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In early 2011, IBM sent its supercomputer, Watson, to compete on the game show Jeopardy against highly successful human players, and he (or it) actually won! Sure, computers can do a lot of things better than humans—like math or storing and retrieving facts—but most people believe that machines will always lack some essentially human elements: personality, wisdom, maybe a sense of humor, or even (depending on your beliefs) a soul. But imagine yourself finishing up the 15th page of a 15-page term paper when your computer freezes up and all your work is lost. Are you one of those who would treat the computer as if it were human? Many people would call their machine a name, blame it for acting up, and seethe in anger.

Why do we express hostility toward inanimate objects? Psychologists refer to the act of treating objects or animals like people as anthropomorphism, and they say it is rather predictable. In fact, it is interesting how readily we attribute elaborate intentions to objects and animals, whether it is a computer that is out to get you, a car that will not cooperate, or even a pet cat that behaves as though she is queen of the house.

Given that we incorrectly see intentions in so many places, what makes people think they are so accurate at understanding the real intentions of other people? If we can be tricked into thinking a computer is outsmarting us, we should be cautious when thinking we understand one another—or even ourselves.

**Focus Questions**

1. How can the human mind, with its quirks and imperfections, conduct studies on itself?
2. How can scientific and critical thinking steer us toward a clearer understanding of human behavior and experience?

Which words and images come to mind when you hear that someone is a psychologist? Many of us think of professionals conducting therapy or people in white lab coats watching rats run through mazes. The field of psychology is also viewed through the lens of “pop” psychology—the scores of self-help gurus on TV, on the radio, and in the books lining bookstore shelves. Although these images are not necessarily false, they do not fully capture...
The Science of Psychology

:: Module 1.1 ::

HYPOTHESES: MAKING PREDICTIONS

Scientific thinking and procedures revolve around the concepts of hypothesis and theory. Both guide the process and progress of the sciences. A **hypothesis** (plural: hypotheses) *is a testable prediction about processes that can be observed and measured*. A testable hypothesis is one that can be confirmed or rejected (you do not prove a hypothesis), and a scientific hypothesis *must* be testable. These rules are regularly broken by people claiming to be scientific. For example, astrologers and psychics are in the business of making predictions. An astrologer might tell you, “It's a good time for you to keep quiet or defer important calls or emails.” This sounds like a request to not even bother testing the prediction, because it might come true. The horoscope leaves two courses of action: (1) cave in, fully accept the prediction, and heed the advice or (2) take your chances. If you take your chances, it is very likely that by the scope of the field of psychology. As you will soon discover, some of your expectations about psychology will likely be challenged in your introductory psychology course.

To begin, we should acknowledge that psychology is a vast discipline; in fact, we might do better to consider it to be a collection of disciplines, composed of many overlapping fields of study. Two unifying qualities allow us to group all these fields into the category of psychological science. First, psychology involves the study of behavior that, broadly defined, can include perceptions, thoughts, and emotions. Second, psychologists employ the scientific method in their work. On these grounds, we can define **psychology as the scientific study of behavior, thought, and experience**. Psychologists share with other sciences a common set of methods and perspectives for understanding the world.

The Scientific Method

What exactly does it mean to be a scientist? A person who haphazardly combines chemicals in test tubes may look like a chemist, but he is not conducting science; a person who dissects a specimen just to see how it looks may appear to be a biologist, but this is not science either. In contrast, a person who carefully follows a system of observing, predicting, and testing is conducting science, whether the subject matter is chemicals, physiology, human memory, or social interactions. In other words, whether a field of study is a science, or a specific type of research is scientific, is based not on the subject but on the use of the scientific method. The **scientific method** is a way of learning about the world through collecting observations, proposing explanations for the observations, developing theories to explain them, and using the theories to make predictions. It involves a dynamic interaction between hypothesis testing and the construction of theories, outlined in Figure 1.1.

[FIG. 1.1] The Scientific Method Scientists use theories to generate hypotheses. Once tested, hypotheses are either confirmed or rejected. Confirmed hypotheses lead to new ones and strengthen theories. Rejected hypotheses are revised and tested again, and can potentially alter an existing theory.
THEORIES: EXPLAINING PHENOMENA

Hypotheses are a major component of scientific theories. A theory is an explanation for a broad range of observations that also generates new hypotheses and integrates numerous findings into a coherent whole. Figure 1.1 shows how hypothesis testing eventually leads back to the theory from which it was based. Theories are built from hypotheses that are repeatedly tested and confirmed; in turn, good theories eventually become accepted explanations of behavior or other natural phenomena. Similar to hypotheses, an essential quality of scientific theories is that they can be proved false with new evidence. In fact, any scientific theory must be falsifiable: Just as researchers can discover strong evidence in support of a theory, they can also discover evidence that falsifies a theory. As Figure 1.1 shows, theories can be updated with new evidence. The process helps to ensure that science is self-correcting—bad ideas typically do not last long in the sciences.

The term theory is often used very casually, which has led to some persistent and erroneous beliefs that many people have about scientific theories. So to clarify a few common issues:

- **Theories are not the same thing as opinions or beliefs.** Yes, it is certainly true that everyone is entitled to their own beliefs. But the phrase “That’s just your theory” is neither the correct use of the term “theory,” nor an argument that a scientist would make.

- **All theories are not equally plausible.** Groups of scientists might adopt different theories for explaining the same phenomenon. For example, several theories have been proposed to explain why people become depressed. This does not mean that anyone can throw their hat into the ring and claim equal status for his or her theory (or belief). There are good theories, and there are not-so-good theories.

- **A measure of a good theory is not the number of people who believe it to be true.** According to a 2009 Gallup Poll, a mere 39% of Americans believe in the theory of evolution by natural selection, despite the fact that it is the most plausible, rigorously tested theory of biological change and diversity.

Testing hypotheses and constructing theories are both part of all sciences. In addition, each science,
including psychology, has its own unique way of approaching its subject matter. As the study of human behavior and experience, psychology examines the individual as a product of multiple influences, including biological, psychological, and social factors.

THE BIOPSYCHOSOCIAL MODEL  Defining psychology as the scientific study of behavior, thought, and experience may sound pretty straightforward, but thinking and behaving are complex subjects with complex explanations. One psychologist might study a single type of cell in the nervous system, whereas another might examine the cultural customs and beliefs that shape daily life for millions of people—all this to explain the same overarching question: Why do we behave the way we do?

Because our thoughts and behaviors have multiple influences, psychologists adopt multiple perspectives to understand them. The biopsychosocial model is a means of explaining behavior as a product of biological, psychological, and sociocultural factors (Figure 1.2 on p. 6). Biological influences on our behavior involve brain structures, chemicals, hormones, and drug effects. On the other end of the spectrum, your family, peers, and immediate social situation also determine how you think, feel, and behave. Also, a balanced understanding of psychology requires that we always incorporate the influences of ethnicity and gender in our discussion of human behavior. These influences constitute the sociocultural part of the model. In between biology and culture, we can examine how a person’s thoughts, experiences, emotions, and personality constitute his or her psychological makeup. Often, behavior can be fully explained only if multiple perspectives are incorporated. This will become particularly apparent as you read about research that tackles complex topics.

Throughout this text, we will apply the biopsychosocial model to many of the topics we will cover. An icon, like the one in the margin, will appear in these sections, prompting you to apply the biopsychosocial model to a specific problem or question about multiple influences on thinking and behavior.

Quick Quiz 1.1a
The Scientific Method

1. A testable prediction about processes that can be observed and measured is referred to as a(n)_______.
   A theory  
   B hypothesis  
   C opinion  
   D hunch

2. A theory or prediction is falsifiable if:
   A it has been proven false.  
   B it is impossible to test.  
   C there can be evidence for it or against it.  
   D if and only if it comes from pseudoscience.

3. How would you apply the biopsychosocial model to a news report claiming that anxiety is caused by being around other people who are anxious?
   A Recognize that the news report considers all portions of the biopsychosocial model.  
   B Recognize that psychologists do not regard biological factors when it comes to anxiety.  
   C Recognize that the only effective treatment of anxiety must be drug based.  
   D Recognize that the news report only considers one portion of the biopsychosocial model.

4. The hypothesis that “exercise improves memory ability” is a scientific one because:
   A it cannot be confirmed.  
   B it cannot be rejected.  
   C it makes a specific, testable prediction.  
   D it can be proven.

Answers can be found on page ANS-1.
### Building Scientific Literacy

A major aim of this book is to encourage the development of the knowledge, skills, and attitudes that are central to the field of psychology. Also, the overarching goal of this textbook is to help students develop **scientific literacy**, the ability to understand, analyze, and apply scientific information. Our focal topic is psychology, but the same ways of thinking are applicable to other scientific fields. As you can see in Figure 1.3, scientific literacy has several key components, starting with the ability to learn new information. Certainly this text will provide you with new terminology and concepts, but you will continue to encounter psychological and scientific terminology long after you have completed the course. Being scientifically literate means that you will be able to read and interpret new terminology, or know where to go to find out more.

Knowledge of terminology by itself does not make a person scientifically literate; individuals should also develop an ability to provide explanations that incorporate
Many students do what is called *massing*—they break up a large pile of cards into smaller groups and move through each pile separately. Another approach is *spacing*—leaving the cards in one big stack and moving through them one at a time. In contrast to massing, spacing means that there is more time between seeing each individual card. The larger the deck, the longer it will be until you return to the beginning. If you used the massing technique (most students prefer it), it is likely because it seems easier and it may even give you the sense that it is more effective than spacing. Actually, the two strategies are not equally effective, and spacing is the better of the two.

![How can science explain this difference?](image)

To find out which study method really works better, psychologist Nate Kornell (2009) conducted an experiment in which he asked a group of 20 student volunteers to practice studying vocabulary words for a standardized test. Students tried studying using both massing and spacing methods. For the massing study session, they studied 20 vocabulary terms in four sets of five cards each. For the spacing study session, they studied another set of 20 vocabulary terms in one set of 20. As shown in Figure 1.4 (p. 8), the volunteers studied each word four times, regardless of the study method. At the end of the study period, Kornell administered a memory test and discovered that the volunteers could remember significantly more words from the spaced condition than from the massed condition. From these results, he concluded that it is better to study by spacing (despite the fact that the people in his study reported that they preferred massing).

