

# Introduction to Psychology

# 1

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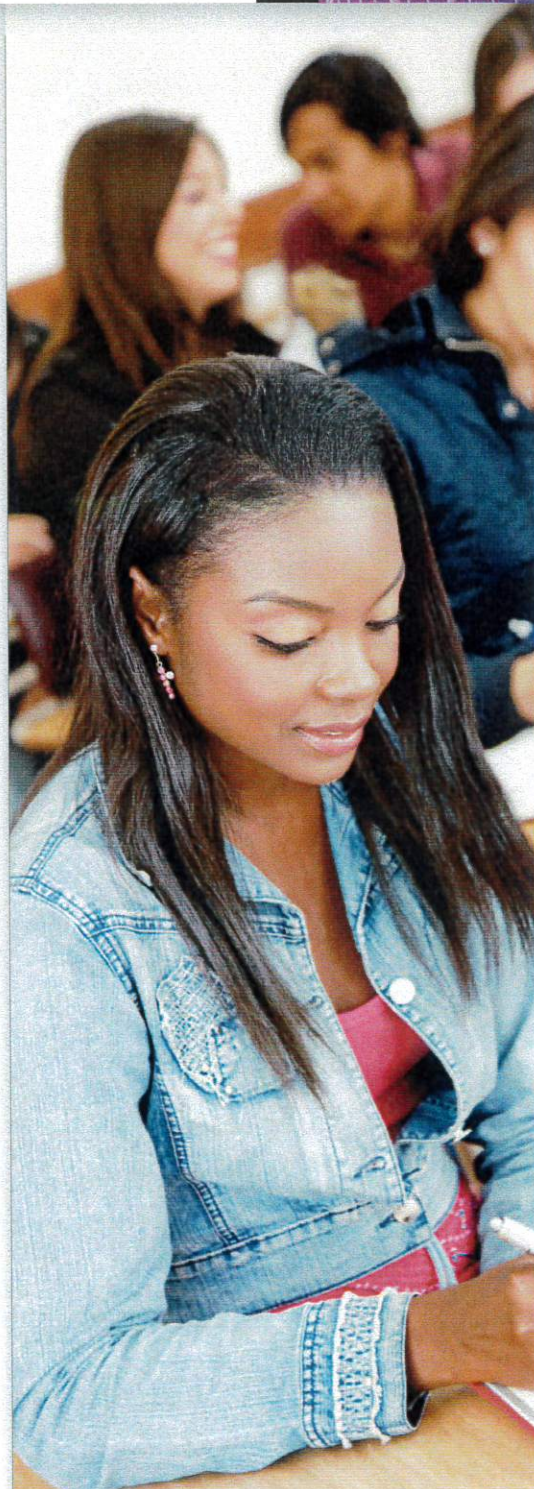
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The SQ3R method will help you maximize your learning in five steps:

- Survey
- Question
- Read
- Recite
- Review

The sticky notes in Chapter 1 will help you master this learning system so that you can use it on your own in the remaining chapters.



## 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 help you learn how to 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 4.) How can you know which career is right for you? How can you solve conflicts and maintain satisfying relationships with others? These are the kinds of practical questions that a good understanding of psychology can help you answer?

Let's begin your exploration of psychology with an assessment of how much you already know, or think you know, about the topic:


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 may be surprised to learn that all the odd-numbered items are false, and all the even-numbered items are true. Learning all you can from this text is a good first step toward a better understanding of behavior and mental processes. The text'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 yield reliable answers to questions about behavior and mental processes 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).

 Watch the **Video Episode 1: Thinking Like a Psychologists Debunking Myths** in **MyPsychLab**

## An Introduction to *Mastering the World of Psychology*

A Ugandan expression says, “The hunter in pursuit of an elephant does not stop to throw stones at birds.” In other words, to achieve any goal, including succeeding in a psychology course, one must remain focused on it. The study strategies we have incorporated into *Mastering the World of Psychology* can help you stay focused on your goal of successfully completing your course in introductory psychology. Here is how the features of the text can help you. 

**SQ3R method** A study method involving the following five steps: (1) survey, (2) question, (3) read, (4) recite, and (5) review.

### 1.1 How will the SQ3R method help you master psychology?

### Studying Psychology: Some Tricks of the Trade

To help you maximize your learning, *Mastering the World of Psychology* includes a set of tried and true study strategies—*Survey*, *Question*, *Read*, *Recite*, and *Review*—that are collectively known as the **SQ3R method** (Robinson, 1970). Here's how to make the most of the SQ3R features that we have included in *Mastering the World of Psychology*:

**STEP 1: Survey.** The goal of the survey step is to get the chapter's “big picture,” a mental map of what it's all about. That's the purpose of the list of learning questions at the beginning of each chapter. The questions give you a blueprint to use as you navigate through the chapter and tell you what you will learn in each section. Use the learning questions to create a note-taking outline that you will fill in as you read the chapter. Next, look over the major elements of the chapter. These elements include the chapter-opening activity called *Think About It*, the section headings, *Summarize It* tables, *Try It* activities, *Explain It* boxes, and *Apply It* boxes. You should also survey the learning questions in the margins by each subheading (the same questions that are listed at the beginning of the chapter) and the boldfaced terms that are also in the margins. Next, skim over the *Chapter Summary*. It includes answers for all the learning questions. Next, do the *Think About It* activity at the beginning of the chapter, keeping in mind the mental overview of the chapter that you constructed with the help of the learning questions. Now you're ready to start working your way through the chapter.

#### Step 1: Survey

- Read over the learning objectives in the outline at the beginning of the chapter.
- Look over the other major elements of the chapter. They include the following:
  - Think About It chapter opener
  - Key terms
  - Summarize It tables
  - Try It activities
  - Explain It boxes
  - Apply It boxes
- Skim the Chapter Summary.
- Create note-taking outline you'll use as you read the chapter. Your outline will include these elements:
  - The titles and main ideas of the chapter's sections
  - The learning questions each section answers
- Do the Think About It activity at the beginning of the chapter.

