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CHAPTER 1

Introduction and Research Methods

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CHAPTER OUTLINE

VIDEO CONTENT

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Things you'll learn in Chapter 1

[AQ1] Why is spending money on psychics a bad idea?
[AQ2] Can genes influence whether you're a dog lover?
[AQ3] Can research with animals help reduce the substance abuse crisis?
[AQ4] Do people who attend college live longer?
[AQ5] How can multitasking hurt your GPA?
[AQ6] Can money buy happiness?

Throughout the chapter, look for the **[AQ1]**–**[AQ6]** icons. They indicate where the text addresses these questions.

Study TIP

Chapter Outline Each chapter of this text begins with an outline of the major and secondary heads, which you should carefully review before starting your study. Outlines are like road maps. They provide a "big picture" of the "road ahead," with landmarks to look for as you're reading. Having this guide also helps your brain organize, understand, and retain important information.

Module 1.1 What Is Psychology?

LO 1.1 Identify what psychology is, how psychological science differs from pseudoscience, the differences and similarities of scientific versus critical thinking, and why we should study psychology.

MODULE 1.1 KEY TOPICS

Here are the key topics you will read about in this module.

- Defining Psychology
- Psychological Science Versus Pseudoscience
- Scientific and Critical Thinking
- Why Study Psychology?

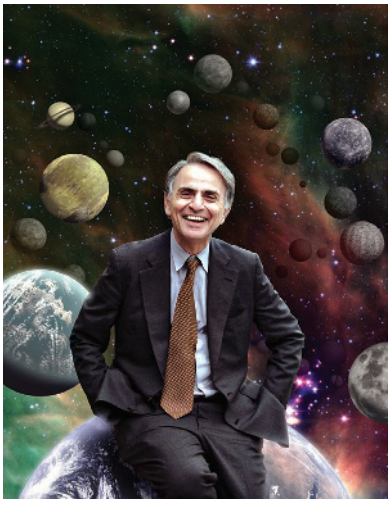
Given that this first module is an introduction to the field of psychology, we begin with a formal definition of psychology. Then, we explore psychological science versus pseudoscience, as well as scientific and critical thinking. We close with a brief look at several major benefits of studying psychology.

Defining Psychology

VIDEO CONTENT

LO 1.1.1 Define psychology.

Psychology The scientific study of behavior and mental processes.



NASA Photo/Alamy Stock Photo

Somewhere, something incredible is waiting to be known—Carl Sagan (American astronomer, astrophysicist, and science communicator, 1934–1996)

Welcome to psychology and psychological science! Why do we start this chapter and text with a quote from Carl Sagan? It's because throughout his lifetime of achievements, as an astrophysicist, author, and professor, Carl Sagan exemplified not only the wondrous accomplishments of science but also its personal payoffs. As your authors, we firmly believe that studying psychology will provide you with invaluable and incredible insights into your own and others' thoughts, feelings, and behaviors, and other mysteries just "waiting to be known." We're excited and honored to be your guides.

Let's begin with a natural first question: "What is **psychology**?" The term derives from the roots *psyche*, meaning "mind," and *logos*, meaning "word." Modern psychology is most commonly defined as the scientific study of behavior and mental processes. Note that *scientific* is a key feature of the definition to reflect the fact that psychologists follow strict scientific procedures to collect and analyze our verifiable data. Although the *mind* and its mental processes, such as feelings, thoughts, and memories, cannot be easily and directly observed, they can be studied scientifically. *Behaviors* (crying, hitting, sleeping) are also emphasized because they can be directly observed and measured. Before going on, also note that psychology encompasses humankind as well as our nonhuman compatriots—from rats and pigeons to cats and chimps.

Psychology as a STEM Discipline and Hub Science Given psychology's scientific nature and the technological contributions it has made to the

world of knowledge, the National Science Foundation recognizes psychology as a member of the STEM field—and a hub science. The acronym STEM refers to areas of knowledge in which scientists and engineers usually work—*Science, Technology, Engineering,* and *Mathematics*.

What is a "hub science"? Have you seen smartphone apps that allow you to map your numerous social media friends and overlapping friendship networks? The discipline of psychology also has similar overlapping and strong connections with other fields. In modern times, scientific data and information no longer originate from a single source. Instead, there are seven major "hub sciences," including psychology, mathematics, physics, chemistry, Earth sciences, medicine, and the social sciences (Bauer, 2023; Boyack et al., 2005; Cacioppo, 2014). Being a *hub science* means that psychological research is used and cited in many other fields. More importantly, these interconnections allow psychologists and students of psychology to offer and learn a great deal from other disciplines, and even to branch out into one of their many interrelated professions (Breckler, 2013).

Psychological Science Versus Pseudoscience

VIDEO CONTENT

LO 1.1.2 Differentiate psychological science from pseudoscience.

Why is science so important in psychology? Since ancient times, people have been interested in the fascinating topics studied by psychologists. Unfortunately, because we are all human and deal with ourselves and others in everyday life, we tend to think we already know what psychology is all about. In fact, when asked why they're taking our intro psych classes, many of our students happily tell us they were looking for a "fun, skate course."

We want to assure you that this text and your course will indeed be fun, and that you'll learn a lot of fascinating facts that will greatly improve your life. However, this first chapter also demonstrates that psychology is a rigorous science based on scientific and critical thinking—definitely not a "skate course." We then expand on this premise with specific details about how psychologists conduct our research, and the relative strengths and limits of these methods.

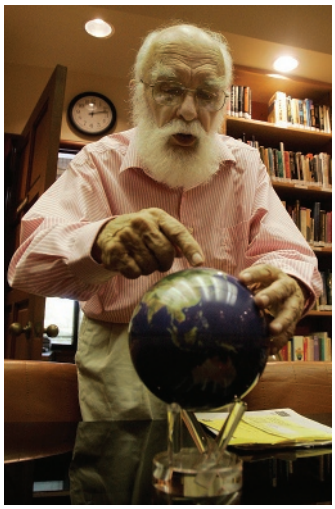
Throughout this text, you'll discover the importance of psychological science and its ability to reliably separate fact from fiction and reality from fantasy. Unfortunately, *psychological science*, which is founded on careful observation, experimentation, and objective, verifiable data, is too often confused with *pseudoscience*, which is based on fantasy, folk wisdom, superstition, and even with so-called "common sense."

In your everyday life, you're likely to encounter numerous faulty, nonscientific conspiracy theories and claims of psychic powers, along with horoscopes, mediums, astrology, and "pop psych" statements such as, "I'm mostly right brained" or "We use only 10 percent of our brain." Sadly, despite the lack of scientific support, these beliefs are on the rise (Andersson et al., 2022; Bensley et al., 2020; Pew Research Center, 2018). For many people, reading their horoscope or going to a palmist to have their fortunes told may be simple entertainment. **[AQ1]** However, fervent believers have been known to waste large sums of money on charlatans purporting to know the future or enable them to speak with their deceased relatives (e.g., M. Wilson, 2015). Broken-hearted families have also lost valuable time and emotional energy on psychics claiming they could locate their missing children.

How can we spot the difference between true psychological science and pseudoscience? First, note that *pseudo* means "false." Second, although *pseudoscientific* claims often give the appearance of science, they do not follow the basics of the *scientific method*, which will be covered later in this chapter. To offset the dangers of pseudoscience, organizations and websites, like *Skeptical Inquirer* and Snopes, and some individuals, like magician James Randi (**Figure 1.1**), have dedicated their lives to revealing the many problems posed by pseudoscience claims (Arkowitz & Lilienfeld, 2017; Gordin, 2017; Loftus, 2010). To test your own possible misconceptions about psychology, **Try This**.

Study TIP

Are you concerned about the numerous citations (authors' names and publication dates) that appear at the end of many sentences, such as (Andersson et al., 2022)? Instructors rarely expect you to memorize the names and dates in parentheses. They are provided as a starting point for research projects, for additional information on a topic of interest, and to double-check the research sources. If you want complete publication information for any of our cited sources, check the full References section at the back of the text.



Alan Diaz/AP Images

FIGURE 1.1 Demonstrating magic versus pseudoscience
The late magician James Randi (1928–2020) dedicated his life and his skills as a magician to educating the public about fraudulent paranormal, psychic, and pseudoscientific claims. Although his foundation offered a prize of $1 million for many years to "anyone who proves a genuine psychic power under proper observing conditions," the money was never collected (Fox, 2020; Randi, 2014; The Amazing Meeting, 2011). For more information, check out https://web.randi.org/home/jref-status

Try This: True or False?

_____ **1.** We only use 10 percent of our brain.

_____ **2.** Some people are left-brained and some are right-brained.

_____ **3.** Hypnosis improves the accuracy of our memories.

_____ **4.** Subliminal ads really work.

_____ **5.** Our memory functions like a recorder.

_____ **6.** Most brain activity stops when we're asleep.

_____ **7.** Punishment is the most effective way to permanently change behavior.

_____ **8.** Our personalities are "set in plaster" by age 30.

_____ **9.** The best way to learn and remember information is to "cram," or study it intensively during one concentrated period.

_____ **10.** There is an autism epidemic, and it's mostly caused by vaccination.

_____ **11.** Polygraph ("lie detector") tests can reliably detect when a person is lying.

_____ **12.** Violent offenders generally have a diagnosis of mental illness.

_____ **13.** People with schizophrenia have multiple personalities.

_____ **14.** Opposites attract and make better and longer-lasting romantic partners.

_____ **15.** In an emergency, the more people who are present, the more likely you are to get help.

(You can check your answers in Appendix B.)

Confirmation bias
The tendency to prefer evidence that confirms our preexisting expectations, while dismissing or failing to seek contradictory evidence; also known as remembering the "hits" and ignoring the "misses."

Are you wondering why pseudoscientific beliefs like the 15 statements in the preceding Try This are so popular? Or why they're so persistent and difficult to change? When we're confronted with information that conflicts with what we already believe and feel strongly about, we often look for and remember evidence that supports our preexisting beliefs and ignore what doesn't. This **confirmation bias** is generally defined as the tendency to prefer evidence that confirms our preexisting expectations while dismissing or failing to seek contradictory evidence (Lange et al., 2021; Meppelink et al., 2019; Nickerson, 1998). We emphasize this point because recognizing and overcoming confirmation bias is perhaps the single best tool for avoiding pseudoscience and error-filled beliefs and judgments.

Study TIP

Key Terms and Glossary Pay close attention to all key terms and concepts, which are boldfaced in the text and defined in the margin. Key terms also appear in a cumulative glossary at the end of this text.

Scientific and Critical Thinking

VIDEO CONTENT

LO 1.1.3 **Discuss** scientific thinking versus critical thinking.

Scientific thinking
The process of objectively evaluating the weight of fact-based, verifiable evidence in favor of or against a certain proposition.

Critical thinking
The process of objectively evaluating value-based claims in order to decide which is most logically defensible.

Empirical approach A process that relies on or is derived from observation, experimentation, and measurement.

We turn next to exploring why psychology emphasizes both scientific and critical thinking (Clouse, 2017; Holmes et al., 2015). As just mentioned, our everyday world is filled with controversial ideas, so-called fake news, conspiracy theories, and unreliable personal beliefs and opinions. How do we evaluate this abundance of information and the competing claims of advertisers and politicians? To separate scientific facts from "alternative facts," evidence-based scientific theories from "personal theories," and sense from nonsense, we need **scientific thinking**, which we define as the process of objectively evaluating the weight of fact-based, verifiable evidence in favor of or against a certain proposition.

In addition to scientific thinking, psychological science also relies heavily on critical thinking. Over the years, the term *critical thinking* has often been linked with theoretical philosophy, pedagogy, and the social sciences. As a result, it has evolved into an umbrella-type term with numerous components and an enormous variety of competing definitions. Based on this long and complex history, and to reflect its close relationship to scientific thinking, we define **critical thinking** simply as objectively evaluating value-based claims in order to decide which is most logically defensible.

Clarifying Scientific Versus Critical Thinking

Can you see how these two ways of thinking are related but not equivalent? Scientific thinking is primarily interested in *fact-based evidence* gathered through the *scientific method*, or the larger, more general **empirical approach**, which relies on or is derived from observation, experimentation, and measurement. (Module 1.3 provides a detailed explanation of the scientific method.)

TABLE 1.1 Scientific Thinking Versus Critical Thinking

Sample Scientific Thinking Questions	Sample Critical Thinking Questions
What is the relationship between smoking and lung cancer?	Why do people begin smoking knowing they might get lung cancer?
What is the evidence for cognitive behavior therapy (CBT) in the treatment of anxiety disorders?	Should therapists recommend cognitive behavior therapy (CBT) for the treatment of anxiety disorders?
Do vaccinations decrease the rates of Covid infection, hospitalizations, and/or deaths?	Why do some people resist Covid vaccinations?

In contrast, critical thinking is primarily interested in *value-based judgments* gathered through **metacognition**, the awareness and regulation of your personal cognitive processes—in other words, thinking about your thinking in order to clarify and improve it. Can you see the value of metacognition and how it applies to many aspects of your everyday life (e.g., Hennecke & Bürgler, 2023; Kuhn, 2022)? **Table 1.1** provides a sample of possible scientific versus critical thinking questions.

Metacognition The awareness and regulation of your personal cognitive processes; thinking about your thinking in order to clarify and improve it.

VIDEO CONTENT

What Is Scientific Thinking?

Having examined the core differences between scientific and critical thinking, let's explore the four key steps that clarify their similarities.

STEP 1: Curiosity. Both scientific and critical thinking are driven by *curiosity*, which is a shared, eager desire to know and learn about ourselves and the world around us.

STEP 2: Skepticism. Both scientific and critical thinking also use *skepticism* to question, challenge, and refine available information. Skepticism encourages curiosity and an open-minded approach to what "everybody knows," while also delaying judgment until objective data are available.

STEP 3: Examination of evidence. Although both scientific and critical thinking carefully examine evidence, scientific thinking emphasizes the *empirical approach*, whereas critical thinking focuses on *metacognition*.

- **Scientific thinking's "empirical approach."** To objectively evaluate and weigh the evidence for or against a proposition, *scientific thinking* requires the data to be fact-based and scientifically verifiable—the *empirical approach.* Using objective, scientific data, the empirical approach can separate *facts* from pseudofacts or so-called alternative facts, and scientific *theories* from opinions and hunches. A *fact* for scientists is a statement backed by direct, verifiable evidence, whereas a *theory* is a tool that predicts facts. Note also that objective evidence requires that the source, author, and evidence must be carefully evaluated for bias and reliability.
- **Critical thinking's "metacognition."** To objectively evaluate data using *critical thinking,* we need to self-monitor our personal cognitive processes and attempt to control them—*metacognition*. Individuals with weak metacognitive skills are generally less consciously aware of what they know and what they don't know. Having strong metacognitive skills allows you to understand the limits of your own knowledge, and to more effectively evaluate spurious claims from unsubstantiated or unethical sources.

STEP 4: Rationalism. Even when we've encouraged our curiosity, successfully practiced skepticism, and carefully examined the data, both scientific and critical thinking still require rational thinking, including logic and reason, to overcome opinions and emotions. For instance, many people continue to text and drive despite overwhelming evidence documenting its dangers. Rationalism requires us to follow established scientific facts and empirical data for scientific thinking and to rationally value truth and logic for critical thinking.

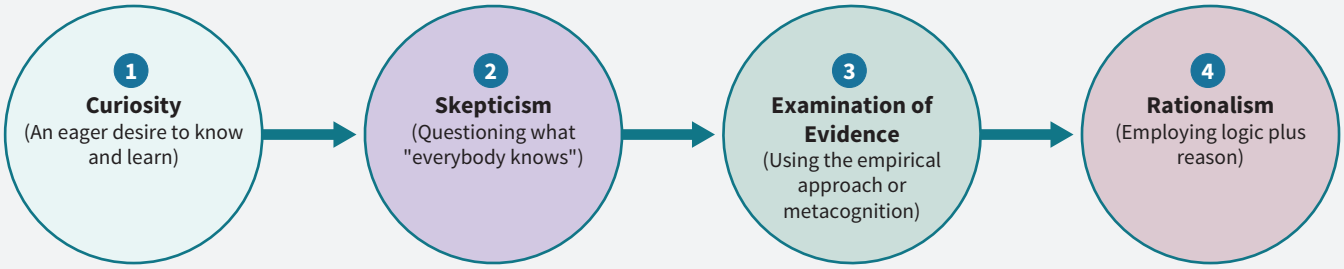
In sum: *All scientific thinking should include critical thinking, but not all critical thinking requires scientific thinking.* If you'd like a visual depiction of the four steps involved in both scientific and critical thinking, see **Process Diagram 1.1**.