![Can we critically evaluate alternative explanations?](image)

As with all research you encounter, there are limitations and other considerations to think about. In this example, the study methods people choose to use are counterintuitive, so it may be difficult to get people to adopt the spacing method. Many students will continue to adopt a massing strategy even though evidence suggests it is not as effective as spacing. Also, this study does not provide evidence that spacing works for all kinds of learning. The terms the students studied were common words that would likely be found on a standardized, general vocabulary test. It would be helpful to see additional studies that apply this research to studying specific topics in sciences and humanities. More importantly, it is not clear how we could apply Kornell’s results to other types of studying, such as learning to solve problems or think critically. Therefore, his results may be limited to factual and vocabulary learning.
Module 1.1: The Science of Psychology

Massed Versus Spaced Practice

In both conditions, volunteers studied each vocabulary word four times. In the massed condition, shown at left, the individual cards were studied closer together whereas in the spaced condition, at right, they were studied further apart. Spaced learning results in better memory for vocabulary terms.

You have a total of 20 terms to learn.

Massing: Studying a deck of five cards four times in a row. This masses study for an individual card, such as card A in the drawing above.

Spacing: Leaving all 20 cards in one stack and studying the whole deck four times in a row. This spaces the studying for each card, such as card A in the drawing above. However, in both conditions, card A will be studied the same number of times (four).

Why is this finding relevant?

Ideally, you will be inspired to apply this material to your own experiences as a student. Each chapter you read in this text includes definitions, and there is a set of flashcards available with the online tools accompanying this text at MyPsychLab, so perhaps you should consider the spacing method when studying key terms for each module. The spacing technique would probably also be useful in other courses, such as history, where you may need to match dates and major historical events, or in a foreign language course, where you are learning new vocabulary and verb conjugations.

CRITICAL THINKING, CURIOSITY, AND A DOSE OF HEALTHY SKEPTICISM

“Our products are 100% organic.”

“These remedies were developed by ancient cultures and have been used for centuries.”

“Join now and find your soul mate.”

In the 1800s, it was not uncommon for entrepreneurs, in the loosest sense of the term, to rally crowds of people to hear them pitch a brand-new product “guaranteed” to deliver whatever miracle people might be in search of. The term snake oil salesman is more fitting than entrepreneur, as this was occasionally exactly what they were selling. Modern-day versions of these products are not hard to find on the Internet and television. Misinformation can sometimes seem far more abundant than truth, which is about as good a reason for developing critical thinking skills as we can think of.

Refer back to Figure 1.3 (p. 7). As the model shows, critical thinking is an important element of scientific literacy. Being a psychologist involves more than just developing a set of skills; it also requires having a certain set of attitudes or dispositions. Among these dispositions are the curiosities that drive us to ask thoughtful questions, to look beyond simple answers, and to demonstrate skepticism toward simplistic or outlandish claims. Most importantly, psychology requires us to be reflective—we should know why we believe what we believe, and we should be able to communicate this to others.

Critical thinking involves exercising curiosity and skepticism when evaluating the claims of others, and with our own assumptions and beliefs.

For psychologists, critical thinking means that we apply scientific methods carefully, examine our assumptions and biases, and tolerate ambiguity when the evidence is inconclusive. Curiosity is essential to psychology because many of us think about the causes of behavior only when it affects us negatively or when it
Critical thinking involves skills that can be learned and developed, but most of us need to make a conscious effort to apply them (Halpern, 1996). Research points to a core set of habits and skills for developing critical thinking:

1. Be curious. Simple answers are sometimes too simple, and common sense is not always correct (or even close to it—the sun only appears to orbit around the Earth).
2. Examine the nature and source of the evidence; not all research is of equal quality.
3. Examine assumptions and biases. This includes your own assumptions as well as the assumptions of those making claims.
4. Avoid overly emotional thinking. Emotions can tell us what we value, but they are not always helpful when it comes to making critical decisions.
5. Tolerate ambiguity. Most complex issues do not have clear-cut answers.
6. Consider alternative viewpoints and alternative interpretations of the evidence.

If you follow these steps, then you will be well on your way to developing critical thinking habits and skills. However, determining what does not constitute critical thinking is important as well. Critical thinking is not a philosophy, a belief, or a faith, nor is it meant to make everyone arrive at the same answer. Complex issues often remain ambiguous, and at times a question may have several plausible answers. Although critical thinking cannot guarantee a correct answer—and sometimes it even delivers unpleasant answers—it will help find and justify good answers.

Critical thinking means respecting other viewpoints, but it also means that some ideas can be incorrect. In many cases, one answer emerges as the best one because a large body of evidence converges upon it. Critical thinking does not mean being negatively or arbitrarily critical; it simply means that you intentionally examine knowledge, beliefs, and the means by which conclusions were obtained.

Truly engaging in critical thinking can be challenging. One thing it asks us to do is break some very persistent mental habits employed by nearly everyone, even the best scientists and most rational thinkers. Take, for example, the belief that our own mental activity has some kind of direct effect on physical reality (Pronin et al., 2006). People are prone to ponder their role in the popular but wildly unscientific term fate—something we are often advised to avoid tempting. Consider this scenario:

Jon has applied to Stanford to attend graduate school. His highly optimistic mother sent him a Stanford T-shirt.
to wear before he even learned whether he was accepted. What if:

1. Jon wears the shirt while he awaits the decision from Stanford? Will he be accepted?

or

2. Jon stuffs the shirt in his drawer and decides to wait until he hears from Stanford? Will he be accepted?

Research participants who read the scenario in which Jon decided to wear the T-shirt were much more likely to guess that Jon would not be accepted (Risen & Gilovich, 2008). But why? Are people so confused about reality that they honestly believe that wearing a Stanford T-shirt could influence decisions made by the Stanford graduate admissions office? It is not likely. However, people do attach a lot of significance to coincidental events, especially when the outcome is negative. If Jon wore the T-shirt before getting accepted and was subsequently declined, we might see it as at least partially his fault. Fate 1: Jon 0. This is the type of scenario that we (and Jon) would likely remember. If Jon does not wear the shirt and is either accepted or declined, we would likely forget about what he did with the T-shirt in the first place. (In the case of the fourth possibility—that Jon wears the shirt and gets accepted—we would now call it his “lucky T-shirt”) (Figure 1.5).

Scientists would be the last people to advise that we avoid being curious about how events in the world are related and what causes them to occur. However, in our search for reality, we have to remind ourselves that the human brain is perhaps too willing to make connections. For the mind to study itself—that is, to do psychology or any other science—it needs to carefully steer around the mental barriers to rational thought. This means thinking critically and scientifically.

Independent reports of alien abductions often resemble events and characters depicted in science fiction movies.

**MYTHS IN MIND**

**Abducted by Aliens!**

Occasionally we hear claims of alien abductions, ghost sightings, and other paranormal activity. Countless television shows and movies, both fictional and documentary based, reinforce the idea that these types of events can and do occur. Alien abductions are probably the most far-fetched stories, yet many people believe they occur or at least regard them as a real possibility. What is even more interesting are the extremely detailed accounts given by purported alien abductees. However, physical evidence of an abduction is always lacking. So what can we make of the validity of alien abduction stories?

Scientific and critical thinking involves the use of the principle of parsimony, which means that the simplest of all competing explanations (the most “parsimonious”) of a phenomenon should be the one we accept. Is there a simpler explanation for alien abductions? Probably so. Psychologists who study alien abduction cases have discovered some interesting patterns and observations about the people reporting them. First, historical reports of abductions typically spike just after the release of science fiction movies featuring space aliens. Details of the reports often follow specific details seen in these movies. (Clancy, 2005). Second, it probably would not be too surprising to learn that people who report being abducted are prone to fantasizing and having false memories (vivid recollection and belief in something that did not happen; Lynn & Kirsch, 1996). Finally, people who claim to have been abducted are likely to experience sleep paralysis (waking up and becoming aware of being unable to move—a temporary state that is not unusual) and hallucinations while in the paralyzed state (McNally et al., 2004). Following the principle of parsimony typically leads to real, though sometimes less spectacular, answers.
Quick Quiz 1.1b :: Building Scientific Literacy

1. Someone who exercises curiosity and skepticism about assumptions and beliefs is using _______.
   - A. critical thinking
   - B. a hypothesis
   - C. pseudoscience
   - D. the biopsychosocial model

2. Scientific literacy does not include ________________.
   - A. gathering knowledge
   - B. accepting common sense explanations
   - C. critical thinking
   - D. applying scientific information to everyday problems

3. Paul is considering whether to take a cholesterol-reducing medicine that has been recommended by his physician. He goes to the library and learns that the government agency that oversees medications—the FDA—has approved the medication after dozens of studies had been conducted on their usefulness. Which aspect of critical thinking does this best represent?
   - A. Paul has examined the nature and source of the evidence.
   - B. Paul was simply curious.
   - C. Paul did not consider alternative viewpoints.
   - D. Paul was avoiding overly emotional thinking.

Answers can be found on page ANS-1.
Now that you have read this module you should:

KNOW ...

- The key terminology of the scientific method:
  - biopsychosocial model (p. 5)
  - psychology (p. 3)
  - critical thinking (p. 8)
  - science (p. 3)
  - pseudoscience (p. 4)
  - scientific method (p. 3)

UNDERSTAND ...

- The steps of the scientific method. The basic model in Figure 1.1 (p. 3) guides us through the steps of the scientific method. Scientific theories generate hypotheses, which are specific and testable predictions. If a hypothesis is confirmed, new hypotheses may stem from it, and the original theory receives added support. If a hypothesis is rejected, the original hypothesis may be modified and retested, or the original theory may be modified or rejected.

- The concept of scientific literacy. Scientific literacy refers to the process of how we think about and understand scientific information. The model for scientific literacy was summarized in Figure 1.3 (p. 7). Working the model involves answering a set of questions:
  - What do we know about a phenomenon?
  - How can science explain it?
  - Can we critically evaluate the evidence?
  - Why is this relevant?

You will see this model applied to concepts in each chapter of this text. This includes gathering knowledge, explaining phenomena in scientific terms, engaging in critical thinking, and knowing how to apply and use your knowledge.

APPLY ...

- The biopsychosocial model to behavior. This is a model we will use throughout the text. As you consider each topic, think about how biological factors (e.g., the brain and genetics) are influential. Also consider how psychological factors such as thinking, learning, emotion, and memory are relevant. Social and cultural factors complete the model. These three interacting factors influence our behavior.

- The steps in critical thinking. To be useful, critical thinking is something not just to memorize, but rather to use and apply. Remember, critical thinking involves (1) being curious, (2) examining evidence, (3) examining assumptions and biases, (4) avoiding emotional thinking, (5) tolerating ambiguity, and (6) considering alternative viewpoints. Try applying these steps below in Table 1.1 and check your answers on page ANS-1.

ANALYZE ...

