\_\_\_ is the only research method that can be used to identify cause-effect relationships between variables.
2. In an experiment, the \_\_\_\_\_ is manipulated by the researcher, and its effects on the \_\_\_\_\_ are measured at the end of the study.
3. The \_\_\_\_\_ group sometimes receives a placebo.
4. Random assignment is used to control for \_\_\_\_\_ bias.
5. \_\_\_\_\_ bias is controlled for when researchers do not know which participants are in the experimental and control groups.

**ANSWERS:** 1. experimental method; 2. independent variable; 3. control; 4. selection; 5. Experimenter, dependent variable;

**1.25** In what ways can participants bias research results?


▲ College students are a convenient population from which many psychological researchers draw their participant samples. In so doing, the researchers must be careful to ensure that these samples are as representative of the general population as possible. This means that their samples must include individuals from diverse racial, ethnic, cultural, and socioeconomic backgrounds.

## Participants in Psychological Research

You have learned about observer and experimenter bias in research, but were you aware that the findings of a study can be biased by the participants themselves? Furthermore, researchers are bound by ethical guidelines that specify how participants and animal subjects are supposed to be treated.

### Participant-Related Bias in Psychological Research

Do you remember reading earlier about the importance of representative samples in survey research? With other methods, representativeness becomes an issue when psychologists want to generalize the findings of studies to individuals other than the studies' participants. For example, projections by the U.S. Census Bureau (2000) indicate that the percentage of non-Hispanic Whites in the U.S. population is expected to decrease from 71.5% in the year 2000 to 53% in 2050. Yet, Whites are often overrepresented in psychological studies because the majority of studies with human participants in the last 30 years have drawn from the college student population (Graham, 1992), which has a lower proportion of minorities than the population in general. Moreover, college students, including those of minority ethnicity, are a relatively select group in terms of age, socioeconomic class, and educational level. Thus, they are not representative of the general population. This lack of representativeness in a research sample is a type of *participant-related bias*.

Gender bias is another type of participant-related bias. For example, Ader and Johnson (1994) found that, when conducting research in which all of the participants are of one sex, researchers typically specify the gender of the sample clearly when it is female but not when the sample is exclusively male. Such a practice, according to Ader and Johnson, reveals a "tendency to consider male participants 'normative,' and results obtained from them generally applicable, whereas female participants are somehow 'different,' and results obtained from them are specific to female participants" (pp. 217–218). On a positive note, however, these researchers report that over the decades, gender bias in the sampling and selection of research subjects has been decreasing.

Another kind of bias happens when researchers, or consumers of research, overgeneralize the findings of a study to all members of a particular group. For example, Sandra Graham (1992) reported finding a methodological flaw—failure to include socioeconomic status—in much of the research literature comparing White Americans and African Americans. Graham pointed out that African Americans are overrepresented among the economically disadvantaged. She maintained that socioeconomic status should be incorporated into research designs "to disentangle race and social class effects" in studies that compare White and African Americans (p. 634).

Ageism is another continuing source of participant-related bias and is especially apparent in the language used in psychological research (Schaie, 1993). For example, the titles of research studies on aging often include words such as *loss*, *deterioration*, *decline*, and *dependency*. Moreover, researchers are likely to underestimate the great diversity among the older adults they study. According to Schaie, "most research on adulthood

shows that differences between those in their 60s and those in their 80s are far greater than those between 20- and 60-year-olds" (p. 50). Researchers should guard against using descriptions or reaching conclusions that imply that all members of a given age group are defined by negative characteristics.

### Protecting Research Participants' Rights

Researchers are ethically obligated to protect the rights of all study participants. In 2002, the American Psychological Association (APA) adopted a new set of ethical standards governing research with human participants so as to safeguard their rights while supporting the goals of scientific inquiry. Following are some of the main provisions of the code:

- *Legality.* All research must conform to applicable federal, state, and local laws and regulations.
- *Institutional approval.* Researchers must obtain approval from all institutions involved in a study. For example, a researcher cannot conduct a study in a school without the school's approval.
- *Informed consent.* Participants must be informed of the purpose of the study and its potential for harming them. Researchers can deviate from this standard of informed consent only when they have a justifiable reason for doing so. Typically, an institutional committee examines whether there is justification for deceiving participants in a study. Most such committees find, for instance, that the use of placebos doesn't violate this standard because a placebo control group enables experimenters to more effectively measure the effects of a treatment by controlling for participants' expectations.
- *Deception.* Deception of participants is ethical when it is necessary. However, the code of ethics cautions researchers against using deception if another means can be found to test the study's hypothesis.
- *Debriefing.* Whenever a researcher deceives participants, including through the use of placebo treatments, he or she must tell participants about the deception as soon as the study is complete.
- *Clients, patients, students, and subordinates.* When participants are under another's authority (for example, a therapist's client, a patient in a hospital, a student in a psychology class, or an employee), researchers must take steps to ensure that participation in a study, and the information obtained during participation, will not damage the participants in any way. Professors, for example, cannot reduce students' grades if the students refuse to participate in a research study.
- *Payment for participation.* Participants can be paid, but the code of ethics requires that they be fully informed about what is expected in return for payment. In addition, researchers are to refrain from offering excessive payments that may bias the study's participants in some way.
- *Publication.* Psychological researchers must report their findings in an appropriate forum, such as a scientific journal, and they must make their data available to others who want to verify their findings. Even when a study produces no findings, its results must still be reported; in such cases, the appropriate forum is the institution that sponsored the research, the organization in which the research was conducted, or the agency or foundation that funded it. Results must also be made available to participants.  **Simulate** on **MyPsychLab**

**1.26** What ethical rules must researchers follow when humans are involved in studies?

### The Use of Animals in Research

The new APA code of ethics also includes guidelines for using animals in psychological research. Here are a few of the important provisions:

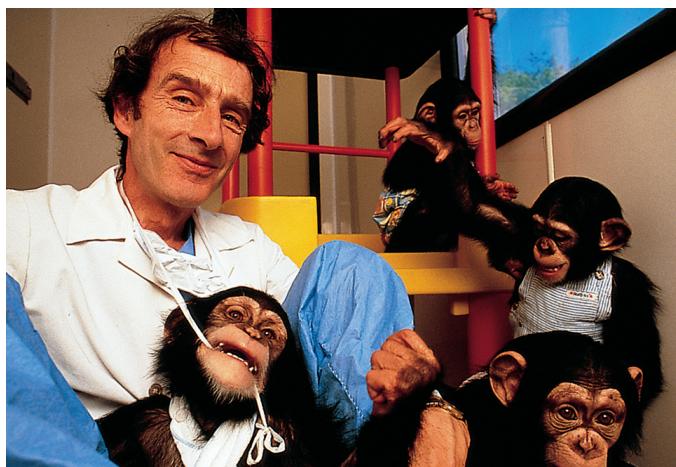
- *Legality.* Like research with human participants, animal research must follow all relevant federal, state, and local laws.

 **Simulate** Ethics in Psychological Research.  
[www.mypsychlab.com](http://www.mypsychlab.com)

**1.27** Why are animals used in research?

- *Supervision by experienced personnel.* The use of animals must be supervised by people who are trained in their care. These experienced personnel must teach all subordinates, such as research assistants, how to properly handle and feed the animals and to recognize signs of illness or distress.
- *Minimization of discomfort.* Researchers are ethically bound to minimize any discomfort to research animals. For example, it is unethical to perform surgery on research animals without appropriate anesthesia. And when researchers must terminate the lives of research animals, they must do so in a humane manner.

Even with these safeguards in place, the use of animals in research is controversial. Many animal rights advocates want all animal research stopped immediately. Books on animal rights devote an average of 63.3% of their content to the use of animals in research (Nicholl & Russell, 1990). Yet, of the approximately 6.3 million animals killed each year in the United States, only 0.3% are used in research and education, while 96.5% are used for food, 2.6% are killed by hunters, 0.4% are killed in animal shelters, and 0.2% are used for fur garments (Christensen, 1997).



▲ Most psychologists recognize that many scientific advances would not have been possible without animal research. Where do you stand on this issue?

In a survey of almost 4,000 randomly selected members of the APA, "80% of respondents expressed general support for psychological research on animals" (Plous, 1996, p. 1177). Among the general public, support for animal research is higher when the research is tied to human health and highest when the animals involved in such research are rats and mice rather than dogs, cats, or primates (Plous, 1996). Most agree that there are at least six reasons for using animals in research: (1) They provide a simpler model for studying processes that operate similarly in humans; (2) researchers can exercise far more control over animal subjects and thus be more certain of their conclusions; (3) a wider range of medical and other manipulations can be used with animals; (4) it is easier to study the entire life span and even multiple generations in some animal species; (5) animals are more economical to use as research subjects and are available at the researchers' convenience; and (6) some researchers simply want to learn more about the animals themselves.