Take-Home Message The core distinction between scientific and critical thinking is essentially between *facts* and *values*, and both of these skills are vital to becoming a successful

AT-A-GLANCE Process Diagram 1.1

STOP! This Process Diagram contains essential information *not* found elsewhere in the text, which is likely to appear on quizzes and exams. Be sure to study it carefully.

Four Steps for Both Scientific and Critical Thinking Follow these four steps to improve your thinking efficiency. Be sure to note how scientific and critical thinking involve four steps, with only a slight difference in Step 3.

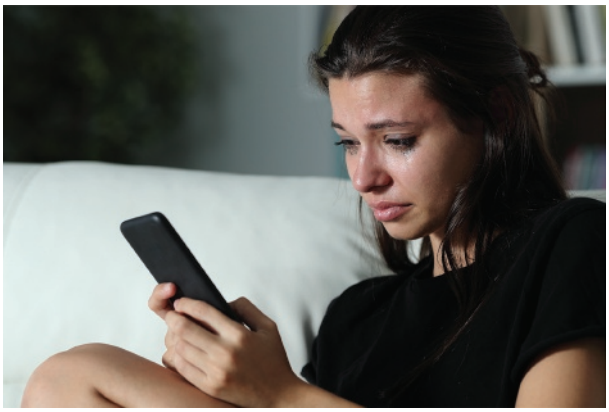


Study TIP

Illustrations Don't skip over photos, figures, and tables. They visually reinforce important concepts and often contain material that may appear on exams.

student and an educated citizen of the world. In addition, it's important to remember that both scientific and critical thinking are the foundation of any science. Check out this first example of **Why Scientific Thinking Matters**.

Why Scientific Thinking Matters: Practical Applications | Does Spending Time on Social Media Lead to Depression?



Antonioguillem/Adobe Stock

You've probably heard—perhaps online, in a magazine, or on television—that spending time on social media is bad for your mental health. And it's not hard to imagine that scrolling through social media and seeing people taking exciting trips, wearing flattering outfits, and attending great parties could make us feel worse about our own lives by comparison.

To scientifically evaluate how spending time on social media affects depression, researchers in one study examined 3,800 teenagers over a four-year period (Boers et al., 2019). Their findings seemed quite conclusive: teenagers who spent more time on social media reported *higher levels of* and *greater increases in* depression than those who spent less time on social media. Moreover, a widely publicized article by Jean Twenge, titled "Have Smartphones Ruined a Generation?" blamed increases in teenagers' reports of anxiety, depression, and even suicide on the arrival of smartphones, which allow ready access to social media (Twenge et al., 2018; Twenge, 2020).

But these findings about the hazards of social media for mental health have now been called into question. Two meta-analyses, a type of research that combines the results of multiple studies, examined the link between social media use, depression, and anxiety in teenagers (Odgers & Jensen, 2020; Orben, 2020). Their findings revealed that the link between social media use and mental health problems is small and inconsistent.

These researchers acknowledge that social media can be detrimental, particularly for teenagers with mental health issues. But they also point out that teenagers who are struggling with anxiety or depression may gravitate toward their phones and social media as a way of forming connections, which in turn can provide valuable resources. They also note that finding a correlation between the widespread availability of cell phones and increases in anxiety and depression does not prove that cell phones or social media *caused* a rise in mental health issues. (You'll learn about how correlation does not prove causation later in this chapter.) After all, other factors might contribute to higher rates of mental health problems, such as concern over climate change, student debt, or income inequality. Moreover, rates of mental health problems among teenagers in Europe did not show an increase during this same time period, suggesting that the availability of cell phones may not be the root cause (Schürmann & Margraf, 2018).

As you might expect, these conclusions are disputed by still other research studies. For example, one study found that college students who were randomly assigned to limit their time on social media—including Facebook, Instagram, and Snapchat—to 30 minutes a day for three weeks showed significant reductions in loneliness and depression (Hunt et al., 2018).

All of these findings illustrate the importance of both scientific and critical thinking, along with the need to delay judgment until adequate, objective, reliable data are available.

In case you're wondering why we include a special section on *Why Scientific Thinking Matters* in each chapter of this text, here is our personal explanation: *Scientific thinking requires objectively evaluating the weight of fact-based, verifiable evidence. Applying this skill not only enhances the understanding of our personal, professional, and social world, it's also considered by many to be a critical 21st-century skill core to solving global and societal issues, such as climate change and pandemic health crises (e.g., McGregor & Frodsham, 2023; Osterhaus et al., 2021).*

Why Study Psychology?

VIDEO CONTENT

LO 1.1.4 **Review** the benefits of studying psychology.

If you've taken other science courses, you know that physicists explain the physical world in terms of mathematics, chemists explain processes at the atomic level, and biologists examine organisms at a cellular level. Unlike these scientists, psychologists generally study nonphysical phenomena—behavior and mental processes. However, psychologists, like all scientists, follow the scientific method (fully discussed in Module 1.3), and our research findings help us understand why people (and even nonhuman animals) think, feel, and act in the ways they do.

As an example, we all face minor and significant choices and problems in our relationships, school life, and work life, but few (if any) of us would simply flip a coin to make these choices or solve these problems. Thankfully, the scientific, psychological principles you'll discover in this course will maximize your chances of choosing and maintaining successful romantic and career relationships. They'll also demonstrate how applying these general principles can improve your overall individual and societal life. In addition, given that psychology is an integral part of today's political, social, and economic world, studying it will broaden your general knowledge and increase your academic and personal success as a global citizen. For more information (and motivation) to study psychology and this text, **Try This**.

Try This: Why Study Psychology?

In the following list of 5 benefits of studying psychology, place check marks beside the benefits that you find most appealing.

1. _____ **Greater understanding of yourself and others.** Greek philosopher Socrates admonished us long ago to "Know thyself." Studying psychology will greatly contribute to an understanding (and appreciation) of yourself and others.
2. _____ **Improved relationships.** Knowing and understanding yourself and others will improve your relationships with friends, family, and coworkers.
3. _____ **Improved problem solving, research, and analytical skills.** Studying psychology demonstrates how to consider problems from different perspectives, which in turn helps reveal the most effective and beneficial solutions. Psychology also teaches you how to effectively gather, organize, and analyze data, skills that are critical to lifetime and academic success. For example, you're almost guaranteed to receive higher grades on all your assignments if you consult reliable sources, like those in **Table 1.2**.
4. _____ **Become a better communicator.** Understanding yourself and others is the foundation of good communication, as well as the basis for understanding disagreements and how to effectively resolve them. For example, do you find "small talk" at parties or with new people awkward and somewhat boring? Experiments have shown that having *deeper conversations* versus *shallow conversations* leads to significantly more meaningful and enjoyable communication (Kardas et al., 2021). If you'd like to try this, there are no "magic questions" for deeper conversations. Just start with one or more of these: "What do you love doing?" "Where do you see

yourself in five years?" "What do you most regret?" Then follow up with deeper questions, which show you're listening. For more specific information and additional sample questions, check out the actual study: https://www.apa.org/pubs/journals/releases/psp-pspa0000281.pdf

5. _____ **Develop transferable skills applicable for numerous careers.** Studying psychology promotes invaluable skills that will apply to other college courses and in a number of job settings. Jump ahead to Module 1.2 of this first chapter for specific details about career options in psychology and transferable skills.

TABLE 1.2 Sample Reliable Resources for Scientific and Critical Thinking

American Psychological Association [apa.org]	Mindhacks [mindhacks.com]	*Research Digest* [digest.bps.org.uk]
American Psychiatric Association [psychiatry.org]	National Institute of Mental Health [nimh.nih.gov/news]	*ScienceAlert* [sciencealert.com]
Association for Behavior Analysis International [abainternational.org]	Neuroskeptic [realclearscience.com/authors/neuroskeptic/]	*Scientific American Mind* [scientificamerican. com/mind/]
Association for Psychological Science [psychologicalscience.org]	PsyBlog [spring.org.uk]	*Skeptic* magazine [skeptic.com]
British Psychological Society [bps.org.uk]	PsychCentral [psychcentral.com]	*Skeptical Inquirer* [skepticalinquirer.org]
Canadian Psychological Association [cpa.org]	PsycINFO [apa.org/pubs/databases/psycinfo/]	Snopes [snopes.com]
FactCheck [factcheck.org]	Psychonomic Society [psychonomic.org]	TED Talks [ted.com/topics/psychology]
Google Scholar [scholar.google.com]	Public Library of Science [plos.org]	We're Only Human [psychologicalscience.org/news/were-only-human]

Before going on, be sure to complete the following **Retrieval Practice.**

Retrieval Practice Module 1.1: What Is Psychology?

INTERACTIVE SELF-SCORING QUIZZES

Study Tip Each module concludes with self-test questions that allow you to stop and check your understanding of the important concepts just discussed.

Key Terms and Concepts Write a definition for each term or concept, using your own words.

- confirmation bias
- critical thinking
- empirical approach
- metacognition
- psychology
- scientific thinking

Self-Test Completing this self-test and checking your answers in Appendix B provides immediate feedback and helpful practice for exams.

1. Psychology is defined as the _____.

a. science of conscious and nonconscious forces
b. empirical study of the mind and behavior
c. scientific study of the mind
d. scientific study of behavior and mental processes

2. _____ relies on common beliefs, folk wisdom, and superstitions and does not follow the basics of the scientific method.

a. Pseudoscience
b. Astrophysics
c. Astronomy
d. Psychology

3. The tendency to prefer evidence that confirms our preexisting expectations, while dismissing or failing to seek contradictory evidence is known as _____.

4. What are the four steps of both scientific and critical thinking?

5. _____ refers to the awareness and regulation of your personal and cognitive processes.

Test Your Scientific/Critical Thinking

1. **Psychologists are among the least likely to believe in psychics, palmistry, astrology, and other paranormal phenomena. Why might that be?**
2. **What do you consider the major problems with believing in pseudoscience? What might be some of the benefits?**
3. **If you had to choose between scientific thinking and critical thinking, which would you choose? Why?**

Real World Application Question

[AQ1] Why is spending money on psychics a bad idea?
Hint: Look in the text for **[AQ1]**.

Module 1.2 Psychology's Past and Present

LO 1.2 Review psychology's origins, including structuralism, functionalism, and the psychoanalytic perspective.

MODULE 1.2 KEY TOPICS

Here are the key topics you will read about in this module.

- Psychology's Origins
- Psychology's Seven Modern Perspectives
- Psychology Today—Three Major Models
- Careers and Specialties in Psychology

This module begins with a brief overview of psychology' history and beginnings as a scientific discipline. Next, we explore modern psychology's seven modern perspectives, followed by psychology's three major models. We close with a look at psychology's major career options and specialties.

Psychology's Origins

VIDEO CONTENT

LO 1.2.1 Review psychology's origins, including structuralism, functionalism, and the psychoanalytic perspective.

Ancient scholars asked many of the same questions about human nature that modern psychologists are still examining. However, psychology is a relative newcomer to the scientific world—less than 150 years old. In this section, we discuss the beginnings of psychological science, and how as interest in the new field grew, psychologists adopted various perspectives on the appropriate topics for psychological research and its proper research methods. These diverse viewpoints and subsequent debates molded and shaped modern psychological science.

We begin with an exploration of psychology's first scientific laboratory and the beginning of experimental psychology. We then discuss the earliest schools of thought and psychology's seven modern perspectives. We close with a look at modern psychology's three major models.

Psychology's history as an *experimental* science began in 1879, when Wilhelm Wundt [VILL-helm Voont], generally acknowledged as the "father" of psychology, established the first psychological laboratory in Leipzig, Germany. Wundt and his followers were primarily interested in conscious experiences—how we form sensations, images, and feelings. Their chief methodology was termed *introspection*, and it relied on participants' self-monitoring and reporting on conscious experiences (Freedheim & Weiner, 2013; Weger et al., 2019).

Although this brief description of Wundt's early laboratory does not do justice to this "father" of psychology and his full contributions to psychology, it's important to remember that he was the first to attempt to answer psychological questions through the collection of scientific data. His research also led to the beginnings of several branches or schools of thought in psychology. Let's begin with structuralism.

Structuralism Wundt's and Titchener's approach to psychology, based on the idea that conscious experiences can be broken down into their basic elements (or structures).

Structuralism

One of Wundt's students, Edward Titchener, brought Wundt's ideas to the United States. Titchener's approach, now known as **structuralism,** is based on the idea that conscious experiences can be broken down into their basic elements (or *structures*). Through *introspection*, research participants were asked to self-report their conscious experiences (**Figure 1.2**). Because introspection could not be used to study animals, children, or

Subrata/Adobe Stock

FIGURE 1.2 Introspection and structuralism Structuralists used a type of controlled *introspection*, in which research participants would be shown an object, like an apple. They would then self-report on their personal conscious thoughts and feelings about the object, which typically relied on personal memories of sensations from their past (color, shape, texture, smell, and taste). Just as chemists of those times attempted to break molecules into elements, structuralists attempted to discover the smallest elements (structures) of the conscious mind.

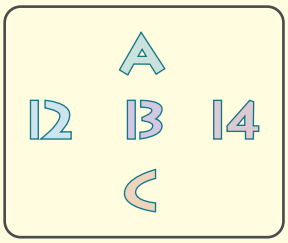
Gestalt psychology A school of thought that emphasized that the whole of anything is greater than its parts.

complex mental disorders, structuralism failed as a working psychological approach. However, it did establish a model for studying mental processes scientifically.

Another reason for the failure of structuralism came from German psychologists, including Kurt Koffka, Max Wertheimer, and Wolfgang Köhler, who founded the school of **Gestalt psychology**, which emphasized that the whole of anything is greater than its parts. The word "Gestalt" basically means "form" or "whole." The gestaltists suggested that the structuralists' attempt to break a "whole" into its basic components led to an inevitable loss of important information. Instead, they advocated studying experiences of thinking, learning, perception, and personality as a whole. **Try This**.

Try This: Gestalt Psychology Versus Structuralism

First, look at the figures in the vertical, middle column. What do you see? Now, look at the figures in the horizontal row. Although the middle figure stays exactly the same in both viewings, most people see the vertical middle figure as the letter B and the horizontal figure as the number 13. Gestalt psychologists would explain that the context, or the "whole" of your experience, determines your perception, whereas structuralists would have difficulty explaining the difference.



Functionalism James's approach, which explored how mental and behavioral processes function to enable organisms to adapt to the environment.

Psychoanalytic perspective An approach to psychology developed by Sigmund Freud, which focuses on unconscious processes, unresolved conflicts, and past experiences.

Functionalism

Structuralism's intellectual successor, **functionalism**, examined the way mental and behavioral processes *function* to enable humans and other animals to adapt to their environment. William James was the leading force in the functionalist school (**Figure 1.3**). Although functionalism, like structuralism, eventually declined, it expanded the scope of psychology to include research on emotions and observable behaviors, initiated the psychological testing movement, and influenced modern education and industry. Today, James is widely considered the "father" of American psychology.

Psychoanalytic Perspective

During the late 1800s and early 1900s, while functionalism was prominent in the United States, the **psychoanalytic perspective** was forming in Europe. Its founder, Austrian physician Sigmund Freud, believed that a part of the human mind, the unconscious, contains unresolved desires and conflicts, as well as memories of past experiences that lie outside personal awareness—yet still exert great influence. According to Freud, a man who is cheating on his wife might slip up and say, "I wish you were her," when he consciously planned to say, "I wish you were here." Such seemingly meaningless so-called Freudian slips supposedly reveal a person's true unconscious desires and motives.

Freud also believed many psychological problems develop from unconscious sexual or aggressive motives and conflicts between "acceptable" and "unacceptable" behaviors. His theory led to an influential theory of personality and a system of therapy known as *psychoanalysis* (Chapters 12 and 14).