- The use of the term scientific theory. As you read in this module, the term theory is often used very casually in the English language, sometimes synonymously with opinion. Thus it is important to analyze the scientific meaning of the term and contrast it with the alternatives. A scientific theory is an explanation for a broad range of observations, integrating numerous findings into a coherent whole. Remember, theories are not the same thing as opinions or beliefs, all theories are not equally plausible, and, strange as it may sound, a measure of a good scientific theory is not determined by the number of people who believe it to be true.

Table 1.1 :: Critical Thinking

Practice applying critical thinking skills to the scenario below:

Magic Mileage is a high-tech fuel additive that actually increases the distance you can drive for every gallon by 20%, while costing only a fraction of the gasoline itself! Wouldn’t you like to cut your fuel expenses by one fifth? Magic Mileage is a blend of complex engine-cleaning agents and patented “octane-booster” that not only packs in extra miles per gallon but also leaves your engine cleaner and running smooth while reducing emissions!

1. How might this appeal lead to overly emotional thinking?
2. Can you identify assumptions or biases the manufacturer might have?
3. Do you have enough evidence to make a judgment about this product?
Would you pay $45,875 for a tape measure? Or $3 million for a baseball, even if you had the cash to spare? It may sound outrageous, but John F. Kennedy’s tape measure went for $45,875 at an auction, and Mark McGwire’s record-setting home run baseball sold for $3 million in 1999. Both ancient philosophers and modern psychologists would be curious about anyone who would pay this price. Socrates and Aristotle pondered the notion that physical objects have an essence—an invisible property that makes them special—but only in the mind of the beholder. As you will see in this module, many of the questions psychologists now test scientifically are not necessarily new—some have been around for centuries. For example, psychologist Paul Bloom (2010) has recently revived and modified the notion of an essence to explain this very human tendency to ascribe significance to certain instances of some objects but not to others. He studies how humans, starting at a very early age, “essentialize” certain objects—consider the child who loses a worn teddy bear and cannot be consoled by a fuzzy new one. Psychologists, like philosophers, are interested in why people think and behave in these ways. The main difference between the two is that psychologists apply scientific methods to find answers.

Focus Questions

1. Why did it take so long for scientists to start applying their methods to human thoughts and experience?
2. What has resulted from the application of scientific methods to human behavior?

Psychology has long dealt with some major questions and issues that span philosophical inquiry and scientific study. For example, psychologists have questioned how environmental, genetic, and physiological processes influence behavior. They have wrestled with the issue of whether our behavior is determined by external events, or if we have free will to act. Psychology’s search for answers to these and other questions continues, and in this module we put this search into historical context and see how these questions have influenced the field of psychology as it exists today.
Psychology’s Philosophical and Scientific Origins

Science is more than a body of facts to memorize or a set of subjects to study. Science is actually a philosophy of knowledge that stems from two fundamental beliefs: empiricism and determinism.

**Empiricism** is a philosophical tenet that knowledge comes through experience. In everyday language, you might hear the phrase “Seeing is believing,” but in the scientific sense, empiricism means that knowledge about the world is based on careful observation, not common sense or speculation. Whatever we see or measure should be observable by anyone else who follows the same methods. In addition, scientific theories must be rational explanations of how the observations fit together. Thus, although the empiricist might say, “Seeing is believing,” thinking and reasoning about observations are just as important.

**Determinism** is the belief that all events are governed by lawful, cause-and-effect relationships. This is easy enough when we discuss natural laws such as gravity—we probably all agree that if you drop an object, it will fall. But does the lawfulness of nature apply to the way we think and act? Does it mean that we do not have control over our own actions? This interesting philosophical debate is often referred to as free will versus determinism. While we certainly feel as if we are in control of our own behaviors—that is, we sense that we have free will—there are some compelling reasons (discussed later in this book) to believe that our behaviors are determined. The level of determinism or free will psychologists attribute to humans is certainly debated, and to be a psychologist, you do not have to believe that every single thought, behavior, or experience is determined by natural laws. But psychologists certainly do recognize that behavior is determined by both internal (e.g., genes, brain chemistry) and external influences.

Psychological science is both empirical and deterministic. Our understanding of behavior comes from observing what we can see and measure, and behavior is caused by a multitude of factors. Psychology arrived at this point over the course of the past couple of centuries and after going through various phases of maturity. For psychology to find its place of origin, there first had to be the right cultural atmosphere.

Once the scientific method started to take hold around 1600, physics, astronomy, physiology, biology, and chemistry all experienced unprecedented growth in knowledge and technology. But why did it take psychology until the late 1800s to become scientific? One of the main reasons is *zeitgeist*, a German word meaning “spirit of the times.” *Zeitgeist* refers to a general set of beliefs of a particular culture at a specific time in history. It can be used to understand why some ideas take off immediately, whereas other perfectly good ideas may go unnoticed for years.

The power of zeitgeist can be very strong, and there are several ways it prevented psychological science from emerging in the 1600s. Perhaps most important is that people were not ready to accept a science that could be applied to human behavior and thought. To the average person of the 1600s, viewing human behavior as the result of predictable physical laws was troubling. Doing so would seem to imply the philosophy of materialism: the belief that humans, and other living beings, are composed exclusively of physical matter. Accepting this idea would mean that we are nothing more than complex machines that lack a self-conscious, self-controlling soul. The opposing belief, that there are properties of humans that are not material (a mind or soul separate from the body), is called dualism.

Although most early thinking about the mind and behavior remained philosophical in nature, scientific methods were generating great discoveries for the natural sciences of physics, biology, and physiology. This meant that the early influences on psychology came from the natural and physical sciences. (Figure 1.6 provides a timeline that summarizes some of the major events in the history of psychology.)
Late 1700s: Franz Mesmer develops techniques to treat mental illness, including the use of hypnosis.

Around 1850: Gustav Fechner pioneers the study of psychophysics.


1861: Physician Paul Broca discovers a brain area associated with the production of speech, now known as Broca’s area, establishing that regions of the brain are specialized to serve different functions.

1879: Wilhelm Wundt establishes the first psychological laboratory in Leipzig, Germany, and two years later he establishes the first journal in psychology.

1880s: Francis Galton introduces and develops the study of anthropometrics.

1883: G. Stanley Hall establishes his laboratory at Johns Hopkins University in Baltimore—the first psychology laboratory in the United States.

1885: Hermann Ebbinghaus begins his scientific study of memory.

1890: William James, founder of the functionalist approach, publishes *Principles of Psychology*.

1892: The American Psychological Association (APA) is established.

1904: Mary Calkins is elected the first female president of the American Psychological Association.

1905: Alfred Binet develops the first intelligence test.

1911: Edward Thorndike demonstrates the basic principles of instrumental learning, forming the basis for the study of operant conditioning.

1912: Max Wertheimer establishes the field of gestalt psychology.

1913: John B. Watson writes “Psychology as the Behaviorist Views It,” establishing behaviorism as the primary school of thought in American psychology.

1914: Ivan Pavlov demonstrates the basic principles of classical conditioning.

1918: Carl Rogers writes *Client-Centered Therapy*, which helps establish humanistic psychology.

1929: Psi Chi is founded as the National Honor Society in psychology to recognize and support excellence in academic psychology.

1936: Kurt Lewin authors *Principles of Topological Psychology*, which introduces the social psychological formulation that the behavior of individuals is influenced by their social environment.


1951: Carl Rogers writes *Client-Centered Therapy*, which helps establish humanistic psychology.

1952: The first Diagnostic and Statistical Manual of Mental Disorders, soon to be in its fifth edition, is published by the American Psychiatric Association.

1954: Margaret Washburn is the first female to receive a PhD in psychology.

1967: Ulrich Neisser publishes *Cognitive Psychology*, which introduces a major new subfield of psychology.


1975: The first Diagnostic and Statistical Manual of Mental Disorders is published by the American Psychiatric Association.

1980s-early 1990s: Brain-imaging techniques such as magnetic resonance imaging become mainstream methods for studying brain anatomy and function in human subjects.

1988: Establishment of the American Psychological Society, now known as Association for Psychological Science (APS).

1990s: President George H. W. Bush proclaims the 1990s to be “The Decade of the Brain,” and there is unprecedented growth in neuroscience and biological psychology.

2003: The Human Genome Project is completed.
INFLUENCES FROM EVOLUTIONARY THEORY: THE ADAPTIVE FUNCTIONS OF BEHAVIOR

Around the same time Fechner was doing his experiments, Charles Darwin (1809–1882) was studying the variety of plants and animals around the world. Darwin noticed that animal groups that were isolated from one another often differed by only minor variations in physical features. These variations seemed to fine-tune the species according to the particular environment in which they lived, making them better equipped for survival and reproduction. Darwin’s theory of evolution by natural selection was based on his observations that the genetically inherited traits that contribute to survival and reproductive success are more likely to flourish within the breeding population. This theory explains why there is such a diversity of life on Earth.

What does evolution have to do with psychology? As Darwin pointed out in The Expression of the Emotions in Man and Animals (1872), behavior is shaped by natural selection, just as physical traits are. Darwin noted that for many species, including humans, survival and reproductive success are more likely to flourish within the breeding population. This theory explains why there is such a diversity of life on Earth.

Charles Darwin proposed the theory of natural selection to explain how evolution works.

INFLUENCES FROM PHYSICS: EXPERIMENTING WITH THE MIND

The initial forays into scientific psychology were conducted by physicists and physiologists. One of the earliest explorations was made by Gustav Fechner (1801–1887), who worked on sensation and perception. As a physicist, Fechner was interested in the natural world of moving objects and energy. He turned his knowledge to psychological questions about how the physical and mental worlds interact. Fechner coined the term psychophysics, which is the study of the relationship between the physical world and the mental representation of that world.

As an example of psychophysical research, imagine you are holding a one-pound weight in your right hand and a five-pound weight in your left hand. Obviously, your left hand will feel the heavier weight, but that is not what interested Fechner. What if a researcher places a quarter-pound weight in each hand, resting on top of the weight that is already there? Fechner wanted to know which of the quarter-pound weights would be perceived as heavier. Oddly enough, although both weigh the same amount, the quarter-pound weight in your right hand will be more noticeable than the quarter-pound weight added to your left hand, almost as if it were heavier (see Figure 1.7). Through experiments like these, Fechner demonstrated basic principles of how the physical and mental worlds interact. In fact, he developed an equation to precisely calculate the perceived change in weight, and then extended this formula to apply to changes in brightness, loudness, and other perceptual experiences.

[FIG. 1.7] The Study of Psychophysics Gustav Fechner studied relationships between the physical world and our mental representations of that world. For example, Fechner tested how people detect changes in physical stimuli.
Darwin’s recognition that behaviors, like physical traits, are subject to hereditary influences and natural selection was a major contribution to psychology.