**STEP 2: Question.** Do the Question step as you come to each subheading in the chapter. This step has two parts: First, read the learning question in the margin. For instance, the learning question for this subsection is “How will the SQ3R method help you master psychology?” Next, think of additional questions you have about the topic and add them to the note-taking outline you created notes in the Survey step.

**STEP 3: Read.** Read the text under each subheading, keeping in mind the learning question and your own questions. Use the *Apply It* boxes, *Try It* activities, *Explain It* boxes, and *Summarize It* tables, if any are present, to help you understand the section.

**STEP 4: Recite.** When you finish reading each subsection, answer its learning question and your own questions aloud in your own words. Jot your answers, along with brief definitions for the section’s key terms, in your outline. When you’re finished, look back at the section to see if you’ve missed anything and modify your notes if necessary. Repeat this process for each subsection and you’ll end up with a well-organized set of notes on the entire chapter.

**STEP 5a: Review I.** To be sure you’ve understood each major section before you move on to the next one, answer the Remember It questions. You should find many of the answers in your notes. If you don’t, you should probably go back and revise them. Next, log on to MyPsychLab and take the section’s Quick Review quiz. Research shows that repeated testing is one of the most effective study strategies you can use (Karpicke, Butler, & Roediger, 2009).

**STEP 5b: Review II.** After you have worked your way through all the major sections, you need to review the entire chapter to be sure that you’re ready to be tested on it. Begin by reading the *Chapter Summary* and comparing it to your notes. Revise your notes if necessary. Next, complete the Study Guide and check your answers against the key in the back of the book. Revisit your notes and restudy the parts of the chapter you scored the lowest on in the Study Guide. Finally, take the chapter Practice Test in the back of the book or log on to MyPsychLab to take the online Chapter Exam. Reread the parts of the chapter that relate to any questions that you miss, and be sure that you understand where you went wrong. At this point, you should be feeling confident about your mastery of the chapter.

Now that you know how to study this text effectively, let’s consider in more detail what impact the work of psychologists has on our everyday lives. Before we begin, think about all of the ways in which psychology—and the language of psychology—plays an integral role in our lives.

## Is Psychology a Science? ▶

**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. In fact, those may be the very sources that led you astray on the quiz at the beginning of the chapter.

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** 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 knowledge gained is dependable because of the method used to obtain it. The scientific method includes the following steps:

- Step 1: Observe and theorize
- Step 2: Formulate a hypothesis

### Step 2: Question

Use the question step for each subheading in the chapter. It has two parts:

- Read the learning question in the margin.
- Think of additional questions you have about the topic.

### Step 3: Read

Read the text under each subheading and be sure you understand it before you go on to the next one. As you read:

- Keep the learning question in mind.
- Keep your own questions in mind.
- Use the *Apply It* boxes, *Try It* activities, *Explain It* boxes, and *Summarize It* tables, if any are present, to help you understand the subsection.

### Step 4: Recite

When you finish reading each section:

- Answer the learning question and your own questions aloud in your own words.
- Add the answers to your outline.
- Look back at the section to see if you’ve missed anything.
- Modify your outline if necessary. Repeat this process for each subsection and you will end up with a well-organized set of notes on the entire chapter.

## 1.2 Why do psychologists use the scientific method?

**psychology** The scientific study of 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.

## APPLY IT

### More Tips 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 five hours straight, try five study sessions of one 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.
- Test, retest, and test again! A great deal of research indicates that testing and retesting yourself over material you have read enhances your ability to recall it when you are tested. For this reason, use all of the self-testing tools we have included in the text as well as those that are available on MyPsychLab.

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



 Watch the **Video** Episode 6: What's in It for Me? Making It Stick in **MyPsychLab**

 Watch on **MyPsychLab**

- Step 3: Design a study
- Step 4: Collect data
- Step 5: Apply results to the hypothesis

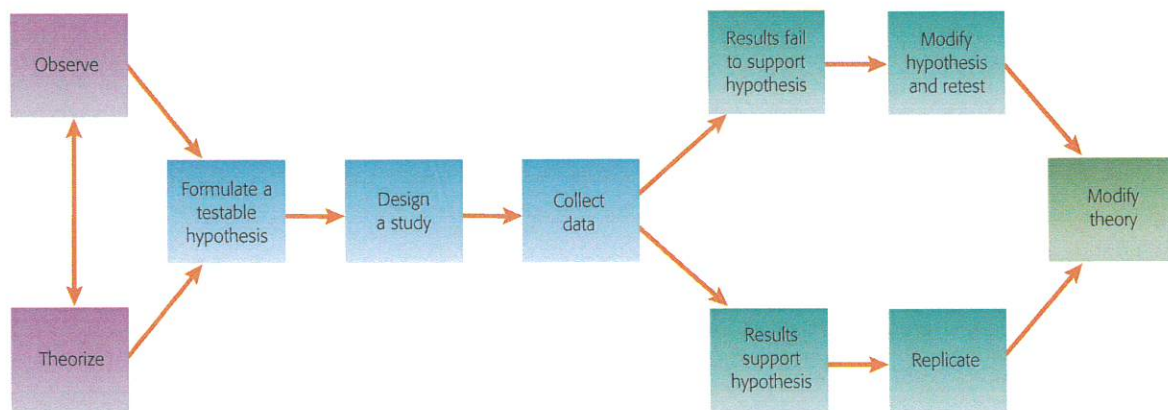
We describe each of these steps in detail in the following section and Figure 1.1 on page 5 will help you visualize the process.

**STEP 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 it.

**STEP 2: 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 specific prediction that can be tested *empirically*—that is, with data. Although the researchers' theory suggests many possible hypotheses, one, in particular, is key to

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

**hypothesis** A testable prediction about the conditions under which a particular behavior or mental process may occur.



**FIGURE 1.1 The Scientific Method**  
These are the steps involved in the scientific method.

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.*

**STEP 3: Design a Study.** Next, to test the hypothesis about equal practice, the researcher could design 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 but to try for the highest score possible.