Bettmann/Getty Images

FIGURE 1.3 William James (1842–1910) William James established the perspective known as functionalism and set up the first psychology laboratory in the United States, at Harvard University. In modern times, he is commonly referred to as the father of American psychology, whereas Wundt is considered the father of *all* psychology.

Psychology's Seven Modern Perspectives

VIDEO CONTENT

LO 1.2.2 Discuss psychology's seven modern perspectives.

Although people have long been interested in human nature, it was not until the first psychological laboratory was founded in 1879 that psychology as a science officially began. As interest in the new field grew, psychologists adopted various perspectives on the appropriate topics for psychological research—and its proper research methods. These diverse viewpoints and subsequent debates molded and shaped modern psychological science.

As summarized in **Table 1.3**, contemporary psychology reflects seven major perspectives: *psychodynamic*, *behavioral*, *humanistic*, *cognitive*, *biological*, *evolutionary*, and

sociocultural. Although there are numerous differences among these seven perspectives, most psychologists recognize the value of each and agree that no one view has all the answers.

Psychodynamic perspective
A modern approach to psychology that emphasizes unconscious dynamics—motives, conflicts, and past experiences; based on the psychoanalytic approach.

Behavioral perspective
A modern approach to psychology that emphasizes objective, observable environmental influences on overt behavior.

Humanistic perspective
A modern approach to psychology that perceives human nature as naturally positive and growth seeking; it emphasizes free will and self-actualization.

Positive psychology
The study of optimal human functioning; emphasizes positive emotions, traits, and institutions.

1. **Psychodynamic perspective.** Freud's nonscientific approach and his emphasis on sexual and aggressive impulses have long been controversial, and today there are few strictly Freudian psychoanalysts left. However, the broad features of his theory remain in the modern **psychodynamic perspective**. The general goal of psychodynamic psychologists is to explore unconscious *dynamics*—internal motives, conflicts, and past experiences—and childhood experiences, while also focusing more on social and cultural factors and less on sexual drives than Freud did.
2. **Behavioral perspective.** In the early 1900s, another major perspective appeared that dramatically shaped the course of modern psychology. Unlike earlier approaches, the **behavioral perspective** emphasizes objective, observable environmental influences on overt behavior. Behaviorism's founder, John B. Watson (1878–1958), rejected the practice of introspection and the influence of unconscious forces. Instead, Watson adopted Russian physiologist Ivan Pavlov's concept of *conditioning* (Chapter 6), which explains behavior as a result of observable stimuli (in the environment) and observable responses (behavioral actions).

   Most early behaviorist research was focused on learning, and nonhuman animals were ideal participants for this research. One of the best-known behaviorists, B. F. Skinner, was convinced that behavioral principles could be used to "shape" both human and nonhuman animal behavior (**Figure 1.4**). As you'll discover in Chapters 6 and 14, therapeutic techniques rooted in the behavioristic perspective have been most successful in treating observable behavioral problems, such as those related to phobias and addictions (Coates et al., 2018; Hinze et al., 2021; Yoshinaga et al., 2019).
3. **Humanistic perspective.** Although the psychoanalytic and behavioral perspectives dominated U.S. psychology for some time, in the 1950s a new approach emerged—the **humanistic perspective**, which stresses *free will* (voluntarily chosen behavior) and *self-actualization* (an inborn drive to develop all of one's talents and capabilities). According to Carl Rogers and Abraham Maslow, two central figures within this perspective, all individuals are born with free will and naturally strive to develop and move toward self-actualization. Like the psychoanalytic perspective, the humanistic approach developed an influential theory of personality, as well as its own form of psychotherapy (Chapters 12 and 14).

   The humanistic approach also led the way to a contemporary research specialty known as **positive psychology**—the study of optimal human functioning (Sanderson, 2019; Seligman, 2003, 2018; Wang et al., 2021). You'll learn more about positive psychology later in this chapter, where we discuss key findings about the psychology of happiness, as well as in a special feature in each chapter called *Why Positive Psychology Matters*.
4. **Cognitive perspective.** One of the most influential modern approaches, the **cognitive perspective**, emphasizes the mental processes we use in thinking, knowing, remembering, and communicating (Farmer & Matlin, 2019; Greene, 2016). These mental processes include perception, memory, imagery, concept formation, problem solving, reasoning, decision making, and language. Many cognitive psychologists also use an *information-processing approach*, likening the mind to a computer that sequentially takes in information, processes it, and then produces a response.
5. **Biological perspective.** During the past few decades, scientists have explored the role of biological factors in almost every area of psychology. Using sophisticated tools and technologies, psychologists who adopt this **biological perspective** examine behavior through the lens of genetics and biological processes in the brain and other parts of the nervous system. Why are genes so important to psychologists? Research shows that genes influence many aspects of our behavior, including how kind we are to other people, our likelihood of getting divorced, and even whether we decide to purchase a handgun

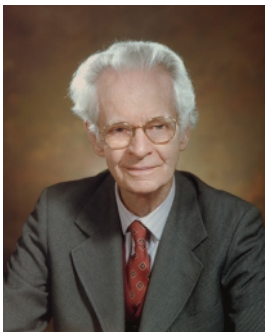
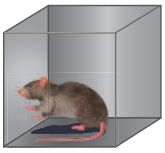
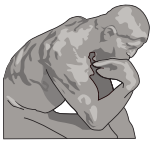

Bachrach/Archive Photos/Getty Images

FIGURE 1.4 B. F. Skinner (1904–1990) B. F. Skinner was one of the most influential psychologists of the 20th century.

Cognitive perspective
A modern approach to psychology that focuses on the mental processes used in thinking, knowing, remembering, and communicating.

Biological perspective
A modern approach to psychology that focuses on genetics and biological processes.

TABLE 1.3 Psychological Science's Seven Modern Perspectives

Perspectives	Major Emphases	Sample Research Questions
Psychodynamic 	Unconscious dynamics, motives, conflicts, and past experiences	How do adult personality traits or psychological problems reflect unconscious processes and early childhood experiences?
Behavioral 	Objective, observable, environmental influences on overt behavior; stimulus–response (S-R) relationships, and consequences for behavior	How do reinforcement and punishment affect behavior? How can we increase desirable behaviors and decrease undesirable ones?
Humanistic 	Free will, self-actualization, and human nature as naturally positive and growth seeking	How can we promote various clients' capacity for self-actualization and understanding of their own development? How can we promote international peace and reduce violence?
Cognitive 	Mental processes used in thinking, knowing, remembering, and communicating	How do our thoughts and interpretations affect how we respond in certain situations? How can we improve how we process, store, and retrieve information?
Biological 	Genetic and biological processes in the brain and other parts of the nervous system	How might changes in neurotransmitters, or damage to parts of the brain, lead to psychological problems and changes in behavior and mental processes?
Evolutionary 	Natural selection, adaptation, and reproduction	How does natural selection help explain why we love and help certain people, but hurt others? Do we have specific genes for aggression and altruism?
Sociocultural 	Social interaction and the cultural determinants of behavior and mental processes	How do the values and beliefs transmitted from our social and cultural environments affect our everyday psychological processes?
	**Why do we need multiple perspectives?** What do you see in this figure? Is it two profiles facing each other, a white vase, or both? Your ability to see both figures is similar to a psychologist's ability to study behavior and mental processes from a number of different perspectives.	

(Barnes et al., 2014; Salvatore et al., 2018; Wilson, 2015; Wu et al., 2020). Research even shows that our genes influence whether we own a dog (see **photo**).

6. **Evolutionary perspective.** The **evolutionary perspective** stresses natural selection, adaptation, and reproduction (Buss, 2011, 2015; Dawkins, 2016; Goldfinch, 2015). This approach stems from the writings of Charles Darwin (1859), who suggested that natural forces select traits that aid an organism's survival. This process of **natural selection** occurs when a particular genetic trait gives an organism a reproductive advantage over others. Because of natural selection, the fastest, strongest, smartest, or otherwise most fit organisms are more likely to live long enough to reproduce, and thereby pass on their genes to the next generation.
7. **Sociocultural perspective.** Finally, the **sociocultural perspective** emphasizes social interactions and cultural determinants of behavior and mental processes. Although we are often unaware of their influence, factors such as ethnicity, religion, occupation, and socioeconomic class all have an enormous psychological impact on our behavior and mental processes.

Image Source/Adobe Stock

Can genes predict whether you're a dog lover? [AQ2] A study of over 35, 000 pairs of twins living in Sweden compared rates of dog ownership between identical twins, who share 100 percent of their genes, and fraternal twins, who share 50 percent of their genes (Fall et al., 2019). The researchers found that if one member of an identical twin pair owned a dog, there was a 40 percent likelihood that the twin would also own a dog, compared with only a 25 percent likelihood for pairs of fraternal twins. This simple study illustrates that some people are more likely dog people, and some are not—and that such differences are at least partially rooted in our genes.

Psychology Today—Three Major Models

VIDEO CONTENT

LO 1.2.3 **Describe** the three major models of psychology today and the contributions of women and people of color to psychology.

The seven perspectives just discussed have all made significant contributions to modern psychology. However, most contemporary psychologists do not adhere to any single perspective. Instead, psychology today recognizes the value of multiple perspectives, knowing that doing so allows us to better understand and scientifically explore the complexities of human and nonhuman behavior and mental processes. In this section, we will explore the three major models of modern psychology, all of which emphasize multiple, interacting approaches—the *biopsychosocial model*, the *APA five pillar approach*, and the *diversity, equity, and inclusivity (DEI) model*.

Biopsychosocial Model

While reading through the previous discussion of the history of psychology, did you notice how some early perspectives, such as *structuralism* and *functionalism*, have largely disappeared, while others, like the *psychoanalytic* view, have evolved into more modern perspectives? In recent times, a more integrative, unifying theme—the **biopsychosocial model**—also has evolved and gained wide acceptance (**Figure 1.5**). This model views biological processes (genetics, neurotransmitters, and evolution), psychological factors (learning, personality, and motivation), and social forces (family, culture, gender, and ethnicity) as interrelated.

The APA Five Pillar Model

Recognizing the importance of combining and integrating all of modern psychology's new and existing perspectives, the American Psychological Association (APA) issued a report titled, "Strengthening the Common Core of the Introductory Psychology Course," which was published in 2014. Based on years of research and numerous conferences, they also developed and recommended the **APA Five Pillar Model** (**Figure 1.6**).

Diversity, Equity, and Inclusion (DEI) Model

In recent years, a focus on DEI has become a major goal for psychology as well as for most businesses and organizations. *Diversity* includes not only race, ethnicity, and gender but also age, religion, sexual orientation, socioeconomic status, and so on. *Equity* involves fair treatment, access, opportunity, and advancement for all people, whereas *inclusion* refers to creating environments where everyone is welcomed, respected, supported, and encouraged to participate.

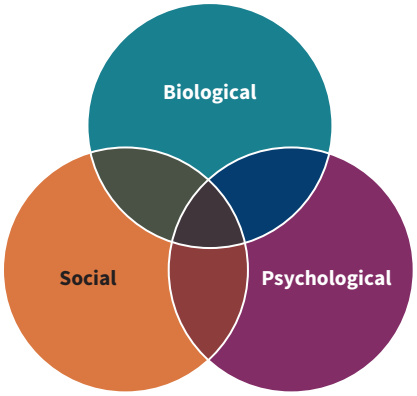
Evolutionary perspective
A modern approach to psychology that stresses natural selection, adaptation, and reproduction.

Natural selection
Darwin's principle of an evolutionary process in which heritable traits that increase an organism's chances of survival or reproduction are more likely to be passed on to succeeding generations.

Sociocultural perspective
A modern approach to psychology that emphasizes social interaction and the cultural determinants of behavior and mental processes.

Biopsychosocial model
Modern psychology's theme that sees biological, psychological, and social processes as interrelated and interacting influences.

APA Five Pillar Model
The American Psychological Association's (APA) view of psychology as founded on five major pillars or domains (biological, cognitive, developmental, social and personality, and mental and physical health).



Adapted from https://www.recoverycollegeonline.co.uk/courses/exploring-the-biopsychosocial-model/

FIGURE 1.5 The biopsychosocial model
This model recognizes that there is usually no single cause for our behavior or our mental states. Our moods and feelings, for instance, are often influenced by genetics and neurotransmitters (biological), our learned responses and patterns of thinking (psychological), and our socioeconomic status and cultural views of emotion (sociocultural).

VIDEO CONTENT
The Biopsychosocial Model

Why does psychology need three separate models—the biopsychosocial, the APA five pillars, and DEI? Have you heard the old saying that "A fish doesn't know it's in water"? As individuals living alone inside our own heads, we're similarly often unaware of the numerous interacting factors that affect us—particularly sociocultural forces.

Unfortunately, the awareness that our thoughts, feelings, and behavior are influenced by multiple interacting factors is relatively new in the field of psychology. As you may have noticed, the original pioneering founders of psychology were not very diverse—primarily Caucasian men! In fact, during the late 1800s and early 1900s, most colleges and universities provided little opportunity for women and people of color, either as students or as faculty members.

One of the first women to be recognized in the field of psychology was Mary Calkins. Her achievements are particularly noteworthy considering the significant discrimination that she overcame. For example, married women could not be teachers or professors in coeducational settings during this time in history. In Mary Calkins's case, even after she completed all the requirements for a Ph.D. at Harvard University in 1895 and was described by William James as his brightest student, the university refused to grant the degree to a woman. Nevertheless, Calkins went on to perform valuable research on memory, and in 1905 she served as the first female president of the American Psychological Association (APA). The first woman to receive her Ph.D. in psychology was Margaret Floy Washburn in 1894. She wrote several influential books and served as the second female president of the APA.

In 1920, Francis Cecil Sumner became the first Black person in the United States to earn a Ph.D. in psychology. Dr. Sumner later chaired one of the country's leading psychology departments, at Howard University. In 1971, one of Sumner's students, Kenneth B. Clark, became the first person of color to be elected APA president. Clark's research with Mamie Clark, his wife, documented the harmful effects of prejudice and directly influenced the Supreme Court's landmark 1954 ruling against racial segregation in schools, *Brown v. Board of Education*, as described in **Why DEI Matters**.

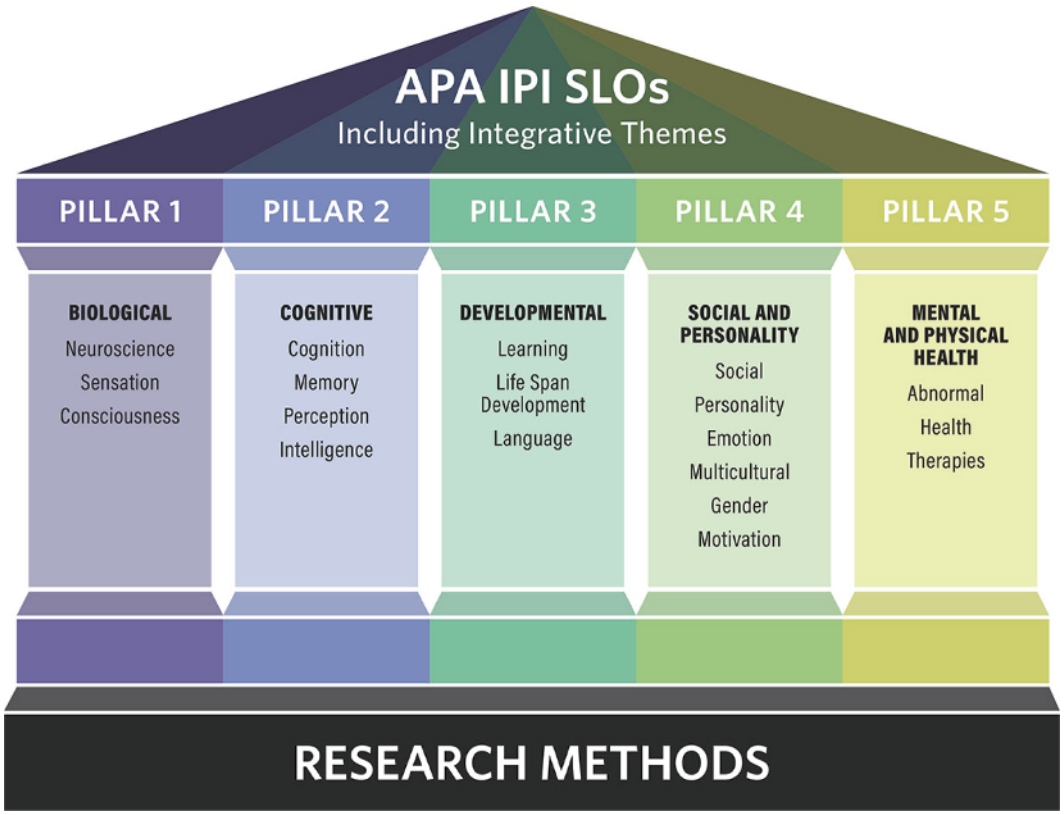


FIGURE 1.6 The APA Five Pillar Model

Why DEI Matters: Practical Applications | Can Research in Psychology Help Us Understand Bias?