**INFLUENCES FROM MEDICINE: DIAGNOSES AND TREATMENTS** Medicine contributed a great deal to the biological perspective in psychology, as well as clinical psychology, the field of psychology that concentrates on the diagnosis and treatment of psychological disorders. One interesting area of medical study was brain localization, the idea that certain parts of the brain control specific mental abilities and personality characteristics.

The mid-1800s saw two competing views of localization. The first was phrenology, which gained considerable popularity for more than 100 years thanks to physicians Franz Gall (1758–1828) and Johann Spurzheim (1776–1832). Gall, Spurzheim, and their followers believed that the brain consisted of 27 “organs,” corresponding to mental traits and dispositions that could be detected by examining the surface of the skull. Phrenology continued to gather supporters for nearly a century before being abandoned by serious scientists. You might have encountered images of the phrenological map of the skull (see Figure 1.8).

The other approach to localization entailed the study of brain injuries and the ways in which they affect behavior. This work had a scientific grounding that phrenology lacked. There were many intriguing cases described by physicians of the 1800s, and here are two that provide great examples:

- Physician Paul Broca studied a patient named Tan. Tan received this name because it was the only word he could speak, despite the fact that he could hear and understand perfectly well. Broca identified an area of the left side of Tan’s brain that was damaged, and claimed to have found where speech production was localized; that area of the brain is now known as Broca’s area.

- Motivated by Broca’s work, Karl Wernicke identified Wernicke’s area in 1874. Patients with damage to Wernicke’s area could speak in sentences that sounded normal, but with unusual or made-up words. Patients who regained some of their speech later reported that, although they could hear just fine, no speech—not even their own—made sense during the recovery period.

Additional medical influences on psychology came from outside of mainstream practices. Franz Mesmer, an 18th-century Austrian physician practicing in Paris, believed that prolonged exposure to magnets could redirect the flow of metallic fluids in the body, thereby curing disease and insanity. Although his claim was rejected outright by the medical and scientific communities in France, some of his patients seemed to be cured after being lulled into a trance. Modern physicians and scientists attribute these “cures” to belief in the treatment—what we now call psychosomatic medicine.
The medical establishment eventually grew more intrigued by the trances Mesmer produced in his patients, naming the phenomenon hypnosis. This practice also caught the attention of an Austrian physician named Sigmund Freud (1856–1939), who began to use hypnosis to treat his own patients. Freud was particularly interested in how hypnosis seemed to have cured several patients of hysterical paralysis—a condition in which an individual loses feeling and control in a specific body part, despite the lack of any known neurological damage or disease. These experiences led Freud to develop his famous theory and technique, called psychoanalysis.

Psychoanalysis is a psychological approach that attempts to explain how behavior and personality are influenced by unconscious processes. Freud acknowledged that conscious experience includes perceptions, thoughts, a sense of self, and the sense that we are in control of ourselves. However, he also believed in an unconscious mind that contained forgotten episodes from early childhood and urges to fulfill self-serving sexual and aggressive impulses. Freud proposed that because these urges were unconscious, they could exert influence in strange ways, such as restricting the use of a body part (psychosomatic or hysterical paralysis). Freud believed hypnosis played a valuable role in his work. When a person is hypnotized, dreaming, or perhaps medicated into a trancelike state (Freud had a fondness for cocaine during a period of his career), he thought, the psychoanalyst could have more direct access into the individual’s unconscious mind. Once Freud gained access, he could attempt to determine and correct any desires or emotions he believed were causing the unconscious to create the psychosomatic conditions.

Although Freud neglected to conduct scientific experiments, his legacy can be seen in some key elements of scientific psychology. First, many modern psychologists make inferences about unconscious mental activity, just as Freud had advocated. Second, the use of medical ideas to treat disorders of emotions, thought, and behavior—an approach known as the medical model—can be traced to Freud’s influence. Third, Freud incorporated evolutionary thinking into his work; he emphasized how physiological needs and urges relating to survival and reproduction can influence our behavior. Finally, Freud placed great emphasis on how early life experiences influence our behavior as adults—a perspective that comes up many times in this text.

THE INFLUENCE OF SOCIAL SCIENCES: MEASURING AND COMPARING HUMANS

A third influential force came out of the social sciences of economics, sociology, and anthropology. These disciplines developed statistical methods for measuring human traits, which soon became relevant to the emerging field of psychology. An early pioneer in measuring perception and behavior was Sir Francis Galton. Galton was probably most inspired by his cousin, Charles Darwin, who had just published his theory of evolution by natural selection. Galton believed that heredity (genetics) explained psychological differences among people. The idea of hereditary psychology fit Galton’s beliefs about social class. For example, he noticed that great achievement tended to run in families. After all, Galton’s cousin was a great naturalist, his uncle Erasmus was a celebrated physician and writer, and Galton himself was no slouch (he began reading as a 2-year-old child, and was into Shakespeare by age 6). To Galton, it seemed natural that people who did better in scholarship, business, and wealth were able to do so because they were better people (genetically speaking).

To support his beliefs, Galton developed ways of measuring what he called eminence—a combination of ability, morality, and achievement. One observation supporting his claim for a hereditary basis for eminence was that the closer a relative, the more similar the traits. Galton was one of the first investigators to
How Psychology Became a Science

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Module 1.2

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scientically take on the question of nature and nurture relationships, the inquiry into how heredity (nature) and environment (nurture) influence behavior and mental processes. Galton came down decidedly on the nature side, seemingly ignoring the likelihood that nurturing influences such as upbringing and family traditions, rather than biological endowments, could explain similarities among relatives. Galton also supported his beliefs by ignoring the fact that great people can and do come from very humble beginnings.

Galton’s beliefs and biases led him to pursue scientific justification for eugenics, which literally translates as “good genes,” and promoted the belief that social programs should encourage intelligent, talented individuals to have children, whereas criminals, those with physical or mental disability, and non-White races should be kept out of the English gene pool. The eugenics movement was based largely on what the researchers wanted to believe was true, not quality research methods. It ultimately led to the mistreatment of many individuals, especially first-generation Americans, immigrants, and the descendants of slaves who were not of Galton’s own demographic group.

Not all of Galton’s contributions to psychology were controversial. He worked on a broad range of topics and is credited with greatly advancing scientific approaches to behavior. The most significant product of Galton’s scientific legacy is the use of statistical methods to measure and study behavior and mental processes.

In modern times, biological and genetic approaches to explaining behavior are thriving (and, thankfully, eugenics has vanished). The field of biological psychology seeks to explain the underlying genetic, physiological, and brain basis for behavior. Biological psychologists typically work in different specialty areas, such as behavioral genetics, where researchers use various methods to determine how genes affect characteristics such as intelligence and personality. Also, the field of cognitive neuroscience examines relationships between thought and brain function.

Quick Quiz 1.2a
Psychology’s Philosophical and Scientific Origins

1. In philosophical terms, a materialist is someone who might believe that:
   A. money buys happiness.
   B. species evolve through natural selection.
   C. personality can be measured by feeling for bumps on the surface of the skull.
   D. everything that exists, including human beings, are composed exclusively of physical matter.

2. According to Sigmund Freud, which of the following would be the most likely explanation for why someone is behaving aggressively?
   A. They are acting according to psychophysics.
   B. There is something going on at the unconscious level that is causing them to behave this way.
   C. They are acting out of free will.
   D. The environment is determining their behavioral response.

3. Jan believes that all knowledge is acquired through experience with the world. Jan is probably ______.
   A. an empiricist
   B. a supporter of eugenics
   C. a clinical psychologist
   D. a phrenologist

4. Francis Galton made a significant contribution to psychology by introducing methods for studying how heredity contributes to human behavior. Which alternative explanation was Galton overlooking when he argued that heredity accounts for these similarities?
   A. The primary importance of the nature side of the nature versus nurture debate
   B. The fact that people who share genes live together in families, so they tend to share environmental privileges or disadvantages
   C. A materialistic account of behavior
   D. The concept of dualism, which states that the mind is separate from the body

Answers can be found on page ANS-1.
**The Beginnings of Contemporary Psychology**

As you now know, before psychology became its own discipline, there were scientists working across different fields who were converging on a study of human behavior. It is possible that physicists could have gone on studying psychophysics, physicians could have continued studying brain injuries, and biologists could have kept studying evolutionary influences on behavior. By modern standards, Darwin, Fechner, and others had produced psychological research but it was not referred to as such because the field had not yet formed. Nevertheless, progress toward a distinct discipline of psychology was in the works.

**STRUCTURALISM AND FUNCTIONALISM: THE BEGINNINGS OF PSYCHOLOGY**

Most contemporary psychologists agree that Wilhelm Wundt (1832–1920) established the first laboratory dedicated to studying human behavior and was responsible for establishing psychology as an independent scientific field. Wundt conducted numerous experiments on how people sense and perceive. His primary research method was introspection, meaning “to look within.” Introspection required a trained volunteer to experience a stimulus and then report each individual sensation he or she could identify through introspection. For example, if the volunteer was given a steel ball to hold in one hand, he would likely report the sensations of cold, hard, smooth, and heavy. To Wundt, these basic sensations were the mental “atoms” that combined to form the molecules of experience. Wundt also developed reaction time methods as a way of measuring mental effort. In one such study, volunteers watched an apparatus in which two metal balls swung into each other to make a clicking sound. The volunteers required about one eighth of a second to react to the sound, leading Wundt to conclude that mental activity is not instantaneous, but rather it requires a small amount of effort measured by the amount of time it takes to react. What made Wundt’s work distinctly psychological was his focus on measuring mental events and examining how they were affected by his experimental manipulations.

Wundt’s ideas made their way to the United States through students who worked with him. One student, Edward Titchener, adopted the same method of introspection used by Wundt to devise an organized map of the structure of human consciousness. Structuralism was an attempt to analyze conscious experience by breaking it down into basic elements, and to understand how these elements work together. Titchener chose the term elements deliberately as an analogy with the periodic table in the physical sciences. He believed that mental experiences were made up of a limited number of sensations, which were analogous to elements in physics and chemistry. According to Titchener, different sensations...
can form and create complex compounds, just like hydrogen and water can combine to form water—H₂O.