**STEP 4: Collect Data.** Once the researcher conducts her study, she collects data that are 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.

**STEP 5: Apply Results to the Hypothesis.** If the scores for males and females are equivalent, the researcher can conclude that the data support her hypothesis. That is, given the same amount of practice time, males and females will score equally well. Next, the researcher will make other psychologists aware of her findings by presenting them at a professional meeting, such as the annual convention of the American Psychological Association, or by publishing them in a professional journal. Such journals publish the results of studies that have been reviewed by other researchers and found to be methodologically sound, a process called *peer review*.

However, publication is only one facet of the final step of the scientific. The other is a process called **replication** in which the researcher or another psychologist who is intrigued by her findings or wants to challenge them to repeat the study using the same procedures. The purpose of replication is to determine whether the original results were a one-time phenomenon or evidence of a true, underlying psychological principle.

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

**replication** The process of repeating a study to verify research findings.

than the 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, the researcher would go on to examine how different types of games affect practice time.

**1.3** What are the goals of psychology?

**The Goals of Psychology**

What goals do psychological researchers pursue when they plan and conduct their studies? Briefly put, psychologists pursue four broad goals:

- **Description:** Identifying and classifying behaviors and mental processes as accurately as possible
- **Explanation:** Proposing reasons for behaviors and mental processes
- **Prediction:** Offering predictions (or hypotheses) about how a given condition or set of conditions will affect behaviors and mental processes
- **Influence:** Using the results of research to solve practical problems that involve behavior and mental processes

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

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

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.

The scientific method has 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 cohesive theories can help us in the quest for understanding. With that point in mind, we’ll turn our attention to some early attempts at psychological theory building and the schools of thought and psychological perspectives that arose from the debate stimulated by them.

The *Summarize It* below summarizes the goals of psychology and applies them to the video game hypothesis we discussed earlier.

**Step 5a: Review!**

To be sure you’ve understood each major section before you move on to the next one:

- Look over the notes in your outline for each of the section’s subheadings.
- Answer the Remember It questions at the end of each section
- Log on to MyPsychLab and take the section’s Quick Review quiz.

**The Goals of Psychology**

Watch the Video Episode 1: The Big Picture: Asking Tough Questions in MyPsychLab

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.

**SUMMARIZE IT**

**REMEMBER IT**

Check your answers and take additional quizzes in [MyPsychLab.com](http://MyPsychLab.com). ✓ Study and Review on [MyPsychLab](http://MyPsychLab)

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.

## Psychology Then and Now

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. Psychology became distinct from philosophy when researchers began to use the scientific method to study behavior and mental processes. By the 1920s, the field's earliest researchers had laid the foundations of the major schools of thought and psychological perspectives that exist in psychology today. As the field grew and research findings accumulated, specialty areas within the field began to follow distinctive pathways.

### Exploring Psychology's Roots

Psychology became a science and an academic discipline in the 19th century when people who wanted to learn more about behavior and mental processes began to use the scientific method. Conventional thought at the time held that such endeavors were the exclusive province of white males. Nevertheless, several researchers overcame gender and ethnic prejudice in the late 19th and early 20th centuries to make notable contributions to the field of psychology.

**1.4** What did the early psychologists contribute to the field?

**Structuralism and Functionalism.** 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. (A *metronome* is a mechanical or electronic device that emits ticking sounds that represent musical rhythms such as 2/4 and 4/4 time at varying tempos.) Introspection as a research method involves looking inward to examine one’s own conscious experience and then reporting that experience.



▲ 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, aimed at analyzing the basic elements, or structure, of conscious mental experience.

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



▲ 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.  
Source: Archives of the History of American Psychology—The University of Akron.

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 aimed at analyzing 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<sub>2</sub>O) 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.

As structuralism began 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 the mentally impaired, 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).

**The Changing Face of Psychology.** As we noted earlier, during the early days of psychology, most people believed that academic and scientific pursuits were the exclusive province of white males. However, there were a number of women and minority group members who refused to allow convention to stand in the way of their quest for a better understanding of behavior and mental processes. They broke barriers that paved the way for later scholars and, at the same time, made important contributions to the field. Here are a few examples:

- *Christine Ladd-Franklin (1847–1930)*: completed Ph.D. requirements at Johns Hopkins University in the mid-1880s but had to wait 40 years to receive her degree; formulated evolutionary theory of color vision.



- *Mary Whiton Calkins (1863–1930)*: completed Ph.D. requirements at Harvard in 1895, but the university refused to grant doctorate to a woman (Dewsbury, 2000); established psychology laboratory at Wellesley College; developed methods for studying memory; first female president of the American Psychological Association in 1905.
- *Margaret Floy Washburn (1871–1939)*: received a Ph.D. in psychology from Cornell University; taught at Vassar College (Dewsbury, 2000); wrote influential books on animal behavior and mental imagery.
- *Francis Cecil Sumner (1895–1954)*: first African American to earn a Ph.D. in psychology; translated more than 3,000 research articles from German, French, and Spanish; chaired psychology department at Howard University; known as the “father” of African American psychology.
- *Albert Sidney Beckham (1897–1964)*: established the first psychological laboratory at an African American institution of higher education (Howard University); studied relationship of intelligence to occupational success.
- *Kenneth Clark (1914–2005) and Mamie Phipps Clark (1917–1983)*: conducted studies of detrimental effects of racial segregation on African American children’s self-esteem that were cited in Supreme Court ruling that declared racial segregation in U.S. schools unconstitutional (Benjamin & Crouse, 2002; Lal, 2002).
- *George Sánchez (1906–1972)*: studied cultural and linguistic bias in intelligence testing during the 1930s (Sánchez, 1932, 1934).