In the 1930s and 40s, Mamie and Kenneth Clark (**Figure 1.7**), a husband-and-wife team of African American social psychologists, conducted a series of ground-breaking studies—often known as "the doll tests"—to examine how racial bias could harm children's self-esteem. The design of their study was very simple: they brought Black children ages 3 to 7 into a room and placed two dolls in front of them—one black, one white. The children were then asked a series of questions: Which doll is pretty? Which doll is ugly? Which doll is bad? Which doll is good? Which doll do you want to play with?

Their findings were clear—and depressing. Black kids overwhelmingly preferred the dolls with White skin. The Clarks were so upset by their heartbreaking results—that children as young as 6 years old were seeing the doll that looked like them as inferior—that they initially held off from publishing these findings.

However, these results were later included as part of the case that led to the U.S. Supreme Court's 1954 *Brown v. Board of Education* ruling, which overturned the legal doctrine of "separate but equal"—one of the most monumental decisions in American history. Legal scholars have argued that the "doll tests" demonstrated a tangible way in which segregation was fundamentally harmful to young children's sense of self. As Chief Justice Earl Warren wrote in his opinion, "To separate [Black children] from others of similar age and qualifications solely because of their race generates a feeling of inferiority as to their status in the community that may affect their hearts and minds in a way unlikely ever to be undone."

The Library of Congress

FIGURE 1.7 Kenneth Clark (1914–2005) and Mamie Phipps Clark (1917–1985) Kenneth Clark and Mamie Phipps Clark conducted experiments with black and white dolls to study children's attitudes about race. This research and their expert testimony contributed to the U.S. Supreme Court's ruling that racial segregation in public schools was unconstitutional.

Source: Library of Congress Prints and Photographs Division [LC-USZ62-126439]. Public Domain.

Change will not come if we wait for some other person or some other time. We are the ones we've been waiting for. We are the change that we seek.

—Barack Obama

Modern Psychology and DEI Calkins, Washburn, Sumner, and the Clarks (Kenneth and Mamie), along with other important people of color and women, made—and continue to make—significant and lasting contributions to psychology's development. Today, women earning doctoral degrees in psychology greatly outnumber men, but, unfortunately, people of color are still underrepresented (American Psychological Association, 2014; Willyard, 2011). To help offset this imbalance, review **Figure 1.8**, which includes just a small sample of BIPOC leaders in psychology. (BIPOC) stands for Black, Indigenous, and people of color. Despite these achievements, the discipline of psychology, like many other fields, has historically focused largely on theories and research conducted by White men, while ignoring the contributions of women as well as people of color.

For example, research examining more than 26,000 articles published between 1974 and 2018 in the most selective journals in psychology revealed relatively few studies that even included non-White study participants (Roberts et al., 2020). Moreover, study authors and journal editors are overwhelmingly White (Dupree & Kraus, 2021). This exclusion of participants, authors, and editors who are indigenous and people of color clearly limits our ability to draw appropriate conclusions. As eloquently described by the authors of one of these recent reviews, "If psychological science is to tackle diverse questions from diverse perspectives, it must diversify" (Roberts et al., 2020, p. 1303).

Even more encouraging news came on October 29, 2021, when the American Psychological Association (APA) issued a lengthy apology for its role in promoting, perpetuating, and failing to challenge racism and racial discrimination in the United States. This statement acknowledges that the APA failed to adequately lead the discipline of psychology in its mission to benefit society and improve lives, and was complicit in maintaining systematic inequities that harmed people of color. As the resolution notes, the "APA is profoundly sorry,

FIGURE 1.8 Leading BIPOC scholars in psychology today

Annjeanette Belcourt

Annjeanette Belcourt-Dittloff's research focuses on improving resiliency and providing public health interventions within American Indian communities.

Steven Lopez

Steven R. López's work focuses on reducing health disparities within Latinx communities and improving cultural competence to improve mental health interventions in Latinx communities.

Sumie Okazaki

Sumie Okazaki's research examines the impact of immigration, social change, and race (i.e., racism, racial identity, and racialization) on Asians and Asian Americans.

Courtesy of Dr. Beverly Daniel Tatum

Beverly Daniel Tatum is the author of the best-selling book *Why Are All the Black Kids Sitting Together in the Cafeteria? And Other Conversations About Race.* In 2014, she received the American Psychological Association Award for Outstanding Lifetime Contributions to Psychology.

Phillip Atiba Goff

Phillip Atiba Goff's research examines the science of racial bias, and in particular the relationship between race and policing in the United States.

Courtesy of Stanley Sue

Stanley Sue is recognized nationally as an expert on mental health issues among people from culturally diverse groups. His work examines the difficulties that members of ethnic minority groups experience in receiving adequate mental health services.

accepts responsibility for, and owns the actions and inactions of APA itself, the discipline of psychology, and individual psychologists who stood as leaders for the organization and field."

Before going on, we'd like to close this section on DEI on a positive note, along with a personal challenge to you our readers (see the following **Practical Application**).

PRACTICAL APPLICATION

How can we improve DEI in ourselves and the world around us?

Throughout this text, you'll find numerous studies and discussions about DEI, and we encourage you to consider how this research applies worldwide, as well as how you might improve your own thoughts, feelings, and actions in this area. If you'd like help in this area—along with our personal opinion, as your authors, we believe *empathy* to be the single most important trait in not only improving DEI, but also in empowering all of us throughout our everyday lives.

For example, when you encounter racism, sexism, ageism, and other issues in DEI, "simply" try putting yourself in the other person's or group's position. If you hear complaints about immigrants, consider the value of *diversity* and imagine the terror and stress of being forced to flee your own home country. Regarding *equity*, consider how you would feel if you discovered that another person or group was getting an unfair advantage resulting in a serious lack of equity. Finally, most of us have experienced being denied access or membership in a desirable group. Recalling your feelings when this happened will give you greater insight into the importance of *inclusivity*. If you'd like more information, see the Practical Application in Chapter 10, which offers three additional tips on reducing prejudice.

Finally, if you're wondering why we include a special section on ***Why DEI Matters*** in each chapter of this text, here is our personal explanation: *Diversity, equity, and inclusion (DEI) recognizes that each individual and group perceives the world in a unique way. Understanding and respecting such differences leads to better decision making as well as greater fairness. DEI not only generates greater business and economic success and a more equitable society, it also lessens our personal tendencies toward ethnocentrism, believing our own culture is "correct," and egocentrism, the inability to take another's perspective (e.g., Madner et al., 2023; Mayhew et al., 2005).*

Careers and Specialties in Psychology

VIDEO CONTENT

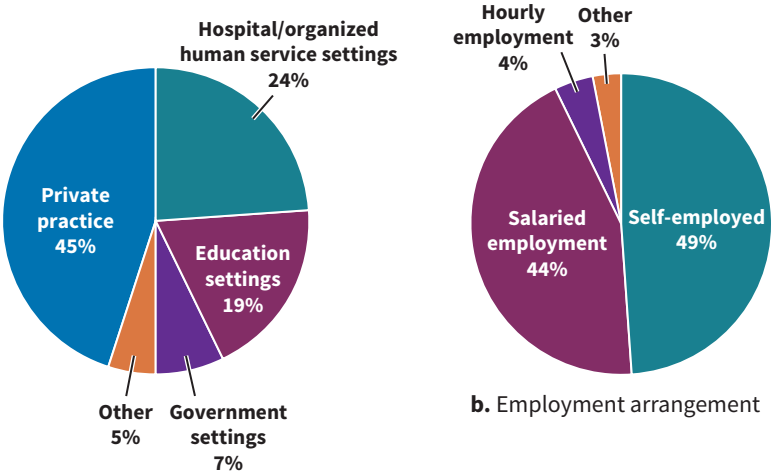
LO 1.2.4 Summarize the major career options and specialties in psychology.

> ***You can only become truly accomplished at something you love. Don't make money your goal. Instead pursue the things you love doing and then do them so well that people can't take their eyes off of you.***
>
> **Maya Angelou**

We close this module with a quote from Maya Angelou to emphasize the importance of choosing a career you will love, because this is perhaps one of the most important factors in your lifetime success. Whether or not you choose a career in psychology is not our primary concern. On the other hand, we do hope that our text will spark your interest and possibly even a love of psychological science. If so, psychology is a large field, and you may not be aware of its numerous career options.

Many people think of psychologists only as therapists, and it's true that the fields of clinical and counseling psychology do make up the largest specialty areas. However, many psychologists' jobs or careers have little or no direct connection with therapy. Instead, these psychologists work as researchers, teachers, or consultants in academic, business, industry, and government settings, or in a combination of settings.

More important to you as a student is to note both Figure 1.9 and Table 1.4, which provide general employment information along with tips for how a bachelor's degree opens up several career paths in psychology, while also providing valuable life skills. Of course, your career options are even greater if you go beyond the bachelor's degree and earn your master's degree, Ph.D., or Psy.D. (Table 1.5). For more information about what psychologists do—and how to pursue a career in psychology—check out the websites of the American Psychological Association (APA) and the Association for Psychological Science (APS).



a. Where psychologists work/primary employment settings

b. Employment arrangement

c. Median annual reported salaries 2015

FIGURE 1.9 Employment Information Note that all data for where psychologists work, their employment arrangements, and median salaries are compiled from self-reported information.

Source: Adapted from American Psychological Association 2016.

VIDEO CONTENT

In the Classroom: Student Voices & Applications of the Study of Psychology

TABLE 1.4 What Can I Do with a Bachelor's Degree in Psychology?

Top Careers with a Bachelor's Degree in Psychology	Sample Skills Gained from a Psychology Major
Management and administration	Improved ability to predict and understand behavior
Sales	Better understanding of how to use and interpret data
Social work	Increased communication and interpersonal skills
Labor relations, personnel, and training	Increased ability to manage difficult situations and high-stress environments
Business services, real estate, insurance	Enhanced insight into problem behavior

TABLE 1.5 Sample Careers and Specialties in Psychology

Career/Specialty	Description
Biopsychologist/neuroscientist	Investigates the relationship between biology, behavior, and mental processes, including how physical and chemical processes affect the structure and function of the brain and nervous system
Climate and environmental psychologist	Investigates how people affect and are affected by the physical environment, and applies psychological science to improve interactions of people to the physical world around us
Clinical psychologist	Specializes in the evaluation, diagnosis, and treatment of psychological disorders
Cognitive psychologist	Examines "higher" mental processes, including thinking, memory, intelligence, creativity, and language
Comparative psychologist	Studies the behavior and mental processes of nonhuman animals; emphasizes evolution and cross-species comparisons
Counseling psychologist	Overlaps with clinical psychology, but generally works with individuals with less serious disorders and focuses more on social, educational, and career adjustment
Cross-cultural psychologist/psychological anthropologist	Studies similarities and differences in and across various cultures and ethnic groups
Developmental psychologist	Examines the course of human growth and development from conception to death
Educational psychologist	Studies the processes of education, and works to promote the academic, intellectual, social, and emotional development of children in the school environment
Experimental psychologist	Researches processes such as learning, conditioning, motivation, emotion, sensation, and perception in humans and other animals (note that psychologists working in almost all other areas of specialization also conduct research)
Forensic and public service psychologist	Applies principles of psychology to support the judicial system and other organizations dedicated to public service, including jury selection, psychological profiling, assessment, and treatment of offenders
Gender or cultural psychologist	Investigates gender or cultural differences and similarities, and how they affect behavior and mental processes
Health psychologist	Studies how biological, psychological, and social factors affect health, illness, and health-related behaviors and mental processes
Industrial/organizational psychologist	Researches and applies principles of psychology to the workplace, including personnel selection and evaluation, leadership, job satisfaction, employee motivation, and group processes within the organization
Personality psychologist	Studies the unique and relatively stable patterns in a person's thoughts, feelings, and actions
Positive psychologist	Examines factors related to optimal human functioning
Quantitative psychologist	Develops and studies methods and techniques used to measure human behavior and mental processes, including design and analysis of research studies
Rehabilitation psychologist	Studies individuals with disabilities and chronic health conditions to enhance their quality of life
School psychologist	Collaborates with teachers, parents, and students within the educational system to help children with disabilities and promote their academic and social progress; provides evaluation and assessment of a student's functioning and eligibility for special services
Social psychologist	Investigates the role of social forces in interpersonal behavior and mental processes, including aggression, prejudice, love, helping, conformity, and attitudes
Sport and performance psychologist	Applies principles of psychology to enhance sport, exercise, and physical performance

Before going on, be sure to complete the following **Retrieval Practice.**

Retrieval Practice Module 1.2: Psychology's Past and Present

INTERACTIVE SELF-SCORING QUIZZES

Key Terms and Concepts Write a definition for each term or concept, using your own words.

- APA five pillar model
- behavioral perspective
- biological perspective
- biopsychosocial model
- cognitive perspective
- evolutionary perspective
- functionalism
- Gestalt psychology
- humanistic perspective
- natural selection
- positive psychology
- psychoanalytic perspective
- psychodynamic perspective
- sociocultural perspective
- structuralism

Self-Test Completing this self-test and checking your answers in Appendix B provides immediate feedback and helpful practice for exams.

1. _____ is generally acknowledged to be the father of psychology.

a. Sigmund Freud **b.** Abraham Maslow
c. B. F. Skinner **d.** Wilhelm Wundt

2. An approach to psychology that stresses natural selection, adaptation, and reproduction is known as _____.

a. the evolutionary perspective
b. structuralism
c. functionalism
d. the humanistic perspective

3. Explain the APA's five pillar model.

4. Which of the following terms do not belong together?

a. structuralism, unconscious behavior
b. behaviorism, observable behavior
c. psychoanalytic, unconscious conflict
d. humanism, free will

5. Modern psychology's theme that sees biological, psychological, and social processes as interrelated and interacting influences is known as the _____.

Test Your Scientific/Critical Thinking

1. **Which of the seven modern perspectives of psychology do you most agree with? Why?**
2. **How might the biopsychosocial model explain difficulties or achievements in your own life?**

Real World Application Question

[AQ2] Can genes influence whether you're a dog lover?
Hint: Look in the text for **[AQ2]**.

Module 1.3 Basics of Psychological Research

LO 1.3 Identify the four goals of psychological research, explain how basic and applied research differ, describe the scientific method, and discuss ethical concerns and guidelines for psychological research.

MODULE 1.3 KEY TOPICS

Here are the key topics you will read about in this module.

- Four Main Goals
- Basic and Applied Research
- Scientific Method
- Research Ethics

In this module, we explore the basics of psychological research, how psychologists conduct our research, how we evaluate our research findings, and the ethics of psychological research. We begin with psychology's four main research goals.

Psychology's Four Main Goals

VIDEO CONTENT

LO 1.3.1 Review psychology's four main goals.

When conducting their research, psychologists have four major goals—to *describe*, *explain*, *predict*, and *change* behavior and mental processes.