The same year Wundt set up his first laboratory, an American scholar named William James (1842–1910) set out to write the first textbook in psychology, The Principles of Psychology, which was eventually published in 1890. Trained as a physician, James combined his knowledge of physiology with his interest in the philosophy of mental activity. Among his many interests, he sought to understand how the mind functions. In contrast to structuralism, which looks for permanent, unchanging elements of thought, James was influenced by Darwin’s evolutionary principles, so he preferred to examine behavior in context, and explain how our thoughts and actions help us adapt to our environment. **Functionalism** is the study of the purpose and function of behavior and conscious experience. The incorporation of Darwin’s ideas can be found today in the modern field of evolutionary psychology, an approach that interprets and explains modern human behavior in terms of forces acting upon our distant ancestors. According to this approach, our brains and behaviors have been shaped by the physical and social environment that our ancestors encountered.

During the early years of psychology, the pioneers were trying to find a way to use the methods and instruments of the natural sciences to understand behavior. Although some of those techniques, such as Wundt’s introspection, are no longer used exclusively, by the turn of the 20th century it was clear that the discipline of psychology was here to stay. With that sense of permanence in place, the second generation of psychologists could focus on refining the subject matter and the methods, and turning psychology into a widely accepted scientific field.

**THE RISE OF BEHAVIORISM** Early in the 20th century, biologists became interested in how organisms learn to anticipate their bodily functions. One of the first to do so was Professor Edwin Twitmyer (1873–1943), an American psychologist interested in reflexes. His work involved a contraption with a rubber mallet that would regularly tap the patellar tendon just below the kneecap; this, of course, causes a kicking reflex in most individuals. To make sure his volunteers were not startled by the mallet, the contraption would ring a bell right before the mallet struck the tendon. As is often the case in experiments, the technology failed after a number of these bell-ringing and hammer-tapping combinations: The machine rang the bell, but the hammer did not come down on the volunteer’s knee. But the real surprise was this—the volunteer’s leg kicked anyway! How did that happen? Because the sound of the bell successfully predicted the hammer, the ringing soon had the effect of the hammer itself, a process now called classical conditioning. The study of conditioning would soon become a focus of

![Ivan Pavlov](image)

Ivan Pavlov (on the right) explained classical conditioning through his studies of salivary reflexes in dogs.

**Behaviorism**, an approach that dominated the first half of the 20th century of American psychology and had a singular focus on studying only observable behavior, with little to no reference to mental events or instincts as possible influences on behavior.

At first, Twitmyer’s research was coolly received when he announced his findings at the American Psychological Association meeting. Not a single colleague bothered to ask him a question. The credit for discovering classical conditioning typically goes to a Russian physiologist named Ivan Pavlov (1849–1936). Pavlov’s Nobel Prize—winning research showed that dogs could learn to salivate to a tone if the tone has a history of sounding just prior to the delivery of food.

Credit for the rise of behaviorism in the United States typically goes to John B. Watson (1878–1958). As research accumulated on the breadth of behaviors that could be conditioned, Watson began to believe that all behavior could ultimately be explained through conditioning. This emphasis on learning also came with stipulations about what could and could not be studied in psychology. Watson was adamant that only observable changes in the environment and behavior were appropriate for scientific study. Methods such as Wundt’s introspection, he said, were too subjective to even consider. Perhaps his most famous statement sums it up:

*Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I’ll guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors. (Watson, 1930, p. 82)*
As you can imagine, Watson believed so much in the power of experience (and so little in the power of genetics) that he was certain he could engineer a personality however he wished, if given enough control over the environment.

After a year of indiscretion involving a female graduate student, Watson was dismissed from his university job, but found his new career—as well as his fortune—in advertising. Most advertisers at the time just assumed they should inform people about the merits of a product. Watson and his colleagues applied a scientific approach to advertising and discovered a consumer’s knowledge about the product really was not that important, so long as he or she had positive emotions associated with it. Thus Watson’s company developed ads that employed behaviorist principles to form associations between a product’s brand image and positive emotions. If Pavlov’s dogs could be conditioned to salivate when they heard a tone, what possibilities might there be for conditioning humans in a similar way? Modern advertisers want the logos for their brands of snacks or the trademark signs for their restaurants to bring on a specific craving, and some salivation along the way. We have John B. Watson and his colleagues to thank for this phenomenon.

Taking up the reins from Watson was B. F. Skinner (1904–1990), another behaviorist who had considerable influence over American psychology for several decades. Much like Watson, Skinner believed that psychology was the study of behavior and not of the unobservable mind. Mostly working with animal subjects in his laboratory, Skinner sought to discover the principles of how rewards affect behavior. His approach rested on the relatively straightforward observation that organisms repeat behaviors that bring rewards and avoid those that do not. Typically, these studies occurred with animals held in small chambers in which they could manipulate a lever to receive rewards. The experimenter would control when rewards were available, and the animal’s task was to learn the reward schedule. You might ask what this work had to do with human behavior. The behaviorists believed that the foundation of psychology could be established through conducting experiments on how rewards and punishment motivate and influence our behavior. Thus, the same principles ought to apply to any organism—both human and nonhuman.

Watson’s and Skinner’s concept of behaviorism met with resistance from many psychologists. If our behavior is controlled by external rewards and the satisfaction of motivational drives, then this leaves little room for free will—the notion that we are free to make choices and guide our own behavior without external influence. Many of those who resisted believed that humans could rise above their instinctive, reward-based motivations.

**HUMANISTIC PSYCHOLOGY EMERGES** The notion that humans have free will and special and unique qualities drew interest in the 1950s by psychologists who were breaking from the predominant perspective of behaviorism. In addition, the field of psychoanalytic psychology developed by Freud did not leave much, if any, room for the possibility of free will.

A new psychological perspective was spawned during this period. **Humanistic psychology** focuses on the unique aspects of each individual human, each person’s freedom to act, his or her rational thought, and the belief that humans are fundamentally different from other animals. Among the many major figures of humanistic psychology were Carl Rogers (1902–1987) and Abraham Maslow (1908–1970). Both psychologists focused on the positive aspects of humanity and the factors that lead to a productive and fulfilling life. Humanistic psychologists sought to
understand the meaning of personal experience. They believed that people could attain mental well-being and satisfaction through gaining a greater understanding of themselves, rather than by being diagnosed with a disorder or having their problems labeled. Both Rogers and Maslow believed that humans strive to develop a sense of self and are motivated to personally grow and fulfill their potential. This view stands in particular contrast to the psychoanalytic tradition, which originated from a medical model and, therefore, focused on illnesses of the body and brain. The humanistic perspective also contrasted with behaviorism in proposing that humans had the freedom to act and a rational mind to guide the process.

**THE COGNITIVE REVOLUTION** Behaviorism dominated psychology in the United States throughout the first half of the 20th century. In Europe, however, psychologists retained an emphasis on thinking, and they ignored the Americans’ cries to study only what could be directly observed. The European focus on thought flourished through the early 1900s, long before psychologists in the United States began to take seriously the idea that they could study mental processes, even if they could not directly see them. Thus it was the work of European psychologists that formed the basis of the cognitive perspective. Early evidence of an emerging cognitive perspective concerned the study of memory. The German psychologist Hermann Ebbinghaus (1850–1909) produced reams of data on remembering and forgetting. The results of his studies produced numerous “forgetting curves,” which showed that most of what a person learns will be forgotten rapidly, but then forgetting slows to a crawl. Not only is the forgetting curve a staple of modern psychology, but some of Ebbinghaus’s methods are also still applied to memory research today (you will read more about Ebbinghaus in Module 7.2).

British psychologist Frederick Bartlett (1886–1969) was able to illustrate that memory is an interpretive process that involves cultural knowledge. Think about the last film or television show you saw. Do you remember the exact words in the script? Do you remember what the characters were wearing? Bartlett’s work demonstrated that we are more likely to remember the general storyline than any of these other details, and our cultural knowledge shapes what we find important enough to remember (Bartlett, 1932).

Another precursor to cognitive psychology can be seen in the early to mid-1900s movement of gestalt psychology, an approach emphasizing that psychologists need to focus on the whole of perception and experience, rather than its parts. (Gestalt is a German word that refers to the complete form of an object; see Figure 1.9.) This contrasts with the structuralist goal of breaking experience into its individual parts. For example, if Wundt or Titchener were to hand you an apple, you would not think, “Round, red, has a stem …”; you would simply think to yourself, “This is an apple.” Gestalt psychologists argued that much of our thinking and experience occur at a higher, more organized level than Wundt emphasized; they believed that Wundt’s approach to understanding experience made about as much sense as understanding water only by studying its hydrogen and oxygen atoms.

What do gestalt psychologists mean by “the whole” in terms of perceptual experiences? This concept becomes clearer when you contrast gestalt psychology with Wundt’s elements. Imagine you have never seen or heard of apples. If someone gave you an apple and you liked it, you might be inclined to try a pear or a plum because these other fruits have a general resemblance to apples. Even though Wundt would want you to tell him you saw red, round, smooth, and so on when you looked at an apple, gestalt psychologists would point out that you might not be inclined to try everything that had similar elements to it. You would not be at all tempted to take a bite out of your neighbor’s shiny new Volkswagen Beetle, no matter how red, round, and smooth it looks.

Around the time humanistic psychology was gaining interest, the interest in mental processes was starting to catch on in the United States. In the 1950s, the scientific study of cognition was becoming accepted practice in American psychology. The invention of the computer gave psychologists a useful analogy for understanding and talking about the mind (the software of the brain). Linguists argued that grammar and vocabulary were far too complex to be explained in behaviorist terms;
the alternative was to propose abstract mental processes. There was a great deal of interest in memory and perception as well, but it was not until 1968 that these areas of research were given the name “cognitive psychology” by Ulrich Neisser (born 1928). These events ushered in a new era of psychology in which studies of mental processes and experiences flourished. Cognitive psychology is a modern psychological perspective that focuses on processes such as memory, thinking, and language. Thus much of what cognitive psychologists study consists of mental processes that are inferred through rigorous experimentation.

**SOCIAL AND CULTURAL INFLUENCES** The presence of other people affects our behavior in so many different ways. Recognition of this influence can be found in the very early years of psychology. As structuralism and functionalism were taking shape in the late 1800s and early 1900s, psychologists were starting to conduct experiments focusing on how other people influence individual behavior. An American psychologist, Norman Triplett (1861–1931), conducted one of the first formal experiments in this area, observing that cyclists ride faster in the presence of other people than when riding alone. Triplett published the first social psychology research in 1892, and a few social psychology textbooks appeared in 1908.