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, 2008). Consequently, the APA and other organizations have established programs to encourage minority enrollment in graduate programs in psychology.

## 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 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 remains 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 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.



▲ 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.

## 1.5 What are the major schools of thought in psychology?

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

Skinner's research on operant conditioning emphasized the importance of reinforcement in learning and 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.

**Psychoanalysis.** Sigmund Freud (1856–1939), whose work you will study in Chapter 11, 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.

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*. Thus, the psychoanalytic approach continues to be influential, albeit in a form that has been modified considerably over the past several decades by the neo-Freudians.

**Humanistic Psychology.** Humanistic psychologists reject with equal vigor (1) the behaviorist view that behavior is determined by factors in the environment and (2) the view of the psychoanalytic approach stating 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 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 9, 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. Rogers developed what he called *client-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 (more on humanistic therapies in Chapter 13).

The humanistic perspective continues to be important in research examining human motivation and in the practice of psychotherapy via a relatively new approach known as **positive psychology**. Martin Seligman (2011), the best known proponent of this approach, defines positive psychology as the scientific study of psychological characteristics, such as optimism, that enable individuals and communities to thrive in the face of adversity. He argues that these characteristics help to protect individuals from traumatic experiences that behaviorists and psychoanalysts suggest almost always doom them to emotional maladjustment. You will read more about positive psychology in Chapter 9.

**Cognitive Psychology.** Cognitive psychology grew and developed partly in response to strict behaviorism, especially in the United States (Robins, Gosling, & Craik, 1999). **Cognitive psychology** sees 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

**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.

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

**positive psychology** The scientific study of psychological characteristics that enable individuals and communities to thrive in the face of adversity.

**cognitive psychology** The school of psychology that sees 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.

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** 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 lightbulbs 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 Gestalists, 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 immigrated 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.

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. But as modern technology has changed computers and computer programs, cognitive psychologists 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).

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 thought by many psychologists to be the most prominent school of psychological thought (Robins et al., 1999). As a result, you will encounter many references to cognitive approaches to a variety of issues in subsequent chapters.

**Evolutionary Psychology.** Why do you think all babies form attachments to their primary caregivers? This is the kind of question that interests *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 on 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.

**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.

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



▲ 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.”



▲ 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.

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

**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.

**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.

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 on humans by having an efficient means of communicating information from one person to another.

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 (Buss, 1999, 2000a, 2000b, 2001, 2008). You'll read more about Buss's work and that of his critics in Chapter 9.

**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 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.

**The Sociocultural Approach.** How do your background and cultural experiences affect your behavior and mental processing? 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. Similarly, researcher Lesley Lambright (2003) explored the cultural characteristics that have helped the Vietnamese survive centuries of warfare. In in-depth interviews with Vietnamese men and women ranging in age from 24 to 68, she learned that Vietnam's multicultural background and the tolerance derived from it, the Vietnamese people's strong family system, and their tendencies toward optimism, patience, and flexibility were instrumental to the resilience of this group. Another factor that emerged from Lambright's study was the tendency of Vietnamese to endorse forgiveness and practicality over vengeful responses to their enemies. A follow-up study that presented Lambright's interview questions in survey form to



▲ A sociocultural approach helps psychologists explain cross-cultural differences in behavior.

Vietnamese college students suggested that younger individuals perceive some of these aspects of traditional culture, such as strong family ties, to be changing. Thus, a socio-cultural approach to understanding psychological variables such as resilience can shed light both on how culture and cultural changes shape the individual's experiences.

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.

## Contemporary Psychological Perspectives ▶

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. 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

### 1.6 What are the seven contemporary psychological perspectives?

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

## Contemporary Perspectives in Psychology

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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 his 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 this student's definition of a meaningful life.
Cognitive	The role of mental processes—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 his physical appearance and capacity for social dominance than they are in his 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 this student from performing at an optimal level.
Sociocultural	The roles of social and cultural influences on behavior	The student doesn't want to be perceived as a "nerd," so he studies just enough to avoid failing.



Click here in your eText for an interactive tutorial on Psychological Perspectives

- *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

The *Summarize It* lists these perspectives and illustrates how each might explain a student's poor performance on exams.

Psychologists need not limit themselves to just one perspective or approach. Many take an *eclectic position*, choosing a combination of approaches to explain a particular behavior. For example, a psychologist may explain a behavior in terms of both environmental factors and mental processes. 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.

## 1.7 What specialty areas exist in psychology?

### Specialties in Psychology

Stop for a minute and reflect on the definition of psychology: *the study of behavior and mental processes*. Clearly, this definition covers a lot of territory. Thus, it's not surprising that, over the years, psychology has become a highly specialized field. For instance, some psychologists work exclusively with issues related to mental illnesses, such as schizophrenia, that affect a small number of people, while others address questions that concern just about everyone, such as how stress affects health. Likewise,

some psychologists focus on research, while others apply the principles of psychology to practical problems. Regardless of specialty area, all psychologists have advanced degrees, typically a Ph.D., in the field. Here is an overview of the major specialty areas in the field today:

- *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.


### REMEMBER IT

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1. The major criticism of Wundt's and Titchener's research methods was that they were not \_\_\_\_\_.
2. American psychologist \_\_\_\_\_ was an advocate of functionalism.
3. Today, more (women than men/men than women) obtain degrees in psychology.
4. The major emphasis of \_\_\_\_\_ is the study of the unconscious.
5. John Watson was the founder of \_\_\_\_\_.
6. The \_\_\_\_\_ school of thought focuses on mental processes such as memory and problem solving.
7. One finding of interest to psychologists who represent the \_\_\_\_\_ perspective is the fact that attachment is a universal feature of infant-caregiver relations.
8. The \_\_\_\_\_ perspective emphasizes the role of social and cultural variables in explanations of individual behavior.
9. The \_\_\_\_\_ \_\_\_\_\_ argues that multiple perspectives are necessary to comprehensively explain behavior and mental processes.
10. \_\_\_\_\_ psychologists specialize in the diagnosis and treatment of psychological disorders.