1. **Description.** Description tells *what* occurred. In some studies, psychologists attempt to *describe*, or name and classify, particular behaviors and mental processes by making careful scientific observations. Description is usually the first step in scientific research. For example, if someone asks, "Are boys more aggressive than girls," what does that mean? The speaker's definition and description of aggression may differ from yours. Science requires specificity.
2. **Explanation.** An explanation tells *why* a behavior or mental process occurred. In everyday life, we all attempt to explain why things happen and why people do, think, or feel as they do. Psychologists ask similar questions, but we do it more systematically and objectively, and our answers are generally more complex. For example, one of the most enduring debates in science is the **nature–nurture controversy**. Are we controlled by biological and genetic factors (the nature side) or by the environment and learning (the nurture side)? As you will see throughout the text, psychology generally avoids "either–or" positions and focuses instead on *interactions*. Today, almost all scientists agree that most psychological, and even physical, traits reflect an interaction between nature and nurture. Returning to the question, "Are boys more aggressive than girls," research suggests numerous factors and interacting causes or explanations for aggression, including gender, culture, learning, and other biopsychosocial factors (McAlister et al., 2022; Rivas-Koehl et al., 2023; Salimi et al., 2019).
3. **Prediction.** Psychologists generally begin with description and explanation (answering the "whats" and "whys"). Then we move on to the higher-level goal of *prediction*, identifying when and under what conditions a future behavior or mental process is likely to occur. For instance, given repeated research findings that alcohol leads to increased aggression (Bryant & Lightowlers, 2021; Denson et al., 2018; Zinzow & Thompson, 2015), we can predict that more fights will erupt in places where alcohol is consumed than in places where it isn't. Can you see how some airlines used this type of research and the goal of prediction when they decided to stop serving alcoholic beverages during the Covid-19 pandemic?
4. **Change.** For some people, change as a goal of psychology brings to mind evil politicians or cult leaders brainwashing unknowing victims. However, to psychologists, *change* means applying psychological science to prevent unwanted outcomes or bring about desired goals. In almost all cases, change as a goal of psychology is positive. Psychologists help people improve their work environments, stop addictive behaviors, become less depressed, improve their family relationships, and so on. Furthermore, as you may know from personal experience, it is difficult (if not impossible) to change someone's attitude or behavior against their will. (Here is an old joke: Do you know how many psychologists it takes to change a light bulb? Answer: None. The light bulb has to want to change!)

Nature–nurture controversy The ongoing dispute about the relative contributions of nature (biological and genetic factors) and nurture (environment and learning) in behavior and mental processes.

Basic research A type of research primarily conducted to advance core scientific knowledge; most often conducted in universities and research laboratories.

Applied research A type of research primarily conducted to solve practical, real-world problems; generally conducted outside the laboratory.

Basic and Applied Research

VIDEO CONTENT

LO 1.3.2 Compare and contrast the fundamental goals of basic and applied research.

In science, research strategies are generally categorized as either *basic* or *applied*. **Basic research** is most often conducted to advance core scientific knowledge, whereas **applied research** is typically designed to solve practical (real-world) problems (**Figure 1.10**). As you'll see in Chapter 6, classical and operant conditioning principles evolved from numerous *basic research* studies designed to advance the general understanding of how human and nonhuman animals learn. In Chapter 14, you'll discover how *applied research* based on these principles has been used to successfully treat psychological disorders, such as phobias. Similarly, in Chapter 7, you'll see how basic research on how we create, store, and retrieve our memories has led to practical applications in the legal field, such as a greater appreciation for the fallibility of eyewitness testimony.

Leigh Green/Alamy Stock Photo

FIGURE 1.10 Applied research in psychology Can you see how this billboard advertisement is a good example of both basic and applied research? Scientific findings on the global climate crisis and its resulting prolonged droughts led to additional research and approaches to deal with the real-world water shortage problem—restricted times and alternating days for watering outdoors in California.

Keep in mind that basic and applied research approaches are not polar opposites. Instead, they frequently share similar goals, and their outcomes interact, with one building on the other, as described in the following section and seen throughout scientific research.

The Scientific Method

VIDEO CONTENT

LO 1.3.3 **Describe** the scientific method, its key terms, and its six steps.

In contrast to our previously discussed problems with *pseudoscience*, which relies on unsubstantiated beliefs and opinions, psychological science is based on rigorous, systematic scientific methods. Like all scientists, psychologists follow strict, standardized procedures so that others can understand, interpret, and repeat or test their findings. During both basic and applied research, most scientific investigations consist of six basic steps, collectively known as the **scientific method** (**Process Diagram 1.2**).

Scientific method The cyclical and cumulative research process used for gathering and interpreting objective information in a way that minimizes error and yields dependable results.

STEP 1: Observation and Literature Review. Do you recall from our earlier discussion that *scientific thinking* is characterized by curiosity—an eager willingness to question and explore the world around us? Curious psychologists, much like professional journalists, begin with a simple *observation* and questions about who, what, when, where, why, or how something is happening. For instance, have you observed all the Retrieval Practice exercises sprinkled throughout this text? As a curious student, thinking scientifically and critically, are you wondering whether completing these activities is worth your time? Or whether doing so will help you do better on exams?

If so, let's conduct an imaginary exercise that will answer these questions while helping you master key terms and concepts within the six steps of the scientific method. Beginning with Step 1 of your research, you'll need to clarify the specific factors you want to observe and measure—in this case, retrieval practice and exam grades. (Note that these specific factors are officially referred to as **variables**, which are simply any factors that can vary or change and can be observed, measured, and verified.) After completing this first part of Step 1, you would perform a *literature review*, which involves a library or Internet searches of professional journals and studying previous research findings on the effect of retrieval practice on exam grades.

Variable Any factor that can vary or change and can be observed, measured, and verified.

STEP 2: Testable Hypothesis. During Step 2, you'll need to create a tentative and testable **hypothesis**, which is a statement and possible explanation of the relationship you've observed between two or more variables. This hypothesis should be based on the information you gathered during your literature review in Step 1, and it should provide predictions about the outcome of your study that can be tested in some way. To make such predictions, you'll need to explicitly state how each of the variables in your hypothesis will be **operationally defined** (observed, manipulated, and measured).

Hypothesis A tentative and testable statement and possible explanation about the relationship between two or more variables; an educated guess about the outcome of a scientific study.

Operational definition A precise description of how the variables in a study will be observed, manipulated, and measured.

Returning to the retrieval practice imaginary exercise, a better grade on your exams might be operationally defined as earning a grade one letter higher than the one you earned on your previous exam. Your combined hypothesis and operational definition might be: "Students who spend 2 hours studying this chapter and 1 hour completing the Retrieval Practice will earn higher scores on a standard academic exam than students who spend 3 hours studying the chapter without completing the Retrieval Practice."

Steps 3 and 4: Research Design/Data Collection and Analysis. For Step 3, you would most likely choose an experimental research design. To begin the data collection and analysis of your experiment (Step 4), you might recruit 100 volunteers from various classes on your college campus. Of these, you would **randomly assign** 50 to Group 1 (Retrieval Practice) and the other 50 to Group 2 (no Retrieval Practice). After allowing both groups to study for 3 hours, you would present and score a 20-point quiz on the material. Then you would record and compare the scores of the two groups.

Random assignment A research technique for assigning participants to experimental or control conditions so that each participant has an equal chance of being in either group; minimizes the possibility of biases or preexisting differences within or between the groups.

At this point, it's important to note that in some cases a different approach to data collection and analysis is required. When scientists want to reveal overall trends that may not show up in individual studies, or when different researchers report contradictory findings, they typically use a popular statistical technique called **meta-analysis**. This method averages or combines the results of many studies to reach conclusions about the overall weight of the evidence.

Meta-analysis A statistical technique for combining and analyzing data from many studies in order to determine overall trends.

AT-A-GLANCE Process Diagram 1.2

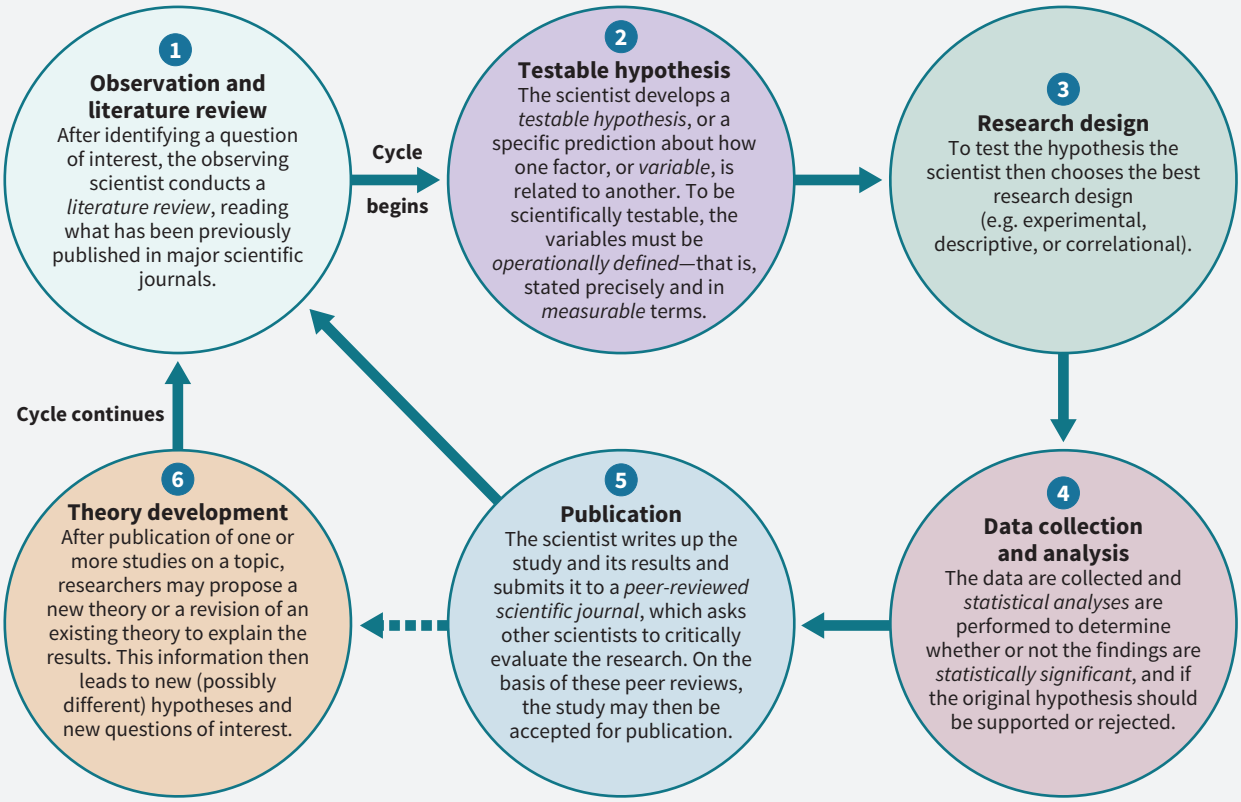
INTERACTIVE FIGURES, CHARTS, & TABLES

STOP! This Process Diagram contains essential information *not* found elsewhere in the text, which is likely to appear on quizzes and exams. Be sure to study it carefully! Research has shown that having diagrams depicting how a process works results in higher performance on tests than having no diagrams at all, or just a text outline of the process (Bui & McDaniel, 2015). This and other research, along with our own experiences as educators, explains why we've included process diagrams throughout this text.

Six Steps in the Cyclical Scientific Method

Although there is no single official scientific method that is accepted by all scientists, scientific investigations do follow a progression of logical steps while collecting data, like those in this diagram. Note also that scientific knowledge is constantly evolving and self-correcting—as shown by the arrows connecting the steps in this diagram. As soon as one research study is published, the cycle almost always begins again. The scientific method's ongoing, cyclical nature often frustrates students.

In most chapters, you will encounter numerous, and sometimes conflicting, scientific theories and research findings. You'll be tempted to ask: "Which one is right?" But, as with most aspects of behavior, the "correct" answer is almost always a combination and interaction of multiple theories and competing findings. The good news is that such complex answers lead to a fuller and more productive understanding of behavior and mental processes. (Note the dotted line from Step 5 to Step 6. It indicates that theories may develop after a combination of repeated testing and numerous supportive publications.)



VIDEO CONTENT

The Scientific Method

For example, a meta-analysis of 25 studies over 24,000 lesbian, gay, and bisexual (LGB) participants found that higher levels of gender nonconformity (meaning gender expression that doesn't match societal expectations of the person's sex assigned at birth) was correlated with experiencing higher levels of prejudice (Thoma et al., 2021). The association between gender nonconformity and prejudice was stronger among gay and bisexual men than among lesbian and bisexual women. (You'll learn more about correlational research in Module 1.4.)

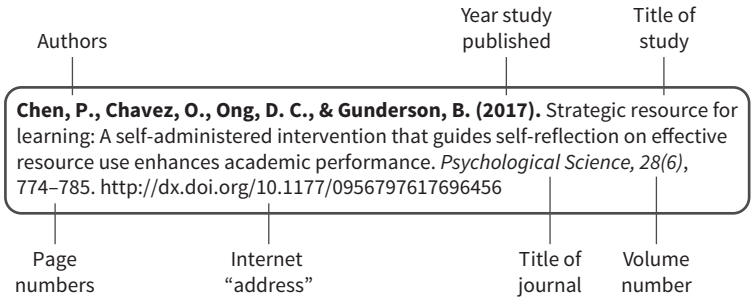


FIGURE 1.11 How to interpret a scientific journal reference Note that the citation for this particular reference would appear in a chapter in this text as (adapted from Chen et al., 2017), with the "et al." indicating multiple authors. However, as shown in this figure, the names of all four authors, along with the article title and the journal, book, or other reference work in which the article was published, are included in the full journal reference. The citation also includes the *digital object identifier* (doi), which is a string of letters, numbers, and symbols allowing easy access to the article on the Internet.

STEP 5: Publication. In this step, you would submit your research for possible publication, assuming your results were *statistically significant*, meaning the results were large enough to be due to experimental manipulation and not merely to chance. Before accepting your findings for publication, most scientific journals will send your paper to reputable scientists for *peer review.* These reviewers will evaluate and comment on the quality, significance, and originality of your research. If the reviews are positive and the suggested corrections are minor, you will have the opportunity to make corrections and your paper will likely be accepted for publication.

The journal editors will then decide what month and year to publish your article. Note that authors and peer reviewers are *not* paid for their work. Their free services are all part of the ethical standards of the academic community—members share their findings and contribute their work for the general advancement of science.

In addition to making a contribution to science, one small payoff for authors/researchers is that they may be cited in other journal articles or in textbooks like this one. As you've noticed throughout this text, citations to publications appear in parentheses at the end of many sentences. These citations, such as (Aagaard, 2019; Yong, 2018), list just the authors' names and the dates of their publications. However, **Figure 1.11** shows what a complete reference looks like and how to interpret its various parts.

STEP 6: Theory Development. Once you've published your research findings, you (and other researchers) might discover additional findings on effective study techniques. After many related findings have been collected and confirmed, scientists can sometimes develop a **theory**, which is a broad explanation for a set of observations or facts that have been substantiated through repeated testing. Theories are particularly helpful because they often lead to new hypotheses, other research, important predictions, and even all-new refined theories. In sum, *science is the cumulative, cyclical process of developing accurate theories using the scientific method*. Before going on, see the important message in the following **Practical Application**.

Theory A broad explanation for a set of observations or facts that have been substantiated through repeated testing.

PRACTICAL APPLICATION

Did you know that the word theory has been listed as one of the seven most commonly misused scientific terms (Ghose, 2013)?

Unfortunately, the term *theory* is also commonly (and mistakenly) used to refer to a simple guess, a hunch, or even just a personal opinion. As mentioned in our earlier discussion of scientific thinking, theories are tools that predict facts, and facts are statements backed by direct verifiable evidence. Have you noticed how often valid scientific findings and widespread agreement on issues like the climate crisis are ignored or diminished by those who claim that these results are "just a theory"? Can you see why it's so important to understand that scientific theories are based on empirical evidence, not just simple hunches or opinions? The value of facts over opinions and science's self-correcting nature are further explained in **Figure 1.12**.

Psychology and the Replication Crisis

As you might expect, *publication* (Step 5 in the research method) and *replication* are core to scientific research. Unfortunately, psychology, medicine, and other sciences have recently come under heavy fire for a serious lack of replication of their original research findings (Clarke et al., 2023; Diener & Biswas-Diener, 2019; Serra-Garcia & Gneezy, 2021). This so-called *replication crisis* first began when scientists revisited a large collection of previous publications, and other researchers attempted to repeat, or **replicate**, the original research. These efforts revealed that only about one-third to just under two-thirds of all psychological studies could be

Replicate To repeat or duplicate the essence of a research study using different situations or participants to determine if the basic findings can be reproduced; replication helps demonstrate reliability of research findings.