Despite the early interest in this field, studies of how people influence the behavior of others did not take off until the 1940s. The events in Nazi-controlled Germany that led up to World War II contributed to the development of this new perspective in psychology in at least two ways. First, Adolf Hitler’s political machine was explicitly anti-Jewish and anti-intellectual. To escape persecution by the German government, a significant number of German professors and scientists from a range of disciplines fled to the United States. These psychologists brought with them the influence of gestalt psychology and mixed with the mostly behaviorist American psychologists. Second, research on social influences began as a result of collaborations between sociologists (who study populations of humans) and psychologists (who were studying individuals at that time). Together, they attempted to understand how normal individuals could be transformed into brutal prison camp guards, how political propaganda affected people, and how society might address issues of stereotyping and prejudice. In addition, psychologists in this tradition recognized how important individual, personal factors were in determining behavior. Out of this context were the field of social and personality psychology, the study of the influence of other people on our behavior along with what makes each individual unique.

Although social psychology was born out of collaboration, Kurt Lewin (1890–1947) is often cited as the founder of modern social psychology. Trained as a gestalt psychologist, Lewin shifted his attention to race relations in the United States. After studying relations between individuals of different groups, he made an observation that is still well known among social psychologists: Behavior is a function of the individual and the environment, or \( B = f(I,E) \). What Lewin meant was that all behaviors could be predicted and explained through understanding how an individual with a specific set of traits would respond in a context that involved a specific set of conditions. Take two individuals as an example: One tends to be quiet and engages in solitary activities such as reading, whereas the other is talkative and enjoys being where the action is. Now put them in a social situation, such as a wedding reception or a funeral. How will the two behave? Given the disparity between the individuals and between the two settings, we would suspect very different behaviors would emerge. This outcome illustrates the essence of Lewin’s formulation of social psychology. On a broader but related scale, cross-cultural psychology is the field that draws comparisons about individual and group behavior among cultures; it helps us understand the role of society in shaping behavior, beliefs, and values.

The trends that emerged during this period laid the foundation for modern perspectives and theories in psychology. Psychology was now a clearly established discipline. A set of subject matter had been developed that included thinking and behavior. There were established venues such as professional organizations and journals to disseminate the results of psychological research. What you encounter in the upcoming modules will reflect these early influences. Although modern technology, such as brain scans and computing, would likely baffle psychology’s founders, we believe they would find the results of modern research absolutely relevant to their own interests. In the next module, we will explore the settings in which this broad array of psychologists are encountered and what they contribute to society.
Quick Quiz 1.2b :: The Beginnings of Contemporary Psychology

1. _______ was the study of the basic components of the mind, while _______ was the study of how they work.
   A. Structuralism; functionalism
   B. Behaviorism; functionalism
   C. Functionalism; structuralism
   D. Humanism; structuralism

2. A distinct feature of behaviorism is its:
   A. search for the deeper meaning of human existence.
   B. search for patterns that create a whole that is greater than its parts.
   C. use of introspection.
   D. exclusive emphasis on observable behavior.

3. Gwen is in search of the deeper meaning of her life, and would like to learn more about her potential as a human being. Which of the following types of psychologists would likely be most useful to her?
   A. Humanistic
   B. Gestalt
   C. Behaviorist
   D. Social

4. The gestalt psychologists, with their focus on perception and experience, are closely linked to modern-day _______ psychologists.
   A. developmental
   B. social
   C. cognitive
   D. evolutionary

Answers can be found on page ANS-1.
Now that you have read this module you should:

KNOW ...

- The key terminology of psychology’s history:
  - behaviorism (p. 21)
  - clinical psychology (p. 17)
  - determinism (p. 14)
  - empiricism (p. 14)
  - functionalism (p. 21)
  - gestalt psychology (p. 23)
  - humanistic psychology (p. 22)
  - materialism (p. 14)
  - nature and nurture relationships (p. 19)
  - psychoanalysis (p. 18)
  - psychophysics (p. 16)
  - structuralism (p. 20)
  - zeitgeist (p. 14)

UNDERSTAND ...

- How various philosophical and scientific fields became major influences on psychology. The philosophical schools of determinism, empiricism, and materialism provided a background for a scientific study of human behavior. The first psychologists were trained as physicists and physiologists. Fechner, for example, developed psychophysics, whereas Titchener looked for the elements of thought. Darwin’s theory of natural selection influenced psychologist William James’s idea of functionalism—the search for how behaviors may aid the survival and reproduction of the organism.

APPLY ...

- Your knowledge to distinguish among the different specializations in psychology. Try the activity in Table 1.2 and check your answers on page ANS-1.

ANALYZE ...

- How the philosophical ideas of empiricism and determinism are applied to human behavior. Psychology is based on empiricism, the belief that all knowledge—including knowledge about human behavior—is acquired through the senses. All sciences, including psychology, require a deterministic viewpoint. Determinism is the philosophical tenet that all events in the world, including human actions, have a physical cause. The deterministic view is also essential to the sciences. Applying determinism to human behavior has been met with resistance by many because it appears to deny a place for free will.

Table 1.2 :: Areas of Specialization within Psychology

Apply your knowledge to distinguish among different specializations in psychology. You should be able to read a description of a psychologist on the left and match her or his work to a specialization on the right. Check your answers on page ANS-1.

| 1. I am an academic psychologist who studies various methods for improving study habits. I hope to help people increase memory performance and become better students. I am a(n) ___________. |
| 2. My work focuses on how the presence of other people influences an individual’s acceptance of and willingness to express various stereotypes. I am a(n) ___________. |
| 3. I have been studying how childrearing practices in Guatemala, the United States, and Cambodia all share some common elements, as well as how they differ. I am a(n) ___________. |
| 4. I am interested in behaviors that are genetically influenced to help animals adapt to their changing environments. I am a(n) ___________. |
| 5. I help individuals identify problem areas of their lives and ways to correct them, and guide them to live up to their full potential. I am a(n) ___________. |

- a. social psychologist
- b. cross-cultural psychologist
- c. cognitive psychologist
- d. humanistic psychologist
- e. evolutionary psychologist
Putting Psychology to Work: Careers in Psychology and Related Fields

Learning Objectives
After reading this module you should:

<table>
<thead>
<tr>
<th>KNOW ...</th>
<th>UNDERSTAND ...</th>
<th>APPLY ...</th>
<th>ANALYZE ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>The key terminology of psychological professions</td>
<td>The various professional settings occupied by psychologists</td>
<td>Your knowledge to identify the job title of a psychologist based on their work</td>
<td>The claim that psychologists could contribute to virtually any field of work</td>
</tr>
</tbody>
</table>

When you picture a psychologist at work, do you imagine one operating a huge chainsaw and cutting a hole through three feet of ground-level ice? What if the psychologist happened to be in Antarctica studying the behavior of seals, and was creating the hole so that he could capture a glimpse of what these animals were doing beneath the ice? This would describe at least part of the career of Jesse Purdy, a psychology professor who has spent many months in Antarctica recording social behavior of Weddell seals. When not cutting holes through ice and observing seals, Dr. Purdy teaches psychology courses to undergraduate students and conducts research on a bizarre animal called the cuttlefish, a close relative of the octopus. This probably sounds like a far cry from what the stereotypes of psychologists suggest Dr. Purdy is supposed to do. Granted, this example is not exactly mainstream, but it does attest to the wide range of topics and settings where you will find psychologists at work.

We will explore this broad range of activity in this module. Psychologists are engaged in a wide variety of professions dealing with a great range of behaviors. In any field you can think of that involves thinking or behaving, you will probably find a psychologist at work. In fact, it would be a challenge to find an employment sector that does not involve psychologists at some level.

Focus Questions

1. How true is the caricature that psychologists constantly analyze people?
2. What range of activities do psychologists engage in?

Professions in Psychology

Psychology is a broad discipline with many applications in the workplace. You will see a wide variety of job titles and descriptions in this module, including some jobs that are not
labeled as *psychology* but are closely aligned to it. Despite the diverse roles described here, remember that these are applications of psychology, which means they involve a scientific approach to behavior and thought. Those who earn a doctoral degree (PhD) in psychology work in a variety of settings, with the most common being at colleges and universities (Figure 1.10).

**RESEARCH AND TEACHING**  *Research psychologists* typically work at universities, in corporations, in the military, and in governmental agencies (such as the National Institutes of Health and Mental Health). Many psychologists working in these different settings focus on applying basic principles of psychology to real-world settings. *Applied psychology* uses psychological knowledge to address problems and issues across various settings and professions, including law, education, clinical psychology, and business organization and management. Some applied psychologists do both basic and applied work; it really depends on where a psychologist is employed.

Your psychology instructor is employed (at least part of the time) in academic psychology. Academic psychologists work at colleges and universities, and most combine teaching with conducting research, although some do only one or the other. Psychologists working in academics are not likely to refer to themselves as academic psychologists, however. For example, most instructors of psychology courses would describe themselves by their specialization, as in “I am a social psychologist” or “I am a developmental psychologist.”

**PSYCHOLOGICAL HEALTH AND WELL-BEING**

For most people, the mental health side comes to mind when they first think of psychology. In fact, the psychologist with notepad in hand listening attentively to a client has become an all-too-common caricature of what psychologists do. This caricature serves to reinforce the belief that psychologists are in the business of analyzing people. Clearly, the mental health field is the largest sector of employment for individuals with advanced degrees in psychology. However, helping professions are not limited to individuals with psychology degrees, as shown in Table 1.3. In fact, we call mental health jobs *the helping professions* because that is what they have in common, rather than specific educational criteria, degrees, or occupational roles.

Why are all these different job descriptions necessary? One reason is to indicate the educational level required; another is to distinguish the treatments considered the most effective by the different professions. For example, *psychiatry* is a branch of medicine concerned with the treatment of mental and behavioral disorders. As physicians, psychiatrists are likely to prescribe drugs such as antidepressants. Clinical and counseling psychologists are more likely to emphasize psychological approaches to treat mental health concerns and disorders. Social workers are likely to emphasize the social context of the individuals in treatment, such as the family’s dynamics, socioeconomic status, and community.

Psychologists may work with a master’s degree in most states, but many go on to pursue doctorates, which provide greater career opportunities. This might include the typical graduate degree for a scientific discipline, the Doctor of Philosophy (PhD), which combines science and practice. However, there is also a specialized Doctor of Psychology (PsyD) degree that focuses almost exclusively on the practice of psychology.

As you can see, mental health providers can be found in many settings and provide numerous services to people in need. The caricature of psychologist as an analyst breaks down even more when we expand our discussion of what psychologists do.

Psychologists can also specialize to practice in specific contexts. *Forensic psychology* encompasses work in the criminal justice system, including interactions with the legal system and its professionals. The field is often glorified in movies and TV as criminal profiling and investigation, but it is actually a practical profession involving very little of what is portrayed in these shows. The relatively few criminal profilers work with the FBI and larger law enforcement agencies to develop
Table 1.3 :: Employment in Psychology

Common occupations in the area of mental health, their educational requirements, and the basic roles for each position.