At this point, you may be wondering how the psychological perspectives relate to the various specialty areas. Think of it this way. Each perspective is a theoretical point of view that a psychologist in any of the specialty areas can use to explain a behavior or mental process that is relevant to her field of study. For instance, the behavior explained in the *Summarize It* table on page 14, a student's poor performance on exams, falls within the domain of educational psychology. By contrast, a clinical psychologist might use the various perspectives to explain the symptoms of a psychological disorder such as depression. A counseling psychologist might use them to explain how people cope with major life changes such as divorce. An industrial/organizational psychologist would use them to explain individual differences in job satisfaction. In other words, it's possible to apply any of the perspectives within the boundaries of any of the specialty areas. Moreover, regardless of which perspective they adopt or their area of specialization, all psychologists approach questions about behavior and mental processes with a set of intellectual tools that you can acquire with a little practice.

## Thinking about Theories and Research

Now that you have read about the various theoretical perspectives in psychology, you probably want to know which of them are “true” and which are “false.” However, psychologists don't think about theories in this way. Instead, they evaluate theories in terms of their usefulness. 

Likewise, you may wonder whether learning about research methods is of any practical value to people who do not intend to become professional researchers. As you'll see, knowledge about research methods can prove extremely useful in everyday life.

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### 1.8 How do psychologists evaluate theories?

#### Evaluating Theories

As you learned earlier in this chapter, useful theories help psychologists achieve the prediction goal by generating testable hypotheses. When assessed against this criterion, the theories 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 of 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.



## Evaluating Research

### 1.9 How will critical thinking help you evaluate 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, not long ago, the news media carried a number of reports warning that working the night shift increases an employee's risk of developing heart problems. These warnings were based, reporters said, on a scientific analysis of 34 studies that involved more than two million workers across a number of countries. The study was published in the prestigious *British Medical Journal* (Vyas et al., 2012) 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.

Applying the first of these three characteristics to the shift work–heart problems 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. 👁

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 shift work and heart problems, a person might say, “I don't agree with that study because my father has worked the late shift for years, and he doesn't have heart problems.”

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 other researchers have reported regarding a possible link between shift work and heart problems. 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.

The quality of the evidence is just as important as the quantity. Thus, a critical thinker would evaluate the findings of the shift work–heart problems study by considering the methods used to obtain them. Did the researchers randomly assign employees to experimental and control groups who worked day and night shifts and then assess whether experimental and control employees differed in the frequency of heart problems later? If so, then the study was an experiment, and media claims that shift work leads to heart problems might be justified. Conversely, if the researchers simply compared rates of heart problems in day- and night-shift employees, then claims of a causal relationship between the two variables would not be justified. Instead, the appropriate response would be to look for underlying variables, such as how day- and night-shift workers differ in eating and exercise habits, that might explain the connection. In fact, the research cited in these reports was correlational in nature, so the strong causal claims implied by many media accounts of the study were inappropriate.

\* **Explore the Concept** *How to Be a Critical Thinker on MyPsychLab*

**critical thinking** The process of objectively evaluating claims, propositions, and conclusions to determine whether they follow logically from the evidence presented.

👁 **Watch the Video** *Episode 2: Thinking Like a Psychologist Thinking Critically in MyPsychLab*

**REMEMBER IT**

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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 \_\_\_\_\_ about research.
4. Critical thinking about media reports of research requires some familiarity with \_\_\_\_\_.

## Descriptive Research Methods

The goals of psychological research are often accomplished in stages. In the early stages of research, **descriptive research methods** are usually the most appropriate. Descriptive research methods yield descriptions of behavior and include naturalistic and laboratory observation, the case study, and the survey.

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

### 1.10 What are the pros and cons of observational and case studies?

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

**laboratory observation** A descriptive research method in which behavior is studied in a laboratory setting.




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

### Observational and Case Studies

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. Suppose, 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 independent observers view the same behavior. If you and another observer independently count, say, 23 aggressive acts in an hour of free play, the findings are considered unbiased. If you see 30 such acts and the other observer records only 15, some kind of bias is at work. In such situations, observers usually clarify the criteria for classifying behavior and repeat the observations. Using video 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 attraction,

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 attraction studies, some of the behavior people display in laboratory simulations of dating may not occur in real-world dating situations. 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. 

In a **case study**, a single individual or a small number of persons 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. Like observational studies, case studies are exploratory in nature. Their 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.

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 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. 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).

It might seem that simply interviewing people with a standard set of questions would be the best way to gather survey data. In reality, the truthfulness of participants' responses can be affected by characteristics of the interviewers, such as their gender, age, race, ethnicity, religion, and social class. Thus, to use interviews effectively,

 **Watch the Video** Episode 1: The Real Word: Speed Dating in **MyPsychLab**

**case study** A descriptive research method in which a single individual or a small number of persons are studied in great depth.

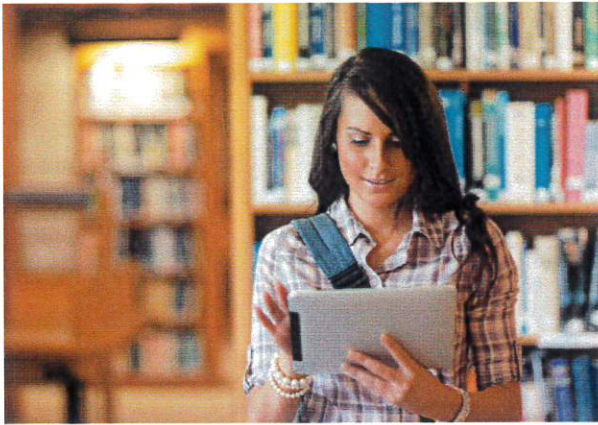
### 1.11 How do researchers design useful surveys?