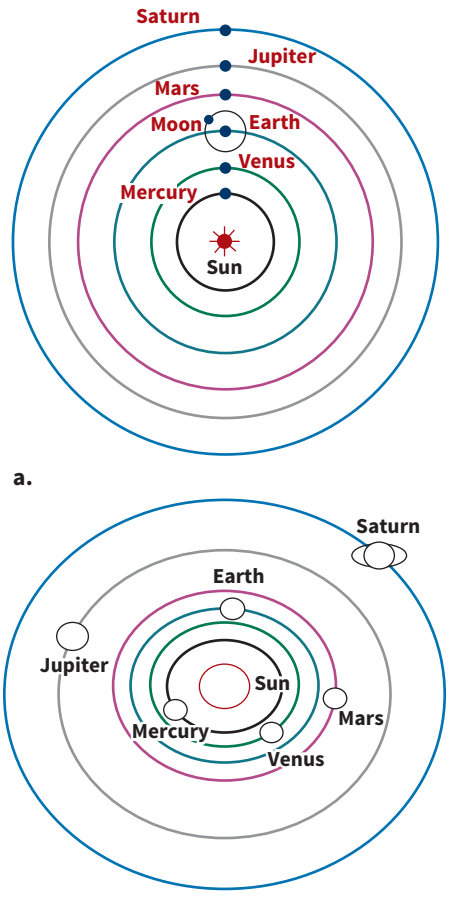


FIGURE 1.12 Opinions versus facts—science to the rescue Early experiments, conducted primarily by Nicolaus Copernicus (1473–1543), led to a collection of facts and ultimately to the theory that Earth was not the center of the universe, as generally assumed at the time. Instead, it was thought to rotate around the sun with the other planets in concentric circles (a). Later scientists (astronomers Johannes Kepler and Tycho Brahe) built on this Copernican (heliocentric) theory with additional experiments that led to a revised theory, in which the orbits were not circular, but rather elliptical (b). Researchers went on to expand the theory further by demonstrating that our sun is not the center of the universe, but only a part of a galaxy that in turn is only one of many billions of galaxies. Can you see how these incremental changes illustrate the value of scientific theories and their ever-changing—and self-correcting—nature?

replicated (Camerer et al., 2018; Open Science Collaboration, 2015; Yong, 2018)! Replication studies have called into question some of the most well-known findings in psychology, such as the influence of mindset and grit on success (Burgoyne et al., 2020; Credé et al., 2017; Zisman & Ganzach, 2021).

Psychologists are justifiably alarmed by this crisis. If numerous researchers, using different procedures or different participants in varied settings, can successfully replicate a study's results, the study is considered more persuasive, and there is increased scientific confidence in the findings. Without replication, scientists might rely on research findings that wouldn't be found again because they result from a unique set of participants or a specific procedure. For example, a study published in 2004 reported that young children who watched more than 2 hours of television a day were more likely to later show problems paying attention in school (Christakis et al., 2004). This finding received a huge amount of attention in the popular press and understandably led to considerable alarm among parents. But a recent re-analysis of the original data using more advanced statistical techniques found no link between TV exposure and attention problems (McBee et al., 2021). This new study illustrates the importance of checking whether research findings can be replicated before drawing firm conclusions.

In sum, replicated empirical data allows psychological scientists to more successfully *describe*, *explain*, *predict*, and *change* behavior and mental processes—the four goals of psychology. But if specific findings cannot be replicated, researchers cannot meet these core psychological goals, and we must look for other explanations and/or conduct further studies.

Before going on, keep in mind that there are sometimes logical and legitimate reasons why replication attempts fail. For instance, a series of studies started in the late 1960s and early 1970s found that children who were able to delay immediate gratification—by not eating a marshmallow placed right in front of them—showed better life outcomes, including greater academic achievement, lower levels of substance abuse, and so on, even 40 years later (Mischel, 2014; Mischel et al., 2011; Mischel & Ebbesen, 1970). Unfortunately, later studies reported results that were much weaker than those from the original series of studies (Watts et al., 2018).

One rational, logical explanation for the relative lack of replication of this so-called *marshmallow study* could be that nowadays more young children attend preschool, which may help teach skills in delaying gratification. Furthermore, rather than measuring delay of gratification, the researchers might have inadvertently assessed the children's reaction to authority and whether or not they trusted adults.

Considering this and other studies and their lack of replication, researchers suggest that attempted replications may not have accurately recreated the original studies, the newer sample size might have been too small to produce significant results, or the replication of certain topics is difficult and unrealistic in current times (Diener & Biswas-Diener, 2019; Van Bavel et al., 2016).

However, this *replication crisis* is still very important, and psychologists are responding to the challenge with a greater emphasis on transparency, better outlets for investigating and storing replication attempts, and even sharing data with other researchers to verify findings. Note also that psychological science has several built-in tools for self-correction. For example, as you discovered earlier in Process Diagram 1.2, the scientific method is cyclical and cumulative, which means that scientific progress results from repeatedly challenging and revising existing research.

Furthermore, many psychology researchers now submit registered reports, meaning they submit papers describing the question their research is addressing before they know what they will find. This process reduces biases that can occur during the review process, such as the finding that studies showing differences between people are more likely to be published than studies showing no differences. This recent approach of submitting registered reports ahead of actual research is seen as improving overall research quality and therefore the confidence that we have in the findings (Soderberg et al., 2021).

Psychology's Research Ethics

VIDEO CONTENT

LO 1.3.4 **Discuss** the ethical concerns and guidelines for psychological research.

So far, we've discussed the four goals of psychology, applied versus basic research, and the scientific method. Now we need to examine the general ethics that guide psychological research. The two largest professional organizations of psychologists, the American Psychological Association (APA) and the Association for Psychological Science (APS), both recognize the importance of maintaining high ethical standards in research, therapy, and all other areas of professional psychology. The preamble to the APA's publication *Ethical Principles of Psychologists and Code of Conduct* (2017) requires psychologists to maintain their competence, to retain objectivity in applying their skills, and to preserve the dignity and best interests of their clients, colleagues, students, research participants, and society.

In addition, colleges and universities have **institutional review boards (IRBs)** that carefully evaluate the ethics and methods of research conducted at their institutions. These boards review whether the potential benefits of the research are justifiable in light of possible risks or harms. They evaluate any potential physical risks of participating in a study, such as having to run on a treadmill, drink a bad-tasting beverage, or experience sleep deprivation. They also evaluate any potential psychological risks, such as having to give a speech, receiving negative feedback on a personality test, or experiencing rejection by a supposed potential dating partner. IRBs may require researchers to make changes in the design or procedure of the research, and they may even deny approval for a particular study altogether.

Institutional review boards (IRBs) Federally mandated groups charged with evaluating the risks and benefits of human and nonhuman animal research at their institution.

Respecting the Rights of Human Participants

The APA and APS have developed rigorous guidelines regulating research with human participants, including the following.

VIDEO CONTENT

In the Classroom: Student Voices & Psychology and Enhanced Interrogation of Prisoners

- **Informed consent.** Researchers must obtain an **informed consent** from all participants *before* initiating an experiment. Participants are made aware of the nature of the study, what to expect, and significant factors that might influence their willingness to participate, including all physical risks, discomfort, and possibly unpleasant emotional experiences.
- **Voluntary participation.** Participants must be told that they're free to decline to participate or to withdraw from the research at any time.
- **Restricted use of deception, followed by debriefing.** If participants knew the true purpose behind certain studies, they might not respond naturally. In one of psychology's most famous, and controversial, studies (Milgram, 1963), researchers ordered participants to give electric shocks to another participant, who was really a confederate of the researcher and was not receiving real shocks (Chapter 10). Although they were told that the study was examining the use of shocks to assist with learning, the researchers were actually testing participants' willingness to follow orders. Obviously in this case, participants' behavior could not be accurately measured if they were told the true focus of the study. Therefore, researchers occasionally need to temporarily deceive participants about the actual reason for the experiment.

  On the limited and rare occasions when deception is necessary, ethical guidelines and restrictions still apply. One of the most important is **debriefing**. After data collection has been completed, participants are provided with a full explanation of the research, including its design and purpose and any deception used. During this debriefing, researchers also address participants' misconceptions, questions, or concerns.
- **Confidentiality.** Whenever possible, participants are provided anonymity. All personal information acquired during a study must be kept private and not published in such a way that an individual's right to privacy is compromised.

Informed consent A participant's agreement to take part in a study after being told what to expect.

Debriefing A discussion procedure conducted at the end of an experiment or study; participants are informed of the study's design and purpose, possible misconceptions are clarified, questions are answered, and explanations are provided for any possible deception.

Respecting the Rights of Nonhuman Animals

Did you know that nonhuman animals, mostly rats and mice, are used in only 7 to 8 percent of psychological research (American Psychological Association [APA], 2009; Institute for Laboratory Animal Research [ILAR], 2010; Market Opinion Research International [MORI], 2005)? Despite the relatively

"Defunding increases aggression."

small number of cases, research with nonhuman animals has made significant contributions to almost every area of psychology, including the brain and nervous system, health and stress, sensation and perception, sleep, learning, memory, motivation, and emotion.

For instance, researchers in one study gave rats cocaine, and then examined how parts of their brains responded when they were no longer given the drug (Gutman et al., 2017). **[AQ3]** This study could have critical, real-world implications for treatment for substance addiction, but do you see why this type of research would be unethical and impossible to conduct using human subjects?

Nonhuman animal research also has produced significant gains for some animal populations, such as the development of more natural environments for zoo animals and more successful breeding techniques for endangered species.

Regardless of their numerous contributions and advantages, using nonhuman animals in psychological research remains controversial (see **cartoon**). Although debate continues about ethical issues in such research, psychologists take great care in handling research animals. Researchers also actively search for new and better ways to minimize any harm to the animals (APA Congressional Briefing, 2015; Morling, 2015; Pelé et al., 2021).

Respecting the Rights of Psychotherapy Clients

Professional organizations, such as the APA and APS, as well as academic institutions and state and local agencies, all require that therapists, like researchers, maintain the highest ethical standards. Therapists must also uphold their clients' trust. All personal information and therapy records must be kept confidential. Furthermore, client records are made available only to authorized persons, and with the client's permission. However, therapists are legally required to break confidentiality if a client threatens violence to themselves or to others, if a client is suspected of abusing a child or an elderly person, and in other limited situations (Adi & Mathbout, 2018; Kress et al., 2013; Rabelo et al., 2019).

Take-Home Message

What about ethics and beginning psychology students? Once friends and acquaintances know you're taking a course in psychology, they may want you to interpret their dreams, help them discipline their children, or even advise them on whether they should start or end their relationships. Although you will learn a great deal about psychological functioning in this text and in your psychology class, take care that you do not overestimate your expertise. Also remember that the theories and findings of psychological science are cyclical and cumulative—and continually being revised.

David L. Cole, a recipient of the APA Distinguished Teaching in Psychology Award, reminds us, "Undergraduate psychology can, and I believe should, seek to liberate the student from ignorance, but also the arrogance of believing we know more about ourselves and others than we really do" (Cole, 1982, p. 24).

Before going on, be sure to complete the following **Retrieval Practice.**

Retrieval Practice Module 1.3: Basics of Psychological Research

INTERACTIVE SELF-SCORING QUIZZES

Key Terms and Concepts Write a definition for each term or concept, using your own words.

- applied research
- basic research
- debriefing
- hypothesis
- informed consent
- institutional review board (IRB)
- meta-analysis
- nature–nurture controversy
- operational definition
- random assignment
- replicate
- scientific method
- theory
- variable

Self-Test Completing this self-test and checking your answers in Appendix B provides immediate feedback and helpful practice for exams.

1. The goal of _____ is to tell what occurred, whereas the goal of _____ is to tell when.

a. health psychologists; biological psychologists

b. description; prediction

c. psychologists; psychiatrists

d. pseudopsychologists; clinical psychologists

2. If you conducted a study on areas of the brain most affected by drinking alcohol, it would be _____ research.

3. A(n) _____ provides a precise definition of how the variables in a study will be observed and measured.

4. The term _____ refers to a broad explanation for a set of observations or facts that have been substantiated through repeated testing.

5. A participant's agreement to take part in a study after being told what to expect is known as _____.

a. psychological standards **c.** debriefing

b. an experimental contract **d.** informed consent

Test Your Scientific/Critical Thinking

1. **What is the difference between a scientific theory, an opinion, and a hunch?**
2. **If you had a million dollars to contribute to either basic or applied research, which one would you choose? Why?**

Real World Application Question

[AQ3] Can research with animals help reduce the substance abuse crisis?
Hint: Look in the text for **[AQ3]**.

Module 1.4 Psychology's Research Methods

LO 1.4 Describe major types of psychological research, as well as what potential sources of error can confound research findings and how researchers guard against these sources of error.

MODULE 1.4 KEY TOPICS

Here are the key topics you will read about in this module.

- Descriptive Research
- Correlational Research
- Experimental Research
- Additional Research Methods
- Potential Researcher Issues
- Potential Participant Issues

Having studied psychology's four main goals, the scientific method, and research ethics, we can now examine how psychologists conduct their research. Psychologists generally draw on three major methods—*descriptive*, *correlational*, and *experimental* (**Figure 1.13**). As you'll see, each of these approaches has advantages and disadvantages, and psychologists often use variations of all three methods to study a single problem. In fact, when multiple approaches lead to similar conclusions, scientists have an especially strong foundation for concluding that one variable does affect another in a reliable and predictable way.

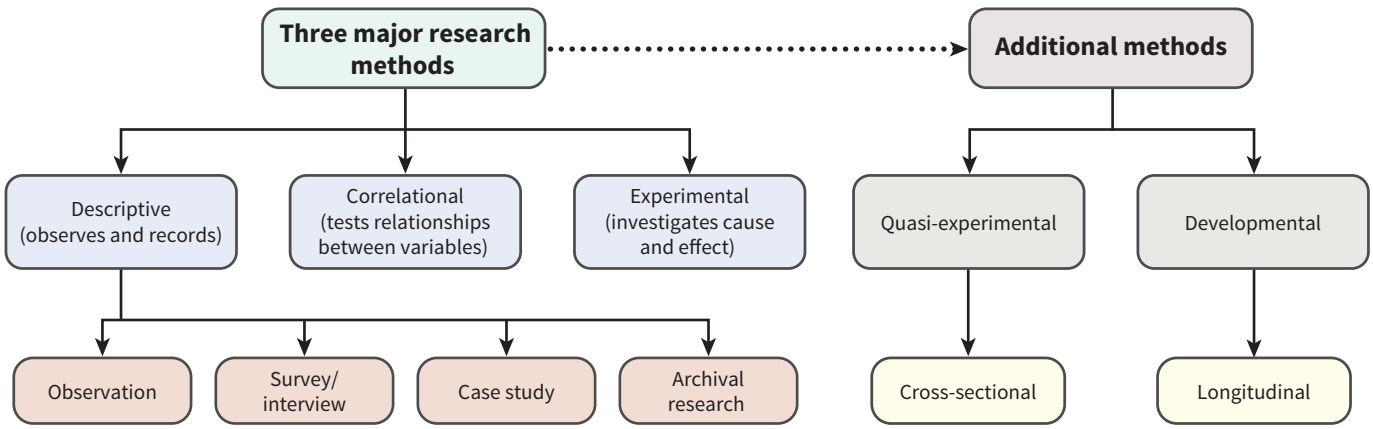


FIGURE 1.13 An overview of psychology's research methods Like most instructors and general psychology texts, we classify correlational research as a separate research method, primarily to promote general understanding. However, it's important to note that *all* descriptive research is correlational because the data it collects is always measured by testing relationships between two or more variables.

Descriptive Research

VIDEO CONTENT

LO 1.4.1 Review descriptive research and its four key methods.

Descriptive research A type of research that systematically observes and records behavior and mental processes without manipulating variables; designed to meet the goal of description.

Observation A descriptive research technique that assesses and records behavior and mental processes in natural, real-world and/or laboratory settings.

Case study A descriptive research technique involving an in-depth study of a single research participant or a small group of individuals.

Archival research A descriptive research technique that studies existing data to find answers to research questions.

Almost everyone observes and describes others in an attempt to understand them, but in conducting **descriptive research**, psychologists do so systematically and scientifically. The key types of descriptive research are *observation*, *survey/interview*, *case study*, and *archival research*.