Is animal research really necessary? Virtually all of the marvels of modern medicine are at least partially the result of experimentation using animals. Animal research has yielded much knowledge about the brain and the physiology of vision, hearing, and the other senses (Domjan & Purdy, 1995). It has also increased knowledge in the areas of learning, motivation, stress, memory, and the effects on the unborn of various drugs ingested during pregnancy. Similarly, animal research has helped psychopharmacologists better understand the side effects of drugs that are used to relieve the symptoms of serial mental illnesses such as schizophrenia (Ortega-Alvaro, Gilbert-Rahola, & Micó, 2006).

Overall, the animal rights controversy has had a positive effect on research ethics: It has served to increase concern for the treatment of animals as research subjects and to stimulate a search for alternative research methods that is reportedly resulting in a decrease in the numbers of animals needed (Mukerjee, 1997, p. 86).

## remember it ▾

### PARTICIPANTS IN PSYCHOLOGICAL RESEARCH

1. Psychologists are required to debrief participants thoroughly after a study involving \_\_\_\_\_.
2. \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ have been overrepresented in many kinds of psychological studies.
3. By using \_\_\_\_\_ in research, researchers have learned a great deal about topics such as the effects of drugs ingested during pregnancy.

ANSWERS: 1. deception; 2. Whites, males, college students; 3. animals

## Psychologists at Work

Psychology is a fascinating field. So fascinating, in fact, that many people choose careers that involve learning more about human behavior and mental processes or using psychological principles to improve people's lives. Most such careers require graduate degrees, but there are many job opportunities for undergraduate psychology majors, too.

### Specialties in Psychology

Wherever you find human activity, you are very likely to encounter psychologists. These professionals work in a number of specialties, most of which require a master's or a doctoral degree.  [Explore](#) on [MyPsychLab](#)

- *Clinical psychologists* specialize in the diagnosis and treatment of mental and behavioral disorders, such as anxiety, phobias, and schizophrenia. Some also conduct research in these areas.
- *School psychologists* are clinical psychologists who specialize in the diagnosis and treatment of learning and behavioral problems that interfere with learning.
- *Forensic psychologists* apply their training in clinical psychology to issues involving psychology and law.
- *Counseling psychologists* help people who have adjustment problems (marital, social, or behavioral) that are generally less severe than those handled by clinical psychologists.
- *Physiological psychologists*, also called *biological psychologists* or *neuropsychologists*, study the relationship between physiological processes and behavior.
- *Experimental psychologists* conduct experiments in most areas of psychology—learning, memory, sensation, perception, motivation, emotion, and others.
- *Developmental psychologists* study how people grow, develop, and change throughout the life span.
- *Educational psychologists* specialize in the study of teaching and learning. (Note: Do not confuse educational psychology with school psychology. Recall that school psychology is the subfield of clinical psychology that deals with the diagnosis and treatment of learning problems. Educational psychologists study learning in typically developing people. As such, they are trained in theory and research methods but not in the diagnosis and treatment of learning problems.)
- *Social psychologists* investigate how the individual feels, thinks, and behaves in a social setting—in the presence of others.
- *Industrial/organizational (I/O) psychologists* study the relationships between people and their work environments.

### Majoring in Psychology

Have you considered majoring in psychology? Many students do. In fact, the number of undergraduate degrees awarded in psychology is surpassed only by the number awarded in business administration and education (NCES, 2008).

As mentioned earlier, professional psychologists have graduate degrees. The American Psychological Association reports that it takes about 5 years of study beyond the bachelor's degree to obtain a doctoral degree in psychology (APA, 2000). However, there are many jobs open to those with a bachelor's degree in psychology, and most such jobs are found in for-profit companies (National Science Foundation, 2000). PayScale, an organization that tracks applicant qualifications across a wide

**1.28** Who are some of the specialists working within psychology?

 [Explore](#) Psychologists at Work. [www.mypsychlab.com](http://www.mypsychlab.com)



▲ Can you guess what type of psychologist is pictured here?

**1.29** What kinds of employment opportunities are available for psychology majors?

variety of employment settings, reports that the most popular jobs for people with undergraduate degrees in psychology are administrative assistant, retail manager, social services case manager, and human resources manager (PayScale, Inc., 2009). In addition, many men and women who intend to go on to postgraduate work in other fields—law, for example—major in psychology.