**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 to reach conclusions about the entire population.

**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.



▲ 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.

survey researchers 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, researchers who use Web-based surveys must be cautious about generalizing the results of their studies because respondents represent only the population of Internet users who choose to participate, not the general population or even the entire population of Internet users. Moreover, they must take steps to ensure that a respondent can participate in the study only once (Gosling et al., 2004).

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 (Johnston, O'Malley, Bachman, & Schulenberg, 2010) 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, Smith, & Rasinski, 1997).

### 1.12 What are the strengths and weaknesses of the correlational method?

#### The Correlational Method

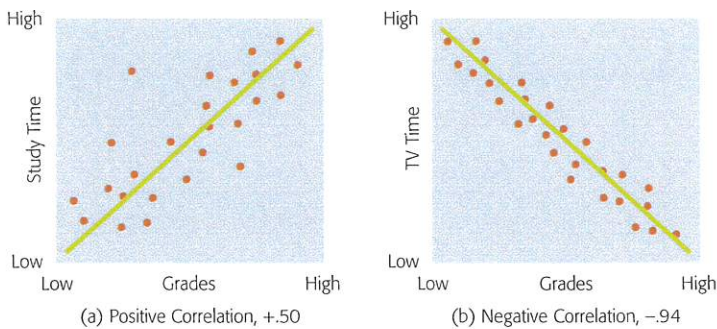
Perhaps the most powerful descriptive method available to psychologists is the **correlational method**, a method used to establish the degree of relationship (correlation) between two characteristics, events, or behaviors. A group is selected for study, and the variables of interest are measured for each participant. For example, one researcher studied 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; 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  $+.64$ .

**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.

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 accumulates on a car’s odometer, the less reliable the car 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 the Appendix.)

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 and illustrated in the *Try It* on page 22.

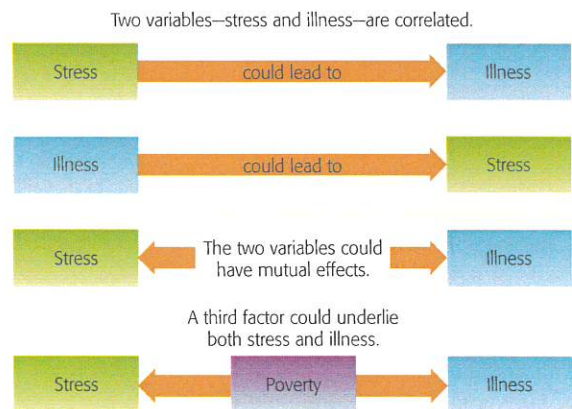
So, you might be thinking, if a researcher can’t draw cause-effect conclusions, why do correlational studies? There are four reasons. First, correlations are quite useful for making predictions. One prediction of this type with which you may be familiar involves the use of a college applicant’s high school class rank as a factor in admissions decisions. In general, the positive correlation between high school class rank and success in college means that the higher an applicant’s rank in high school, the more likely he or she is to succeed in college. Likewise, as you will learn from the *Explain It* on page 22, several correlations determine whether a particular individual gets a credit card or loan.

Correlational studies are also useful when it is 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.



▲ Temperature is correlated with snow-cone sales. As temperature increases, so does the number of snow cones sold. Is this a positive or a negative correlation? What about the corresponding correlation between temperature and coffee sales? Is it positive or negative?



**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.

## TRY IT

What Is the *Third Variable Problem*?

The *third variable problem* occurs when one variable is associated with another because both are linked to a third, unmeasured variable. See if you can determine the unmeasured variable that underlies these correlations.

1. The more churches a town has, the more bars it has.
2. The more mileage a car has accumulated, the less reliable it is.
3. The larger a child's shoe size, the higher his raw score on an intelligence test (i.e., the number of questions he answers correctly).



PsychTutor

Click here in your eText for an interactive tutorial on **Correlation Versus Causation**

## Answers:

1. The third variable is population. The larger the town, the more establishments of all kinds there are in it.
2. Many answers are possible, but the best one is that a car's parts wear out as it accumulates mileage. So, the third variable is wear and tear on the car's parts.
3. The third variable is age. The older children are, the more questions they answer correctly on intelligence tests.

## EXPLAIN IT

## What Is a Credit Score?

Have you seen television commercials or pop-up ads that ask, "What's your credit score?" If so, you probably inferred from the ad itself that credit scores are connected in some way to your financial well-being. That's true, but do you really know what a credit score is? You can use what you've just learned about correlations to get a better understanding of what credit scores are and how they are determined.

A credit score is a numerical summary of an individual's financial history that predicts the likelihood that he or she will have a delinquency in the future. A delinquency is failure to pay back a loan, declaration of bankruptcy, or any instance in which a person makes a payment on a loan or credit card more than 90 days after the original due date. The higher a person's credit score, the lower the likelihood of a future delinquency (Equifax, 2006). Thus, the connection between credit scores and delinquencies is a correlation, one that allows financial institutions to make predictions about the likelihood that an applicant will fulfill her financial obligations. Can you determine the nature (positive or negative) of the correlation between credit scores and delinquency risk? The graph in Figure 1.4 may help you visualize it.

If you compare this graph to the scatterplots in Figure 1.2 on page 21, you will see that the correlation between credit scores and delinquencies is negative. In other words, the higher your score, the lower your chances of a delinquency. Consequently, using credit scores helps lenders minimize the chances that consumers will fail to pay them back.

The credit score itself is based on several correlations. Some of these correlations are positive, and some are negative. See if you can determine which of

the three credit score factors below is based on positive correlations and which is derived from negative correlations (see answers following):

- The longer your credit history, the higher your score.
- The more credit cards you have, the lower your score.
- The more reports of late payments there are on your credit report, the lower your score.

If you guessed that a positive correlation is the basis of the first item on the list, and the others are based on negative correlations, you are correct.