Observation

When conducting **observation**, researchers systematically assess and record participants' behavior in real-world and/or laboratory settings without interfering. Many settings lend themselves to *naturalistic observation*, from supermarkets to airports to outdoor settings. Jane Goodall's classic naturalistic observations of wild chimpanzees provided invaluable insights into their everyday lives, such as their use of tools, acts of aggression, demonstrations of affection, and, sadly, even their killing of other chimps' babies (infanticide). The chief advantage of observation in a natural setting is that researchers can obtain data about real-world behavior rather than about behavior that is a reaction to an artificial experimental situation. For example, in an observational study of the human animal, researchers used footage from traffic stops in Oakland, California, to examine how police officers speak differently to Black and White drivers (Camp et al., 2021). Specifically, police officers were less friendly and respectful to Black men than to White men. These subtle differences may create a downward cycle, in which police officers treat Black drivers more negatively, which leads Black drivers to respond more negatively.

Although naturalistic observation has many strengths, it can be difficult and time-consuming to conduct, and the lack of control by the researcher makes it difficult to conduct observations of behavior that occurs infrequently. For a researcher who wants to observe behavior in a more controlled setting, *laboratory observation* has many of the advantages of naturalistic observation but with greater control over the variables (**Figure 1.14**).

Survey/Interview

Psychologists use *surveys/interviews* to ask people to self-report on their behaviors, opinions, and attitudes. In Chapter 3, you'll read about survey research showing that even a single close childhood friendship can protect vulnerable children in lower socioeconomic circumstances from several psychological risk factors (Graber et al., 2016).

One key advantage of this approach is that researchers can gather data from many more people than is generally possible with other research designs. Unfortunately, most surveys and interviews rely on self-reported data, and not all participants are honest. As you might imagine, people are especially motivated to give less-than-truthful answers when asked about highly sensitive topics, such as infidelity, drug use, and illegal behavior.

Different people might also report different answers about the same situation. For example, one recent meta-analysis found that parents describe their parenting in a more positive way than do their teenage children (Hou et al., 2020)!

Jeffrey Isaac Greenberg 3+/Alamy Images

FIGURE 1.14 Laboratory observation In this type of observation, the researcher may bring participants into a specially prepared room in the laboratory, with one-way mirrors or hidden cameras and microphones. Using such methods, the researcher can observe school children at work, families interacting, or other individuals and groups in various settings.

Case Study

What if a researcher wants to investigate photophobia (fear of light)? In such a case, it would be difficult to find enough participants to conduct an experiment, or even to use surveys, interviews, or observation. For rare disorders or phenomena, researchers try to find someone who has the problem and then study that person intensively. This type of in-depth study of a single research participant, or a small group of individuals, is called a **case study**. In Chapter 9, we'll share a fascinating case study that examined the impact of severe neglect during childhood on language acquisition. Research like this obviously could not be conducted using another method, for ethical reasons, and because of the rarity of such severe deprivation.

Archival Research

The fourth type of descriptive research is **archival research**, in which researchers study

previously recorded data. Interestingly, archival data from 30,625 Himalayan mountain climbers from 56 countries found that expeditions from countries with hierarchical cultures, which believe that power should be concentrated at the top and followers should obey leaders without question, had more climbers reach the summit than did expeditions from more egalitarian cultures (Anicich et al., 2015). Sadly, they also had more climbers die along the way. The researchers concluded that hierarchical values impaired safety by preventing low-ranking team members from sharing their valuable insights and perspectives. (If you're wondering, American climbers ranked a little below midpoint in hierarchical values.)

Did you know that many researchers in psychology are now using social media posts and searches as a type of archival research? For example, one study examined suicide-related posts on X (formerly known as Twitter) to study suicide contagion on social media (Cero & Witte, 2020). Posts were classified as suicide-related if they directly or indirectly mentioned suicide (such as, "I'm so sad! Gonna kill myself" or "My final day on Earth ..."). Can you see how this type of basic research and analysis of patterns could lead to valuable applied research that would help identify people at risk of harming themselves and thus serve as a screening tool for suicide risk? Another recent study found that people are more likely to share social media posts about political figures they oppose than political figures they support on both Facebook and X (Rathje et al., 2021). Sadly, this finding may help explain the current political polarization seen in the United States.

Correlational Research

VIDEO CONTENT

LO 1.4.2 **Discuss** correlational research.

Recall from our earlier discussion and from Figure 1.13 that the key types of descriptive research are *observation, survey/interview, case study, and archival research*. In addition, keep in mind that that *all* descriptive research is correlational because the data it collects is measured by testing relationships between two or more variables. Like most instructors and general psychology texts, we separate descriptive and correlational "methods" primarily to promote general understanding.

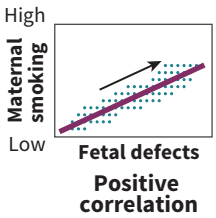
The three major forms of correlation, shown in **Figure 1.15,** are often depicted in graphs called scatterplots (shown in the left-hand column of the figure). Each dot on these graphs represents one participant's score on both variables, such as maternal smoking and fetal defects. The pattern (or "scattering") of the dots (upward, downward, or horizontal) reveals the direction of the correlation (positive, negative, or zero). The clustering of the dots reveals the strength of the correlation.

- **Direction of the correlation** (left-hand column). The + or − sign in the correlation coefficient indicates the *direction* of the correlation, either positive or negative. Note in Figure 1.15a that when two factors vary in the same direction, meaning they increase or decrease together, the correlation is called a *positive correlation*. In contrast, when two factors vary in opposite directions, one increasing as the other decreases, it's known as a *negative correlation* (Figure 1.15b). When there is no relation between the two variables, it is called a *zero correlation* (Figure 1.15c).
- **Strength of the correlation** (right-hand column). Look again at the scatterplots in the left column, and note how the various dots cluster around the three solid dark lines. The closer the dots are together, the stronger the relationship—little scatter (more clustering) indicates a high correlation. Correlations of a +1.00 and a −1.00 magnitude both indicate the strongest possible relationship. As the number decreases and gets closer to 0.00, the relationship weakens. We interpret correlations close to zero as representing no relationship between the variables—like the "relationship" between intelligence and shoe size.

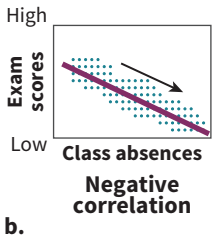
Limits of Correlations

Unfortunately, correlations are sometimes confusing, misleading, and not particularly useful. In addition, a mathematical correlation can be found between two events or variables that have no direct connection—yet people may wrongly infer that they do. Therefore, it's important to note these two major cautions concerning correlations.

Chris Carroll/Corbis/Getty Images



a.



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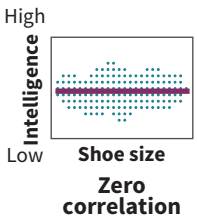


c.

Direction of the correlation	Strength of the correlation
+1.00	Perfect positive relationship (100% of the variance)
+.80 to +.99	Very strong positive relationship (64–98% of the variance)
+.60 to +.79	Strong positive relationship (36–62% of the variance)
+.40 to +.59	Moderate positive relationship (16–35% of the variance)
+.20 to +.39	Weak positive relationship (4–15% of the variance)
0.00	No relationship (0% of the variance)
−.20 to −.39	Weak negative relationship (4–15% of the variance)
−.40 to −.59	Moderate negative relationship (16–35% of the variance)
−.60 to −.79	Strong negative relationship (36–62% of the variance)
−.80 to −.99	Very strong negative relationship (64–98% of the variance)
−1.00	Perfect negative relationship (100% of the variance)

Test Your Scientific/Critical Thinking

Can you identify whether each of the following pairs most likely has a positive, negative, or zero correlation?

1. Health and exercise
2. Hours of TV viewing and student grades
3. Happiness and helpfulness
4. Hours of sleep and number of friends
5. Extraversion and loneliness

(You can check your answers in Appendix B.)

FIGURE 1.15 **Interpreting a correlation** One clear payoff for correlational research is that it can help us to reduce or prevent certain serious problems. We can, for example, examine the link between a pregnant woman's use of drugs—like nicotine, alcohol, and opioids—and serious birth defects (e.g., Bateman et al., 2021; Maessen et al., 2019; Pielage et al., 2023).

ANIMATION CONTENT

Correlation Does Not Mean Causation!

1. **Correlation does *not* prove causation!** Correlational studies can detect whether or not two variables are related. However, they cannot tell us which variable is the cause or the effect—or whether other known or unknown factors may explain the mathematical relationship. As an example, studies show that cities with a higher total number of police officers have a higher crime rate. Does this mean that an increase in police officers leads to more crime? Of course not. Instead, a *third variable* (increased population) is the most logical source of the link between more officers and more crime. A similar confusion occurs with the correlational finding that sales of ice cream are higher when the rate of drownings is highest. Obviously, eating ice cream doesn't *cause* people to drown. A third factor, such as high temperatures, increases both ice cream consumption and participation in water-based activities. For a lighter note on correlations, enjoy the cartoons (**Figure 1.16**).

   This mistake of confusing correlation with causation is sometimes referred to as the **third-variable problem**, which identifies a situation in which a variable that has not been measured accounts for a relationship between two or more other variables. Would you like another example? See **Figure 1.17**.

Third-variable problem
A situation in which a variable that has not been measured affects (confounds) a relationship between two or more other variables; also known as a problem of confounding.

2. **Correlations are sometimes *illusory*—meaning they don't exist.** In this second problem, there is *no* factual connection between two variables; the supposed correlation is the result of random coincidence or misperception. Popular beliefs, such as that infertile couples are more likely to conceive after an adoption, or that certain slot machines are more likely to pay off than others, or that strange behaviors increase during a full moon, are called **illusory correlations** (false correlations) (Ernst et al., 2019; Lilienfeld et al., 2015; Van Dessel et al., 2021).

Illusory correlation
A mistaken perception that a relationship exists between variables when no such relationship actually exists.

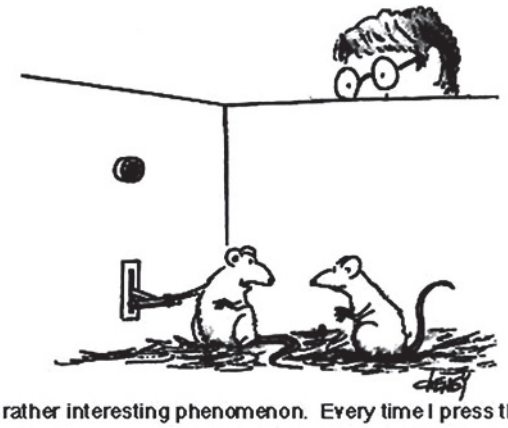


FIGURE 1.16 Revisiting correlation versus causation

Superstitions, such as the idea that breaking a mirror will lead to seven years of bad luck or that wearing your lucky team jacket will bring the team good luck, are additional examples of illusory correlations. We mistakenly perceive an association that factually does not exist. Unfortunately, these and other well-known superstitions persist despite logical reasoning and scientific evidence to the contrary (**Table 1.6**).

Why are beliefs in illusory correlations so common? As you'll discover in upcoming chapters, we tend to focus on the most noticeable (salient) factors when explaining the potential causes of behavior. For example, focusing attention on the dramatic (but rare) instances when infertile couples conceive after adoption or when a gambler wins a large payout on his birthday are both examples of illusory correlations, as well as what is called the *saliency bias* (Chapter 10). We also more often note and remember events that confirm our expectations and ignore the "misses." This is known as the *confirmation bias* (Module 1.1, and discussed throughout this text).

The important thing to remember while reading research reports in the media or any textbook is that observed correlations may be illusory and that correlational research can *never* provide a clear cause-and-effect relationship between variables. Always consider that a third factor might be a better explanation for a perceived correlation. To find causation, we need the experimental method, which is discussed in the next section.

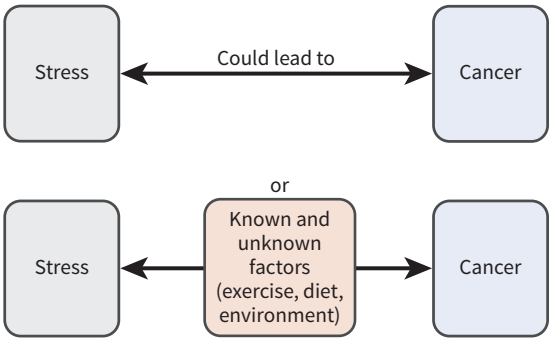


FIGURE 1.17 Correlation versus causation—the third-variable problem Research has found a strong correlation between stress and cancer (Chapter 3). However, this correlation does not tell us whether stress causes cancer, whether cancer causes stress, or whether other known and unknown factors, such as smoking, drinking, or poverty, could contribute to both stress and cancer. Can you think of a way to study the effects of stress on cancer that is not correlational—and is still ethical?

The Value of Correlations

After discussing the limits of correlational research, it's important to point out that this research method is still incredibly valuable, offering at least three major advantages.

1. **Prediction.** A correlation can tell us if a relationship exists between two variables, allowing us to use one variable to predict scores on another. Consider research showing a positive correlation between years of education and health outcomes, which means that we can logically *predict* that, as your educational level increases, your overall health and life expectancy are likely to increase (e.g., Frakt, 2019). **[AQ4]** In fact, the age-adjusted mortality rate of high school dropouts ages 25–64 is more than twice that of those with some college (Cutler & Lleras-Muney, 2006; Picker, 2016). This large and persistent correlation between education and health has been observed many times and in many countries. Although there are several possible explanations for this finding, researchers in this area suggest the results are most likely due to better access to health care among the more highly educated, along with improved thinking and decision-making patterns. (Keep this correlation in mind when someone questions you about why you're going to college.)
2. **Real-world settings.** A second value to correlational studies is that, like descriptive studies, they can be conducted in real-world settings to examine relationships that would otherwise be impossible or unethical to study. As mentioned earlier, smoking cigarettes and drinking alcohol while pregnant are highly correlated with birth defects and other

TABLE 1.6 Superstitions as Illusory Correlations

	Behavior	Superstition
 Pavlo Melnyk/Shutterstock	**Wedding plans:** Why do brides wear something old and something borrowed?	The "something old" is usually clothing that belongs to an older woman who is happily married. Thus, the bride will supposedly transfer that good fortune to herself. "Something borrowed" is often a relative's jewelry. This item should be golden, because gold represents the sun, which was once thought to be the source of life.
 Allison Achauer/Moment/Getty Images	**Spilling salt:** Why do some people throw a pinch of salt over their left shoulder?	Years ago, people believed good spirits lived on the right side of the body, and bad spirits on the left. If someone spilled salt, it supposedly meant that a guardian spirit had caused the accident to warn them of evil nearby. At the time, salt was scarce and precious. Therefore, the person was advised to bribe the bad spirits with a pinch of salt thrown over their left shoulder.
 cagi/Shutterstock	**Knocking on wood:** Why do some people knock on wood when they're speaking of good fortune or making predictions?	Down through the ages, people have believed that trees were homes of gods, who were kind and generous—if approached in the right way. A person who wanted to ask a favor of the tree god would touch the bark. After the favor was granted, the person would return to knock on the tree as a sign of thanks.

undesirable birth outcomes, and conducting experiments on pregnant women with cigarettes and alcohol would obviously be immoral and illegal. Fortunately, evidence from this strong correlation, along with other research, has helped convince many women to avoid these harmful substances while pregnant—likely preventing many birth defects. Similarly, correlational findings that drunk driving and distracted driving are highly linked with serious and fatal car accidents have led to strict laws that have reduced these practices.

Real-world correlations offer other practical applications. For instance, many parents, professionals, and researchers (mentioned earlier) have repeatedly expressed concerns about the potential ill effects of Facebook and other social media sites on young people. However, when 12 million Facebook users were compared to nonusers, researchers found that people with moderate levels of online social interaction and high levels of offline social interaction actually have a lower short-term mortality risk (Hobbs et al., 2016). Research has long showed that people who have strong social networks live longer, but this is the first large-scale study showing that online relationships may be good for our mental and physical health—when used in moderation.

3. **Directions for future research.** Correlational research, like descriptive studies, offers data and ideas for future research. Even though correlation does *not* prove causation, it can point to *possible* causation, which can then become the subject of later experiments (which may prove causation)—the topic of our next section.