You may have wondered what kinds of courses are offered for psychology majors. One of the purposes of an introductory course in psychology is to survey the subfields in which more advanced courses are offered (Brewer et al., 1993). The contents of this textbook provide a good guide to the kinds of courses you would take if you majored in psychology. **TABLE 1.1** provides an overview of the various components of a bachelor's degree program in psychology.

**TABLE 1.1 Components of the Major in Psychology**

| Foundations Courses   | Intermediate and Advanced Courses   | Capstone Experiences  |
|---|---|---|
| <p>These courses are typically required of all students majoring in psychology. Many programs accept transfer courses from community colleges that fulfill these requirements.</p> <ul style="list-style-type: none"> <li>• Introduction to Psychology</li> <li>• Research Methods</li> <li>• Statistics</li> </ul> | <p>Students choose courses from broad domains such as those listed below. Some programs require at least one course in each of several such domains. In some programs, students may transfer intermediate (sophomores level) coursework from community colleges to satisfy some of these requirements. However, all bachelor's degree programs require a minimum number of junior- and senior-level courses regardless of how many credits a student transfers in.</p> <ul style="list-style-type: none"> <li>• Learning and Cognition</li> <li>• Individual Differences, Psychometrics, Personality, Social and Cultural Processes</li> <li>• Biological Bases of Behavior, Sensation, Perception, Animal Behavior, Motivation, Emotion</li> <li>• Developmental Changes across the Life Span</li> </ul> | <p>Some programs require a capstone experience in which seniors in the major are expected to integrate the knowledge and skills they have learned in prior courses. Other programs offer capstone experiences as options that may count toward advanced course requirements. Capstone experiences may include one or more of these:</p> <ul style="list-style-type: none"> <li>• History and Systems in Psychology (senior-level course)</li> <li>• Community Service</li> <li>• Senior Thesis</li> <li>• Research Practicum</li> </ul> |

Sources: Halonen et al. (2002); Brewer et al. (1993).

### remember it ▾

#### PSYCHOLOGISTS AT WORK

1. The number of undergraduate degrees awarded in psychology is \_\_\_\_\_ only to those awarded in business administration and education.
2. There are \_\_\_\_\_ job opportunities for college graduates who major in psychology.

ANSWERS: 1. second; 2. many

## Summary and Review

### An Introduction to *The World of Psychology* p. 3

#### **1.1** What process do scientists use to answer questions about behavior and mental processes? p. 3

Scientists use the scientific method, which consists of the orderly, systematic procedures researchers follow as they identify a research problem, design a study to investigate the problem, collect and analyze data, draw conclusions, and communicate their findings.

#### **1.2** What are the goals of psychology? p. 5

The four goals of psychology are the description, explanation, prediction, and influence of behavior and mental processes.

### Exploring Psychology's Roots p. 6

#### **1.3** What roles did Wundt and Titchener play in the founding of psychology? p. 6

Wundt, who is considered the “father” of psychology, established the first psychological laboratory in 1879 and launched the study of psychology as a formal academic discipline. One of his students, Titchener, founded the school of thought called structuralism.

#### **1.4** Why is functionalism important in the history of psychology? p. 7

Functionalism was the first American school of psychology and broadened the scope of the field to include examination of behavior as well as conscious mental processes.

#### **1.5** In what ways have women and minorities shaped the field of psychology, both in the past and today? p. 7

Early female and minority psychologists had to overcome significant educational and professional barriers to work in the field. Still, many of these individuals made noteworthy contributions. Today minority group representation is growing, and more women than men obtain degrees in psychology.

### Schools of Thought in Psychology p. 9

#### **1.6** How do behaviorists explain behavior and mental processes? p. 9

Behaviorists, adherents of the school of psychology founded by John B. Watson, view observable, measurable behavior as the only appropriate subject matter for psychology. Behaviorism also emphasizes the environment as the key determinant of behavior.

#### **1.7** What do psychoanalytic psychologists believe about the role of the unconscious? p. 10

According to Freud’s theory of psychoanalysis, an individual’s thoughts, feelings, and behavior are determined primarily by the unconscious—the part of the mind that one cannot see and cannot control.