Thanks to the association between length of credit history and credit scores, the scores of young adults tend to go up somewhat automatically during the first few years after they get their first loan or credit card. Of course, young consumers don't benefit from this factor unless they also make payments on time, refrain from running up large credit card balances, and resist the temptation to borrow money excessively as they work to build their credit histories. Once young consumers grasp the nature of the correlations that are embodied in credit scores, they can manipulate those correlations in their favor to increase the scores.



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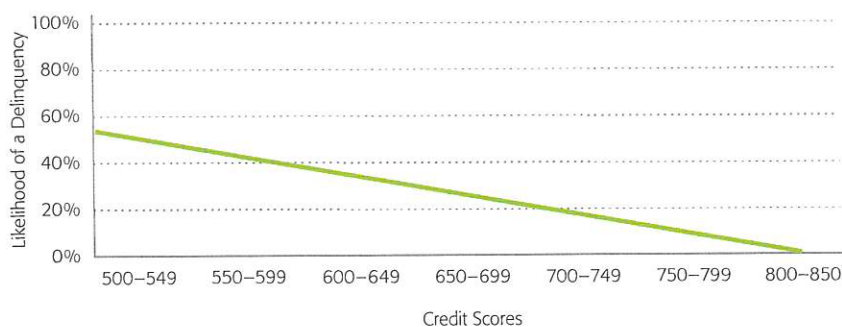


FIGURE 1.4 Predicting Credit Delinquencies

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.

### REMEMBER IT

Check your answers and take additional quizzes in MyPsychLab.com. ✓ [Study and Review on MyPsychLab

1. One problem with the \_\_\_\_\_ is that it often does not generalize to individuals other than the subject of the study.
2. In order to be useful, a survey must be based on a \_\_\_\_\_ sample.
3. A(n) \_\_\_\_\_ is a number describing the strength and direction of a relationship between two variables.
4. In positive correlations, two variables move in \_\_\_\_\_.
5. In negative correlations, two variables move in \_\_\_\_\_.
6. The closer a correlation coefficient is to +1.0 or -1.0, the \_\_\_\_\_ the relationship between two variables.

## 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 that a cause-effect relationship exists 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?

**An Example of an Experimental Study.** Alan Lang and his colleagues (1975) conducted a classic experiment to determine whether alcohol consumption itself increases aggression or whether the beliefs or expectations about the effects of alcohol cause the aggressive behavior. The participants in the experiment were 96 male college students. Half of 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

**1.13** How do researchers use experiments to test causal hypotheses?

**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.

**variable** Any condition or factor that can be manipulated, controlled, or measured.

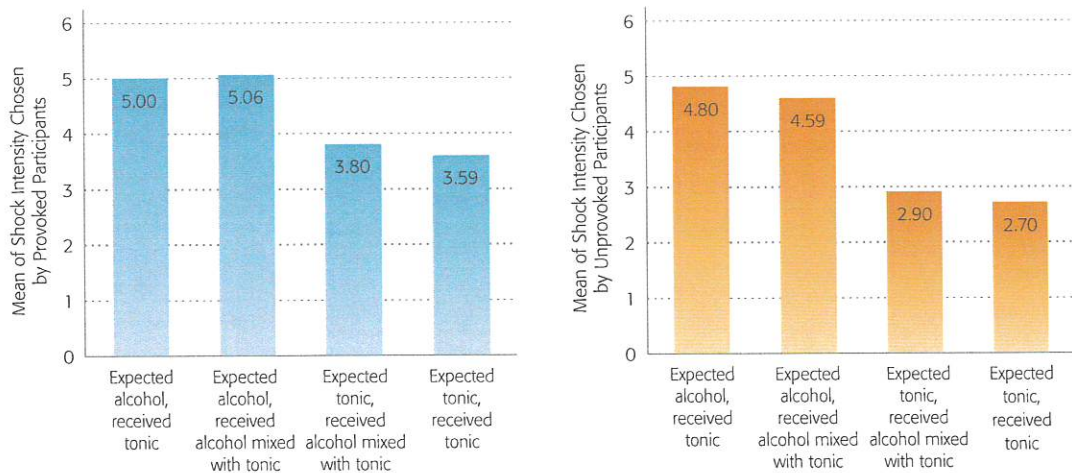
After the students had consumed the designated amount, the researchers had an accomplice, who posed as a participant, purposely provoke half the students by belittling their performance on a difficult task. All the students then participated in a learning experiment, in which the same accomplice posed 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 they were drinking only tonic (see Figure 1.5). The researchers concluded that it was the *expectation* of drinking alcohol, not the alcohol itself, that caused the students to be more aggressive.

**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) 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.


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

Why would expecting to drink alcohol affect a person’s behavior almost as much as actually drinking it?



**FIGURE 1.5 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. (1995)



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. 

**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, as noted earlier, used three experimental 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

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 a change occurs? 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. Suppose 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 count how many still have headaches an hour later. But some headaches go away without treatment. So if the medication appears to work, it may be only 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.

## Limitations of the Experimental Method

You now know that experiments provide information about cause–effect relationships. But what are their limitations?

**Confounding Variables.** One of the advantages of the experimental method is that it enables researchers to exercise strict control over the setting. However, the more control they exercise, the more unnatural and contrived the research setting becomes. And the more unnatural the setting becomes, the less applicable findings may be to the real world. However, the most important limitation of the experimental method is that, even when a researcher follows the method's steps scrupulously, **confounding variables**, factors other than the independent variable(s) that are unequal across groups, can prevent her from concluding that the independent variable caused a change in the dependent variable. Three sources of bias are frequently responsible for the presence of confounding variables in an experiment: selection, the placebo effect, and experimenter bias.