<table>
<thead>
<tr>
<th>JOB TITLE</th>
<th>EDUCATION</th>
<th>ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical psychologist</td>
<td>PhD or PsyD</td>
<td>Diagnosis and treatment of psychological disorders</td>
</tr>
<tr>
<td>Counseling psychologist</td>
<td>Doctorate or master’s</td>
<td>Treatment of psychological disorders and less severe psychological difficulties</td>
</tr>
<tr>
<td>Neuropsychologist</td>
<td>PhD or PsyD</td>
<td>Diagnosis and evaluation of individuals with neurological damage</td>
</tr>
<tr>
<td>School psychologist</td>
<td>EdD, PhD, or master’s</td>
<td>Diagnosing behavioral problems and learning disabilities; working in schools to develop personalized programs to help students</td>
</tr>
<tr>
<td>Community psychologist</td>
<td>PhD or PsyD</td>
<td>Providing basic mental health services to the community with a focus on education and prevention</td>
</tr>
<tr>
<td>Licensed clinical social worker; independent social worker</td>
<td>Master’s in social work (MSW)</td>
<td>Counseling individuals and families experiencing mental health and social problems; engaging in community organizations and providing social services</td>
</tr>
<tr>
<td>Forensic psychologist</td>
<td>Doctorate or master’s</td>
<td>Psychology related to judiciary or criminal issues, such as evaluating an individual’s competency to stand trial</td>
</tr>
<tr>
<td>Psychiatrist</td>
<td>Medical doctor</td>
<td>Diagnosis and treatment of psychological disorders</td>
</tr>
<tr>
<td>Psychiatric nurse</td>
<td>Nursing degree, RN</td>
<td>Working as part of a comprehensive treatment team to manage medical and behavioral treatments on a regular basis</td>
</tr>
<tr>
<td>Behavioral health technician; case manager</td>
<td>Bachelor’s degree</td>
<td>Overseeing treatment on either an inpatient or outpatient basis, respectively</td>
</tr>
</tbody>
</table>

a set of characteristics that are statistically related to a criminal’s methods. You would more likely see forensic psychologists working in prisons, training and evaluating police officers, or assisting with jury selections and evaluating whether defendants are able to stand trial.

School psychology involves working with students who have special needs, such as those with emotional, social, or academic problems. Practitioners might address ways to change troubling or disruptive behavior, or a cognitive disability that interferes with learning, such as dyslexia. School psychologists may spend a lot of time observing a child’s behavior or administering special psychological tests to identify learning disabilities. These professionals rarely work alone; instead, they are more often part of students’ educational teams, which include their parents, teachers, and counselors.

Most of the helping professions we have described have two things in common: (1) graduate degrees (more school after college!) and (2) licensure or certification as approved by individual states. More school and licensing tests may or may not sound appealing, and certainly many individuals prefer to start their careers rather than going for another degree. With a Bachelor’s degree, individuals can work in treatment settings on a more basic level. For example, case managers make regular contact with individuals to ensure they are complying with treatment (e.g., taking medication as prescribed) and make sure their clients are in touch with public and private services that may help them. Behavioral health technicians have similar tasks, except they are for the short term (usually less than 30 days) and on an inpatient basis.

HEALTH AND MEDICAL PROFESSIONS In addition to providing for mental health, an increasing number of psychologists are focusing on physiological health in the field known as health psychology (or behavioral medicine), the study of how individual, biological, and environmental factors affect physical health. Health psychologists identify the behaviors and personality traits that put people
Putting Psychology to Work: Careers in Psychology and Related Fields

What does marketing have to do with psychology? A very successful career for himself in advertising. (In Module 1.2, we mentioned that psychologist John B. Watson made go on to marketing and advertising. (In Module 1.2, we mentioned that psychologist John B. Watson made a very successful career for himself in advertising.)

What does marketing have to do with psychology? A great deal, it turns out. Marketing involves a lot of research on what consumers prefer, what buyers expect, and what makes shoppers choose one product over another. Marketing professionals conduct surveys and experiments on preferences, such as the taste tests we see reported on television commercials.

I'M NOT PLANNING ON A CAREER IN PSYCHOLOGY... Not wanting to become a psychologist is fine, too—the world needs only so many psychologists. Based on recent trends, only a small percentage of this year's nearly 100,000 bachelor-level psychology graduates will go on to work in psychological fields—far more (approximately 40%) will go on to work in business settings (Magaletta et al., 2010). But students who major or minor in psychology will be able to apply what they have learned in many different types of work. Because of psychology's emphasis on research methods, psychology majors often turn out to be excellent problem solvers and critical thinkers. Also, psychology majors learn many principles of human behavior, ranging from individual cognition to group dynamics. These skills are needed for marketers, managers, and teachers (see Figure 1.11). So an understanding of behavior works to your advantage regardless of which career you eventually choose.

Even if this is the only course you take in psychology, we hope you enjoy it. We also hope that you come to understand more than just a few principles about human behavior. We anticipate that you will become more aware of the evidence people use when they make claims about behavior. Remember, as members of a capitalist society, our warning is caveat emptor—"Buyer, beware!"

Many undergraduates who major in psychology go on to marketing and advertising. (In Module 1.2, we mentioned that psychologist John B. Watson made a very successful career for himself in advertising.)

PSYCHOLOGY IN THE CORPORATE WORLD

One of the fastest-growing fields within psychology is industrial and organizational (I/O) psychology, a branch of applied psychology in which psychologists work for businesses and other organizations to improve employee productivity and the organizational structure of the company or business. I/O psychologists may develop tests to hire workers who have the best chance at succeeding, they may assist work teams to improve communication and responsibility, and they may help organizations with the management of change. This approach to psychology is covered in depth in Chapter 17.

Closely related to I/O psychology is human factors psychology, the study of how people interact with tools, physical spaces, or products. This is the high-tech branch of applied psychology; a great deal of human factors work applies principles of sensation and perception to complex work environments such as aircraft cockpits or laparoscopic surgical devices. Human factors psychologists may study human–computer interaction to develop user-friendly software and other products. Similarly those who practice environmental psychology study factors that improve working and living conditions, but they do so by establishing how the environment affects individuals or groups. Results from this type of research may be used in the design of working and living spaces to foster communication, to reduce distractions, and to prevent or reduce strain, stress, and fatigue.

Many undergraduates who major in psychology go on to marketing and advertising. (In Module 1.2, we mentioned that psychologist John B. Watson made a very successful career for himself in advertising.)

Research and Development
Teaching
Mgmt., Sales and Admin.
Other

[FIG. 1.11] Work Settings for People Earning Master’s and Bachelor’s Degrees in Psychology
Quick Quiz 1.3a :: Professions in Psychology

1. A professional who would study how stress affects the heart is a(n) ________________ psychologist.
   - A. environmental
   - B. health
   - C. clinical
   - D. I/O

2. A ____________ psychologist would likely be asked to evaluate whether different display screens are optimal for work performance.
   - A. health
   - B. forensic
   - C. school
   - D. human factors

3. A major difference between most clinical psychologists and psychiatrists is that:
   - A. clinical psychologists can prescribe medications.
   - B. psychiatrists prescribe medications.
   - C. to be a clinical psychologist, you must obtain a Doctorate degree.
   - D. to be a psychiatrist, you need to obtain only a Master's degree.

4. You meet someone on the bus who is a psychiatrist. From this, you may safely assume that:
   - A. she completed medical school.
   - B. she is likely to be analyzing you right now.
   - C. her work involves profiling criminals.
   - D. she most likely conducts research and teaches at a university.

5. Psychologists could be involved in virtually any field of work because:
   - A. they study how people behave in multiple situations, including how they carry out the tasks associated with their jobs.
   - B. there are not enough jobs, so psychologists usually cannot find work in their own field.
   - C. they are more likely to change careers than most other professions.
   - D. it is unlikely that they have the social skills needed when working cooperatively with others.

Answers can be found on page ANS-1.
Module Summary

Now that you have read this module you should:

KNOW …

- The key terminology of psychological professions:
  - applied psychology (p. 28)
  - forensic psychology (p. 28)
  - health psychology (p. 29)
  - industrial and organizational (I/O) psychology (p. 30)
  - psychiatry (p. 28)
  - school psychology (p. 29)

UNDERSTAND …

- The various professional settings occupied by psychologists. Psychologists work at universities as researchers and teachers. Of course, many psychologists work in the mental health care fields. They can be found in business and industry working in specialized roles geared toward promoting important factors such as team building, efficiency, and personnel matters. Professionals in the field also conduct applied work as specialists in human factors and environmental psychology. Schools employ psychologists for their specialized training in learning, thinking, and development. Some psychologists work in forensics and primarily work in court and law enforcement settings.

- The distinctions among mental health professions in their approaches and educational requirements. The many different titles among those working in the mental health professions can be explained in terms of education background and specific roles within the work setting. Typically, an advanced degree (PhD or PsyD) and a state license is required for clinical psychologists, and, in the case of psychiatry, an MD is required. Many therapists and counselors who work directly with clients or patient populations have master’s degrees in clinical, counseling, or school psychology and social work. Some jobs requiring a Bachelor’s degree involve work with clients in mental health settings, such as case managers or psychiatric nurses.

APPLY …

- Your knowledge to identify the job title of a psychologist based on their work. To do this, complete the matching activity in Table 1.4 and check your answers on page ANS-1.

ANALYZE …

- The claim that psychologists could contribute to virtually any field of work. Data show that most psychologists are employed in mental health settings or in academics. However, fields such as I/O psychology, human factors, and environmental psychology have allowed psychologists to apply their knowledge to just about any field you can imagine.

### Table 1.4 :: Matching Psychologist Titles and Roles

Identify the appropriate job title for each psychologist in the table below. For every job description on the left, there is one correct title on the right. Check your answers on page ANS-1.