#### **1.8** According to Maslow and Rogers, what motivates human behavior and mental processes? p. 10

The humanistic theories of Maslow and Rogers focus on the uniqueness of human beings and their capacity for choice, personal growth, and psychological health. Humans are motivated by the need for self-actualization.

**REVIEW:**

After you have read each section of the chapter and followed the previous steps in the SQ3R process, review the Summary and Review section at the end of the chapter. Review the list of key terms and turn back to the page where the term is defined and review that section if you find you cannot recite the term’s meaning.

#### **1.9** What is the focus of cognitive psychology? p. 10

Cognitive psychology is an influential school that focuses on mental processes such as memory, problem solving, reasoning, decision making, language, perception, and other forms of cognition.

#### **1.10** What is the main idea behind evolutionary psychology? p. 12

Evolutionary psychology focuses on how human behaviors necessary for survival have adapted in the face of environmental pressures over the course of evolution.

#### **1.11** How is biological psychology changing the field of psychology? p. 12

Biological psychologists look for connections between specific behaviors (such as aggression) and particular biological factors (such as hormone levels) to help explain individual differences. Using modern technology, biological psychologists have discovered relationships between biological and behavioral variables that have resulted in more effective medications for certain disorders and new insight into the genetic base of many mental illnesses.

#### **1.12** What kinds of variables interest psychologists who take a sociocultural approach? p. 13

The sociocultural approach focuses on how factors such as cultural values affect people’s behavior.

#### **1.13** What are psychological perspectives, and how are they related to an eclectic position? p. 14

Psychological perspectives are general points of view used for explaining people’s behavior and thinking. In taking an eclectic position, psychologists use a combination of two or more perspectives to explain a particular behavior.

### Thinking about Theories and Research p. 15

#### **1.14** How do psychologists evaluate theories? p. 15

Psychologists evaluate theories in terms of their usefulness. Useful theories generate testable hypotheses and practical solutions to problems. Theories possessing heuristic value are useful for stimulating debate and research.

## Summary and Review continued

### **1.15 How can critical thinking be used to interpret media reports of psychological research? p. 16**

Critical thinkers are independent, able to suspend judgment, and willing to change prior beliefs. They also use knowledge of research methods to evaluate research findings reported in the news media.

### **Descriptive Research Methods p. 18**

#### **1.16 How do psychological researchers use naturalistic and laboratory observation? p. 18**

In naturalistic observation, researchers observe and record the behavior of human participants or animal subjects in a natural setting without attempting to influence or control it. In laboratory observation, researchers exert more control and use more precise equipment to measure responses.

#### **1.17 What are the advantages and disadvantages of the case study? p. 18**

The case study is appropriate for studying people with rare psychological or physiological disorders or brain injuries. Disadvantages of this method include possible observer bias, an inability to establish the cause of behavior, and lack of generalizability.

#### **1.18 How do researchers ensure that survey results are useful? p. 19**

To be useful, surveys must involve a sample that is representative of the population to which the results will be applied.

#### **1.19 What are the strengths and weaknesses of the correlational method? p. 21**

When the correlation between two variables is known, information about one variable can be used to predict the other. However, a correlation cannot be used to support the conclusion that either variable causes the other.

### **The Experimental Method p. 23**

#### **1.20 Why do researchers use experiments to test hypotheses about cause-effect relationships? p. 23**

The experimental method is the only research method that can identify cause-effect relationships.

#### **1.21 How do independent and dependent variables differ? p. 24**

In an experiment, an independent variable is a condition or factor manipulated by the researcher to determine its effect on the dependent variable.

#### **1.22 Why are experimental and control groups necessary? p. 24**

Comparing experimental and control groups allows researchers to judge the effects of the independent variable(s) compared to outcomes that occur naturally or in the presence of a placebo.

#### **1.23 What kinds of factors introduce bias into experimental studies? p. 26**

Environmental factors, such as heat or noise, can be a source of bias. Selection bias occurs when there are systematic differences

among the groups before the experiment begins. The placebo effect occurs when a person's expectations influence the outcome of a treatment or experiment. Experimenter bias occurs when the researcher's expectations affect the outcome of the experiment.

#### **1.24 What are the limitations of the experimental method? p. 27**

Experiments are often conducted in unnatural settings, a factor that limits the generalizability of results. Also, this method may be unethical or impossible to use for some research.

### **Participants in Psychological Research p. 28**

#### **1.25 In what ways can participants bias research results? p. 28**

Participant-related bias happens when researchers fail to include underrepresented groups in their samples.