**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 on MyPsychLab

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

**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.

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

**confounding variables** Factors other than the independent variable(s) that are unequal across groups.

**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.

**Selection Bias.** 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, **selection bias** occurs. 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 as the *Try It* on page 26 illustrates. Random assignment maximizes the likelihood that the groups will be as similar as possible at the beginning of the experiment. If there were preexisting differences in students' levels of aggressiveness in the Lang experiment, random assignment would have spread those differences across all the groups.

**Participant and Experimenter Bias.** 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** 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



## TRY IT

### Does Random Assignment Really Make Groups Equal?

You will need a set of 100 poker chips with 50 white chips, 25 red chips, and 25 blue chips for this activity. Put all of the chips in an opaque bag or container. Draw one chip out of the container and flip a coin. If heads comes up, assign the chip to the "experimental group." If it's tails, assign the chip to the "control group." Repeat the procedure for all 100 chips. When you are finished, determine the proportion of white, red, and blue chips in each group. The proportions should be very close to 50% white, 25% red, and 25% blue. Repeat the activity imagining that each chip color represents a human characteristic, such as ethnicity, that a researcher might be interested in. As you will see, by randomly assigning participants to experimental and control conditions, a researcher can

construct groups that are equally representative of the population from which they are drawn.

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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**.

**Quasi-Experiments.** Some treatments cannot ethically be given to human participants because their physical or psychological health would be endangered. For instance, as we noted earlier, it would be unethical to intentionally expose fetuses to alcohol for the purpose of experimentation. For this reason, researchers must conduct **quasi-experiments**, comparisons of groups that have differing degrees of exposure to a variable of interest, to study variables such as the effects of prenatal drug exposure. Quasi-experiments do not provide evidence of causal relationships, but they are the only option available for studying variables such as prenatal alcohol exposure.

Quasi-experiments are also useful when it is impractical or impossible to manipulate an independent variable of interest. For instance, when educational researchers compare test scores of children attending different schools, they are conducting quasi-experiments. Likewise, comparisons of groups that differ in gender, age, income, educational attainment, and a host of other variables are quasi-experiments.

**Cross-cultural research**, comparisons of mental processes and behaviors in different cultures, is also quasi-experimental. As we noted in the discussion of the sociocultural perspective earlier in the chapter, research examining the influence of culture on behavior and mental processes has become increasingly important in recent years. Cross-cultural research is important in evolutionary psychology as well due to its focus on universal phenomena such as infant attachment.

The *Summarize It* summarizes the different types of research we have discussed in this chapter.

**double-blind technique** A procedure in which neither the participants nor the experimenters know who is in the experimental and control groups until after the data have been gathered; a control for experimenter bias.

**quasi-experiments** Comparisons of groups that differ in exposure to a variable of interest that cannot be manipulated for ethical or practical reasons.

**cross-cultural research** Comparisons of mental processes and behaviors among humans living in different cultures.

SUMMARIZE 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.	Researcher'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 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 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**

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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.

## Research Participants

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 human participants and animal subjects are to be treated.

**1.15** How can participants' characteristics influence a study's usefulness?



### 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. During the 1990s, several psychologists offered critiques of the lack of representativeness of participants in psychological research. These critiques raised awareness of the failure of psychologists to consider the effects of their sample selection procedures on the results of their studies. As a result, the American Psychological Association and other professional organizations began to require that researchers make every effort to ensure that participants are representative of the population to which the study's results will be generalized. These organizations also require that researchers include detailed information about participants' characteristics (i.e., age, ethnicity) in all published research. A few areas of concern are race, gender, and age.

Researcher Sandra Graham (1992) put forward two important criticisms regarding study participants. She pointed out that whites are often overrepresented in psychological studies because the majority of studies with human participants 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 called **participant-related bias**. Graham (1992) also 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 (634).

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

**participant-related bias** A type of bias in which a study's participants are not representative of the population to which results will be generalized.

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.

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 understate 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 Human Participants' and Animals' Rights ▶

**1.16** How do researchers protect human participants' and animals' rights?

In 2002, the American Psychological Association (APA) adopted its most recent 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. In 2010, the APA amended the code of ethics to clarify this provision. These amendments require psychologists to act in accord with basic human rights even if the laws under which they are practicing or the policies and regulations of the organizations for which they work violate such rights (APA Ethics Committee, 2010).
- **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.
- **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.
- **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.


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

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

- *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. Thus, it is important to address the question of whether animal research is really necessary.

The fact that virtually all of the marvels of modern medicine are at least partially the result of experimentation using animals supports the view that animal research is indeed necessary (Aaltola, 2005). Such research 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 several mental illnesses such as schizophrenia (Thaaker & Himabindu, 2009). Thus, animal research is critically important to experiments that involve variables that cannot be ethically manipulated in human beings.

However, the material benefits derived from an action cannot stand alone as an ethical justification for it (Brody, 2012). For this reason, decisions about the use of animals in research must balance the potential benefits of a given study against the pain and suffering that might be inflicted upon its animal subjects. For example, studying potential cures for cancer might justify intentionally making an animal fatally ill. By contrast, a study that goes to this extreme in search of a cure for male pattern baldness might not. Emphasis on achieving this kind of ethical balance in animal research has led to a search for alternative research methods that are reportedly resulting in a decrease in the numbers of animals needed (Garrett, 2012). 

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### REMEMBER IT

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

## Looking Back

In this chapter, you have learned a great deal about psychologists, the methods they use, and a tried-and-true approach to studying textbook chapters, the SQ3R method. To be most effective, a general study method such as SQ3R must be adapted to each individual's learning preferences and study skill level. To implement this goal, think about how personally helpful each of the SQ3R features was as you worked your way

through Chapter 1. Use the following table to rate each feature according to this scale: 2 = very useful, 1 = somewhat useful, and 0 = not useful. As you read each chapter, make a conscious effort to follow the SQ3R steps, devoting the most emphasis to those features to which you gave a rating of 1 or 2. Such an approach will enable you to use your study time efficiently and effectively and, we hope, avoid those pre-exam "all-nighters."