<table>
<thead>
<tr>
<th>1. I am employed at a state penitentiary and work closely with parole officers to make sure parolees have a psychological treatment plan to address substance abuse, anger management, impulsiveness, and other problems. I am a(n) _____________.</th>
<th>a. health psychologist</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. I conduct research for the military to ensure that computer systems in aircraft are as user-friendly as possible. I am a(n) _____________.</td>
<td>b. psychiatrist</td>
</tr>
<tr>
<td>3. I went to medical school and then began working at a hospital, where I treat severe psychological disorders with medications and some psychotherapy. I am a(n) _____________.</td>
<td>c. forensic psychologist</td>
</tr>
<tr>
<td>4. I am an independent consultant, and I try to help businesses identify and hire the best possible executives. I am a(n) _____________.</td>
<td>d. human factors psychologist</td>
</tr>
<tr>
<td>5. Although I did not go to medical school, I have been working with heart surgery patients to help them adjust to life after surgery. This involves psychotherapy to deal with emotions and stress, as well as helping the patients adopt healthier behaviors. I am a(n) _____________.</td>
<td>e. I/O psychologist</td>
</tr>
</tbody>
</table>
Module 1.1 :: The Science of Psychology

Focus Questions:

1. **How can the human mind, with its quirks and imperfections, conduct studies on itself?** After reading this module, you might find the term *quirks and imperfections* to be a matter of interpretation. We could also say that the human tendency to find patterns in the world and connect events together is a hallmark achievement of our species. Unfortunately, this amazing capacity can easily lead people down the path of pseudoscience. Just because someone perceives a pattern or meaning in a set of events does not mean a pattern actually exists. Before taking the first step toward conducting scientific studies on human behavior, we have to recognize the mental traps that await us.

2. **How can scientific and critical thinking steer us toward a clearer understanding of human behavior and experience?** Scientific and critical thinking bring clarity to any type of inquiry. The scientific method, whether applied to human behavior or atomic particles, involves making predictions in the form of clear, testable hypotheses, and constructing and testing theories that can be supported or falsified. The steps toward critical thinking guide the process of science, as they require us to constantly question the accuracy and source of information, as well as remain aware of how our personal biases can influence our thinking.

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Module 1.2 :: How Psychology Became a Science

Focus Questions:

1. **Why did it take so long for scientists to start applying their methods to human thoughts and experience?** The zeitgeist—the cultural and social environment of a given period—that allowed psychology to emerge as a science did not begin until key figures in the natural and physical sciences, including Charles Darwin and Gustav Fechner, began applying scientific thinking to some aspects of human behavior. Key figures including Wilhelm Wundt and Edward Titchener were among the first to conduct studies on mental processes.

2. **What has resulted from the application of scientific methods to human behavior?** As you read in this module, the scientific method became increasingly applicable to studies of human behavior. As a scientific understanding of human behavior grew, people began asking more questions about different topics. This exploration led to the development of numerous subfields within psychology that focus on specific aspects of behavior, such as biological, social, and cognitive factors.

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Module 1.3 :: Putting Psychology to Work: Careers in Psychology and Related Fields

Focus Questions:

1. **How true is the caricature that psychologists constantly analyze people?** Psychologists probably do not do this any more than people in the general public. Psychologists who do provide mental health services are likely to limit their practice of psychology to areas where they are familiar with the tools and theories of their specific fields. In short, psychologists do not spend all of their waking hours analyzing people! As you read in this module, psychologists can be found in a broad range of settings.

2. **What range of activities do psychologists engage in?** Psychologists engage in a wide variety of activities. The most typical role is to work as a psychotherapist in a mental health setting, but other psychologists are engaged in research and teaching at universities, improving productivity and satisfaction in work settings, and helping engineers devise better tools and computer systems, among many other jobs.

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Watch the complete video series online at MyPsychLab
1. Psychology can be considered a collection of many related fields of study. What is one of the features that all of these fields have in common?
   - A. The use of the scientific method
   - B. The study of mental illness
   - C. The belief that the unconscious mind determines human behavior
   - D. The use of introspection
   **Answer:** D. The use of introspection

2. ________ are built from ________ that are repeatedly tested and confirmed.
   - A. Theories; hypotheses
   - B. Hypotheses; theories
   - C. Predictions; observations
   - D. Observations; predictions
   **Answer:** A. Theories; hypotheses

3. The biopsychosocial model assumes that:
   - A. behavior often can be fully explained only by combining multiple perspectives.
   - B. biological factors are more important than social factors in determining behavior.
   - C. all living organisms form social groups, based on their physical and psychological needs.
   - D. the simplest explanation for behavior is usually the best.
   **Answer:** C. all living organisms form social groups, based on their physical and psychological needs.

4. Which of the following is true about the concept of scientific literacy?
   - A. Only trained scientists are considered scientifically literate.
   - B. Scientific literacy is the ability to answer basic science questions without looking up their answers.
   - C. A person who can understand, analyze, and apply scientific information is demonstrating scientific literacy.
   - D. Knowledge of scientific terminology is the most important part of scientific literacy.
   **Answer:** B. Scientific literacy is the ability to answer basic science questions without looking up their answers.

5. ________ is the belief that knowledge comes through observation and experience.
   - A. Determinism
   - B. Parsimony
   - C. Skepticism
   - D. Empiricism
   **Answer:** D. Empiricism

6. Psychology has been a science since:
   - A. around 470 B.C.
   - B. the early 1600s.
   - C. the mid-1900s.
   - D. the late 1800s.
   **Answer:** B. the early 1600s.

7. How did physiologists and physicists, like Gustav Fechner, contribute to the development of psychology as a science?
   - A. They studied the relationship between the physical world and the mental representation of that world.
   - B. They demonstrated that the brain was responsible for consciousness.
   - C. They identified the locations of specific functions within the brain.
   - D. They extended Darwin’s theory of evolution to behavior and cognitive abilities.
   **Answer:** C. They identified the locations of specific functions within the brain.

8. The belief that the unconscious mind has an influence on a person’s behavior is part of which early approach to psychology?
   - A. Structuralism
   - B. Functionalism
   - C. Psychoanalysis
   - D. Behaviorism
   **Answer:** C. Psychoanalysis

9. The question of nature and nurture relationships centers on how _________ (nature) and _________ (nurture) influence behavior and mental processes.
   - A. environment; heredity
   - B. heredity; environment
   - C. emotion; logic
   - D. logic; emotion
   **Answer:** B. heredity; environment

10. Why was the perspective adopted by Wilhelm Wundt and his followers called structuralism?
    - A. They wanted to identify the major brain structures.
    - B. Their primary goal was to understand the physiology of the mind.
    - C. They focused their efforts on analyzing the elements of the nervous system.
    - D. Their primary focus was on describing the structure of conscious experience.
    **Answer:** B. Their primary goal was to understand the physiology of the mind.

11. Which school of psychology questioned whether psychologists should study the mind, which was thought to be unobservable?
    - A. Psychoanalysis
    - B. Behaviorism
    - C. Gestalt psychology
    - D. Humanism
    **Answer:** A. Psychoanalysis

12. You attend a lecture by a psychologist who uses terms such as free will and life’s meaning. Which psychological perspective is most consistent with the points the psychologist presented?
    - A. Behaviorism
    - B. Humanistic psychology
    - C. Functionalism
    - D. Psychodynamics
    **Answer:** B. Humanistic psychology

13. __________ psychologists are generally interested in how the behavior of individuals can be influenced by other people.
    - A. Social
    - B. Gestalt
    - C. Behavioral
    - D. Humanistic
    **Answer:** C. Behavioral

14. Dr. Fernwood is a research psychologist. The main focus of her research is the use of psychological knowledge to find ways to reduce bullying in schools. Dr. Fernwood’s research could be described as ________ psychology.
    - A. basic
    - B. forensic
    - C. applied
    - D. I/O
    **Answer:** C. applied

15. In which field is someone with a background in psychology likely to work?
    - A. Advertising
    - B. Teaching
    - C. Management
    - D. Any of the above
    **Answer:** D. Any of the above
Work the Scientific Literacy Model: Understanding the Scientific Origins of Psychology

What do we know about psychological science?

Figure 1.6 on page 15 outlined the movement of psychology toward a scientific study of human behavior, including influences from fields such as medicine and physics. Refresh your memory of contemporary psychology, including the rise of behaviorism, humanistic psychology, social psychology, and cognitive psychology, by reviewing the discussion on pages 20–24. Psychologists today often use multiple, unique perspectives to study a topic, but they share with other scientists a common set of methods for understanding our world. Figure 1.1 on page 3 offers a reminder of how psychologists use the scientific method to study human behavior. Of course, approaching any subject scientifically requires that we understand some key concepts. Review the discussion of determinism and empiricism on page 14. Psychologists assume that a multitude of factors cause our behavior (determinism), and that our understanding of behavior comes from observing what we can see and measure (empiricism). Here is a tip:

Remember that an Empirical approach means knowledge is gained through Experience, often by conducting Experiments.

Why is this relevant?

Watch the accompanying video excerpt on the different psychological perspectives. You can access the video at MyPsychLab or by clicking the play button in the center of your eText. If your instructor assigns this video as a homework activity, you will find additional content to help you in MyPsychLab. You can also view the video by using your smartphone and the QR code below, or you can go to the YouTube link provided.

After you have read this chapter and watched the video, imagine your friend Jake has become very anxious ever since he started taking harder classes in his major. The university’s counselor diagnosed him with an anxiety disorder. Compare and contrast how the behavioral, humanistic, and cognitive approaches would view the origins and treatment of Jake’s anxiety. Then, describe how each of the three approaches is viewed by psychologists today.

How can science explain behavior?

Regardless of their theoretical approach, psychologists rely on the scientific method to gather data. Testing hypotheses and constructing theories are key parts of all scientific endeavors, and the scientific method involves a dynamic interaction between these two tasks. Recall from page 21 that the proponents of behaviorism, for example, relied almost exclusively on studying observable behavior. Classic studies by Watson and Skinner made up the foundation of our knowledge in those areas today, and you can see the results of Watson’s research on behavioral conditioning in the evolution of modern advertising. Moreover, the rise of cognitive psychology eventually allowed the application of the scientific method to phenomena that behaviorists of the time thought were unobservable, such as memory and thought processes.

Can we critically evaluate scientific claims?

As outlined on page 7, scientific literacy consists of abilities to understand, analyze, and apply scientific information. A key component of scientific literacy—critical thinking— involves exercising curiosity and skepticism when evaluating the claims of others, and when assessing our own assumptions and beliefs. For instance, the alien abductions Myths in Mind on page 10 reminds us that seeking the simplest of all explanations, also known as applying the principle of parsimony, will generally put you on the path to thinking scientifically and critically. Recall that a key characteristic of a scientific hypothesis is its ability to be tested. We mention astrology as an example, because its predications are typically so general that they cannot be falsified. It is a good idea to be skeptical of any claims that are based on assumptions that cannot be proved or disproved; many times they are couched in pseudoscientific terminology.

MyPsychLab

Your turn to Work the Scientific Literacy Model: Watch the accompanying video on YouTube, or on your phone (using the QR code). If your instructor has assigned this as a homework activity, you can find the video clip and additional content at MyPsychLab. Answer the questions that accompany the video clip to test your understanding.