#### **1.26 What ethical rules must researchers follow when humans are involved in studies? p. 29**

All research must conform to applicable laws and regulations. Researchers must obtain approval from all institutions involved in the study. Participants must give informed consent, may not be deceived unless necessary, and, if deceived, must be debriefed as soon as possible after they participate. Subordinates' participation in a study may not negatively affect them in any way. Participants may be paid after being fully informed about what is expected in return for payment. Researchers must report their findings in an appropriate forum, and results must be made available to participants.

#### **1.27 Why are animals used in research? p. 29**

Animals provide a simpler model for studying similar processes in humans; researchers can exercise more control over animals and use a wider range of medical and other manipulations; with animals, researchers can study an entire life span or even a generation; animals are more economical and more available as research subjects; and in some cases, researchers want to learn about the animals themselves.

### **Psychologists at Work p. 31**

#### **1.28 Who are some of the specialists working within psychology? p. 31**

There are clinical and counseling psychologists, physiological psychologists, experimental psychologists, developmental psychologists, educational psychologists, social psychologists, and industrial/organizational (I/O) psychologists.

#### **1.29 What kinds of employment opportunities are available for psychology majors? p. 31**

Individuals with bachelor's degrees in psychology are employed in many different settings. Most popular jobs include administrative assistants, human resources managers, social services case managers, and retail managers. Majoring in psychology is also good preparation for postgraduate study in other fields (for example, law).

## Key Terms

applied research, p. 6  
basic research, p. 6  
behaviorism, 9  
biological psychology, p. 12  
case study, p. 18  
causal hypothesis p. 23  
cognitive psychology, p. 10  
confounding variables, p. 26  
control group, p. 25  
correlation coefficient, p. 21  
correlational method, p. 21  
critical thinking, p. 16

dependent variable, p. 24  
descriptive research methods, p. 18  
double-blind technique, p. 26  
evolutionary psychology, p. 12  
experimental group, p. 24  
experimental method, p. 23  
experimenter bias, p. 26  
functionalism, p. 7  
Gestalt psychology, p. 11  
humanistic psychology, p. 10  
hypothesis, p. 4

independent variable, p. 24  
information-processing theory, p. 11  
laboratory observation, p. 18  
naturalistic observation, p. 18  
neuroscience, p. 12  
placebo, p. 26  
placebo effect, p. 26  
population, p. 19  
pseudoscience, p. 17  
psychoanalysis, p. 10  
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psychology, p. 3  
random assignment, p. 26  
replication, p. 5  
representative sample, p. 19  
sample, p. 19  
scientific method, p. 3  
selection bias, p. 26  
sociocultural approach, p. 13  
structuralism, p. 7  
survey, p. 19  
theory, p. 4

## Practice Test

### Multiple Choice

- A \_\_\_\_\_ is a general principle or a set of principles that attempts to explain how a set of separate facts are related.
  - hypothesis
  - theory
  - perspective
  - basic research
- A first-grade teacher asked the school psychologist to help her manage the behavior of a first-grader who behaves inappropriately in the classroom. After reviewing the relevant research, the psychologist recommends that the teacher give the child some kind of reward whenever she is behaving appropriately. Toward which goal of psychology is the psychologist working?
  - explanation
  - description
  - prediction
  - influence
- Advocates of the school of structuralism were criticized for their reliance on introspection because \_\_\_\_\_.
  - it relied too much upon free association
  - it lacked objectivity
  - it did not lend itself to laboratory experimentation
  - it did not provide for individual measurements of responses
- A psychologist on a radio call-in show claimed that parents strongly influence children's development by showing affection when children behave in a desirable way and withholding affection when they behave in an undesirable way. The psychologist's views were consistent with the \_\_\_\_\_ school of thought.
  - evolutionary
  - biological
  - behaviorist
  - cognitive

- Which statement best summarizes the psychoanalytic perspective?
  - The mind is one great blooming, buzzing confusion.
  - Life is a constant striving for superiority.
  - Introspection is not a proper scientific technique in psychology.
  - The mind is like an iceberg in that only a small part of its substance is visible.
- Which two schools of thought suggest that the way we interpret an experience is more important than the experience itself?
  - cognitive, psychoanalytic
  - behaviorist, psychoanalytic
  - cognitive, Gestalt
  - Gestalt, behaviorist
- Dr. Mkemba is a psychologist who is studying the influence of hormones on emotions. She is probably a \_\_\_\_\_ psychologist.
  - biological
  - cognitive
  - psychoanalytic
  - behaviorist
- Lisa described a problem she was having to a therapist and asked him to analyze it. The therapist replied that he would prefer to hear her analysis of the problem because her view of it was more important than his view. The therapist's approach exemplifies the \_\_\_\_\_ perspective.
  - behaviorist
  - psychoanalytic
  - evolutionary
  - humanist

## Practice Test continued

9. Students asked Dr. Ringold why they needed to learn about psychological theorists whose ideas have been found to lack support. He replied that their theories were important to the field because they had stimulated a great deal of debate among researchers. Dr. Ringold was commenting on the theories' \_\_\_\_\_.
- applications to real-world problems
  - heuristic value
  - ability to explain observations
  - testable hypotheses
10. A recent news report cited research conducted at the University of Texas suggesting that low-fat diets reduce fertility in laboratory rats. The report went on to suggest that the study meant that women who hope to have children may need to add more fat to their diets. If Janice wants to apply the critical thinking skills she learned in her psychology class to figure out how to respond to the report, what should she do?
- Start eating a high-fat diet immediately
  - Start eating high-fat foods if she finds that the study has been published in a prestigious journal
  - Find out whether other studies have produced similar findings before she makes any changes to her diet
  - Ask her friends if they agree with the study
11. Sandy is interested in determining how long bear cubs stay with their mother. She spends several years studying their behavior in Yellowstone Park noting date of birth, time of leaving mother, and so on for several bear families. This is an example of the \_\_\_\_\_ method.
- |                 |                             |
|-----------------|-----------------------------|
| a. survey       | c. case study               |
| b. experimental | d. naturalistic observation |
12. Which of the following correlation coefficients represents the *strongest* relationship?
- |         |         |
|---------|---------|
| a. +.52 | c. +.19 |
| b. -.13 | d. -.97 |
13. Christine is conducting an experiment on the effects of unpleasant odors on studying. She believes that exposure to unpleasant odors will decrease the amount of information that a person learns from reading a passage in a textbook. In Christine's study, \_\_\_\_\_ is the independent variable and \_\_\_\_\_ is the dependent variable.
- |                       |                    |
|-----------------------|--------------------|
| a. learning, odors    | c. odors, learning |
| b. studying, learning | d. odors, studying |
14. Professor Beaufort is running an experiment to determine if exercise has an effect on memory. Three groups are given the same list of 25 words and allowed 15 minutes to study it. Then one group watches television in a classroom while the other two groups exercise. One of the exercise groups participates in an hour-long yoga class while the other attends an aerobic dance class for the same period of time. Which group is the control group?
- the yoga group
  - the aerobic group
  - the TV group
  - This study has no control group.
15. Dr. Rabini wants to study the effects of psychiatric medications on prenatal development in humans. He hopes to do so by giving real drugs to an experimental group of pregnant women and placebos to a control group of pregnant women. Dr. Rabini's research is \_\_\_\_\_.
- ethical if he fully informs pregnant women of all the risks involved
  - ethical if a university review board approves it
  - unethical if the drugs are found to be harmful
  - unethical under any circumstances
16. Drs. Vostock and Smythe are discussing an experiment in which chimpanzees will be exposed to a substance that may cause them to develop malignant tumors. A review board will judge their research to be ethical if \_\_\_\_\_.
- it is technically possible
  - the researchers euthanize any animals that develop tumors
  - the researchers take steps to ensure that the animals do not suffer needlessly
  - chimpanzees are the only animals available for the study
17. A patient in a psychiatric hospital is more likely to be treated by a(n) \_\_\_\_\_ psychologist than by a(n) \_\_\_\_\_ psychologist.
- developmental, industrial/organizational
  - clinical, counseling
  - physiological, educational
  - educational, clinical

### Essay

18. Susan feels anxious whenever she enters the school cafeteria. Choose three of the major perspectives in psychology and compare and contrast how they would explain Susan's problem.
19. Suppose you hear on the news that a researcher claims to have "proven" that day care is harmful to infants. How could you use what you've learned in this chapter about critical thinking and research methods to evaluate this statement?
20. Give an example of a research study that might be done by (a) a developmental psychologist, (b) an industrial/organizational psychologist, and (c) a forensic psychologist.

*For answers to the questions in this Practice Test, please turn to page AK-1.*