Study TIP

Are you confused about the difference between third variables and illusory correlations? If so, note that with the *third-variable problem*, a correlation actually exists between two or more variables, but a third factor might be responsible for their relationship. In contrast, with an *illusory correlation* there is *no* actual connection between two variables—the apparent connection is totally false.

Experimental Research

VIDEO CONTENT

LO 1.4.3 Identify the key terms and components of experimental research.

Experimental research
A type of research that involves the manipulation and control of variables to determine cause and effect; designed to meet the goal of explanation.

As you've just seen, both descriptive and correlational studies are important because they reveal important data, insights, and practical applications. However, to determine *causation*, we need **experimental research**. This method is considered the "gold standard" for scientific

research because only through an **experiment** can researchers manipulate and control variables to determine cause and effect.

If you've ever followed a recipe to cook a new dish, or tried various methods of dating to see what works best, you're already familiar with the basic components of an *experiment*. You manipulated and controlled the variables and then noticed the cause and effect of your efforts. Now, to further help you understand all the important key terms and the general setup for an experiment, imagine yourself as a psychologist interested in determining how texting while driving a car might affect the number of traffic accidents.

Your first task is to develop your *hypothesis* (Step 1), which we defined earlier as a tentative and testable explanation about the relationship between two or more variables.

Next, you solicit volunteers for your experiment (Step 2). To minimize critical differences between participants, you'll need to avoid **sample bias**, which occurs when the researcher recruits and selects individuals who do not accurately reflect the composition of the larger population from which they are drawn. Interestingly, some critics suggest that psychological literature is biased because it too often uses college students as participants. Psychologists counteract potential sample bias by selecting participants who constitute a **random sample** of the entire population of interest, which allows each member of that group an equal chance of being selected.

After *random sampling*, it's important to randomly assign participants to one or more research group(s)—either an **experimental group** or a **control group**—using chance procedures (such as a coin toss or a random-numbers table). As defined earlier, random assignment helps ensure that all participants have an equal opportunity to be in either group. Note that having at least two groups allows the performance of one group to be compared with that of another. See **Figure 1.18** for a comparison of random sample and random assignment.

Then, both the experimental group and the control group will be assigned to a driving simulator (Step 3). Participants assigned to the *experimental group* receive one level of the **independent variable (IV)**, which is the treatment under study, and the variable being manipulated by you—the experimenter. Those assigned to the *control group* will be treated in every way just like the experimental group. The only difference is that they will *not* text while driving.

In Step 4, while all participants drive for a given amount of time (e.g., 30 minutes in the driving simulator), you, the experimenter, will record the number of simulated traffic accidents—the **dependent variable (DV)**. Note that the goal of any experiment is to learn how the dependent variable is *affected by* (depends on) the independent variable. See **Figure 1.19** for a visual comparison of the relationship between the IV and DV.

Given the critical importance of understanding the basics of the experimental method, **Process Diagram 1.3** offers a visual example and summary of this experimental setup, including Step 5, which explains what happens after the experiment is completed.

Take-Home Message Research clearly shows that phone use, particularly texting, while driving leads to increased accidents and potentially serious or fatal consequences (e.g., Federal Communications Commission, 2021; National Highway Traffic Safety Administration, 2019). In other words: "Let's all just put down our phones and drive."

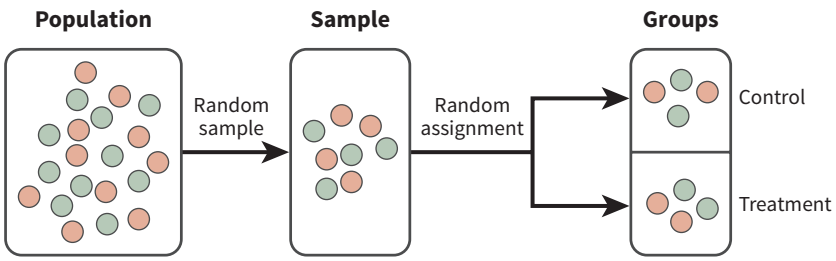


FIGURE 1.18 Understanding random sample versus random assignment In a typical experiment, the researcher selects a random sample of the population of interest and then uses random assignment to make sure that each participant has an equal chance of being assigned to either the control or treatment group.

Experiment A careful manipulation of one or more independent variables to measure their effect on other dependent variables; allows the determination of cause-and-effect relationships.

Sample bias A bias that may occur when research participants are unrepresentative of the larger population or population of interest.

Random sample A sample that allows each member of the population of interest an equal chance of being selected.

Experimental group The group that is manipulated (i.e., receives treatment) in an experiment; participants who are exposed to the independent variable (IV).

Control group The group that is not manipulated (i.e., receives no treatment) during an experiment; participants who are not exposed to the independent variable (IV).

Independent variable (IV) The variable that is manipulated and controlled by the experimenter to determine its causal effect on the dependent variable; also called the treatment variable.

Dependent variable (DV) The variable that is observed and measured for change; the factor that is affected by (or dependent on) the independent variable.

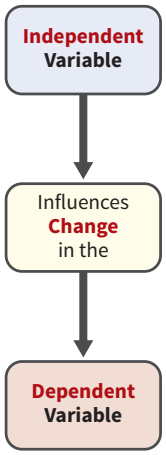


FIGURE 1.19 Independent and dependent variables Remember that the independent variable (IV) is under the control of and manipulated by the experimenter. In turn, the independent variable *may* produce changes in the dependent variable (DV).

AT-A-GLANCE Process Diagram 1.3

STOP! This Process Diagram contains essential information *not* found elsewhere in the text, which is likely to appear on quizzes and exams. Be sure to study it carefully.

Experimental Research Design

When designing an experiment, researchers must follow certain steps to ensure that their results are scientifically meaningful. In this example, you, as the imaginary experimenter, will be examining whether people texting on phones while driving have more traffic accidents than those who don't text while driving.

STEP 1. The experimenter begins by identifying the hypothesis.

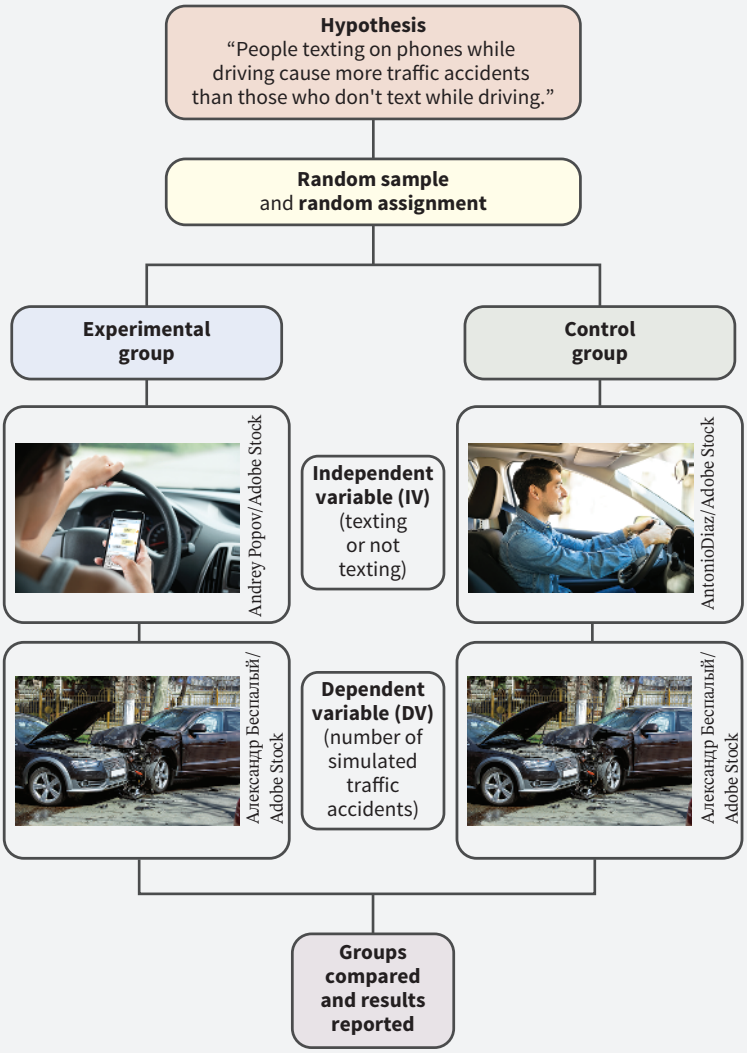
STEP 2. Next, the experimenter solicits volunteers for the experiment. In order to avoid sample bias, the experimenter first attempts to select a random sample of the entire population of interest. Then, the experimenter randomly assigns these participants to two different groups—either the experimental group, which receives the treatment, or the control group, which does not receive the treatment. Having two groups allows a baseline comparison of responses between the two groups.

STEP 3. Both the experimental and the control groups are assigned to a driving simulator. The experimental group then texts while driving, whereas the control group does not text. Texting or not texting are the two levels of the independent variable (IV).

STEP 4. The experimenter counts the number of simulated traffic accidents for each group and then analyzes the data. The number of simulated traffic accidents is the dependent variable (DV). Note that the DV is called "dependent" because the behavior (or outcome) exhibited by the participants is assumed to *depend* on manipulations of the IV.

STEP 5. If the differences between the two groups are *statistically significant*, the experimenter writes up a report and submits it to scientific journals for possible publication.

In Step 5, you'll compare the results from both groups. If the differences are significant, you may want to report your findings to a peer-reviewed scientific journal like the ones found in our references. Keep in mind that because the control group was treated exactly like the experimental group, except for the differing levels of the IV, any significant difference in the number of traffic accidents (the DV) between the two groups would be the result of the level of the IV. In contrast, if you found little or no difference between the groups, you would conclude that texting does not affect traffic accidents.



Study TIP

Are you confused about the difference between independent and dependent variables (IV and DV)? If so, study the puppet and ruler illustrations shown here, which help illustrate the differences pictorially.

The experimenter *manipulates* the IV to determine its causal effect on the DV.

The experimenter *measures* the DV, which *depends* on the IV.

ANIMATION CONTENT **Important Components of an Experiment**

Additional Research Methods

VIDEO CONTENT

LO 1.4.4 Describe quasi-experimental and developmental research.

In some cases, researchers are unable to use traditional research methods (descriptive, correlational, and experimental), or their particular concerns are not addressed in the standard way, so they turn to other methods, such as *quasi-experimental* or *developmental psychology* designs.

Quasi-Experimental Design

Imagine that you wanted to study how a father's attachment to his child was affected by his presence or absence at that child's birth. You obviously could not randomly assign fathers to either the present-at-birth condition or the absent-at-birth condition. Similarly, if you want to examine whether exposure to a school shooting or terrorist event increases the risk of developing post-traumatic stress disorder (PTSD), you certainly can't randomly assign some people to experience such an event.

In cases in which standard experimental design and random assignment to groups is impossible or unethical, researchers often turn to an alternative method called a **quasi-experimental design**, in which random assignment of participants to an experimental group or to a control group cannot be made due to either practical or ethical reasons. The prefix *quasi-* means "sort of," and in this case the research looks sort of like a true experiment. Knowing that assessing the differences between the two groups still might provide important information, experimenters can compare the two groups without random assignment, and the research method would then be a quasi-experimental design. Why can't these designs make the same strong claims for causation that can be made based on true experiments? Without random assignment, uncontrolled third variables might skew the results.

Quasi-experimental design
A research design in which random assignment of participants to an experimental group or to a control group cannot be made due to either practical or ethical reasons.

Cross-sectional design
In developmental psychology, a research technique that measures different groups, typically of different ages or developmental levels, at a single point in time.

Longitudinal design
In developmental psychology, a research design that measures one group over an extended period of time.

Developmental Psychology's Research Methods

As you'll learn more about in Chapter 9, developmental psychologists typically use all the research methods discussed in the prior section. However, to study the entire human life span, they also need two additional techniques—*cross-sectional* and *longitudinal* (**Figure 1.20**).

The **cross-sectional design** measures different groups at a single point in time to provide information about topics of interest. For example, one cross-sectional study of U.S. adults conducted by the Pew Research Center (2019) found significant differences between various age groups in their reported use of the Instagram social media platform. In 2019, 75 percent of those between the ages of 18 and 24 used this platform, compared to 57 percent of those ages 25–29, and 8 percent of those over age 65.

In contrast to cross-sectional research, a **longitudinal design** takes repeated measures of one group over an extended period of time. One group of developmental researchers wondered if peer ratings of personality taken during childhood might be better predictors of later adult personality than self-ratings (Martin-Storey et al., 2012).

To explore this question, they designed a longitudinal study that began when they first asked grade-school children in 1976–1978 to rate themselves and their peers on several personality factors, such as likeability, aggression, and social withdrawal.

In 1999–2003, the researchers returned and asked the same participants, now in mid-adulthood, to complete a second series of personality tests. As hypothesized, the peer ratings were better than self-ratings in predicting adult personality. Does this finding surprise you? If so, try contacting some of your childhood peers and then compare notes on how you remember one another's personalities as children and now as adults.

Now that you have a better idea of these two types of research, if you were a developmental psychologist interested in studying intelligence in adults, which design would you choose—cross-sectional or longitudinal? Before you decide, note the different research results shown in **Figure 1.21**.

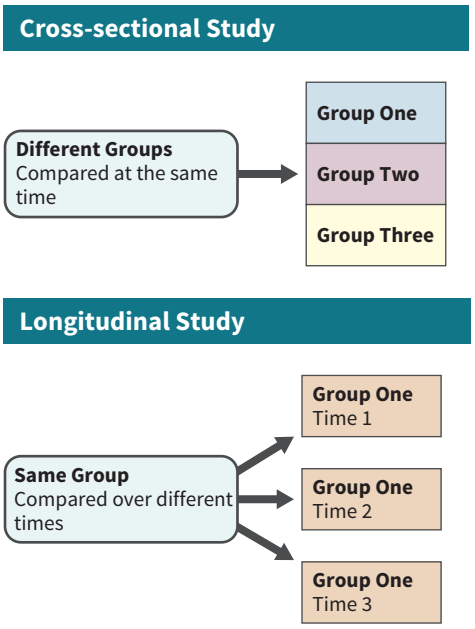


FIGURE 1.20 Cross-sectional versus longitudinal design Note how a cross-sectional study measures different groups at one point in time, whereas a longitudinal study measures the same group compared over different times.

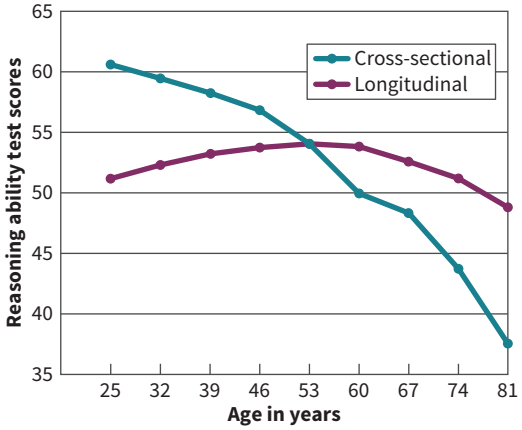


FIGURE 1.21 Which results are true? Cross-sectional studies have shown that reasoning and intelligence reach their peak in early adulthood and then gradually decline. In contrast, longitudinal studies have found that a marked decline does not begin until about age 60.

Why do the two methods show such different results? Cross-sectional studies sometimes confuse genuine age differences with *cohort* effects—differences that result from specific histories of the age group studied. As shown in the top line in Figure 1.21, the 81-year-olds measured by the cross-sectional design have dramatically lower scores than the 25-year-olds. But is this due to aging, or perhaps to broad environmental differences, such as less formal education or poorer nutrition?

A prime example of possible environmental effects on cross-sectional studies was found in research on attitudes toward gay marriage. These studies revealed that young people are much more supportive of gay marriage than older adults (Pew Research Center, 2016). So, does this mean that people grow more opposed to gay marriage as they age? Probably not. These differences are most likely a reflection of cohort and generational effects. Young people today are generally more liberal and positive toward different sexual orientations, and therefore more likely to support gay marriage (see **photo**).

The key thing to remember is that the different age groups, called *cohorts*, grew up in different historical periods. Therefore, the results may not apply to people growing up at other times. With the cross-sectional design, age effects and cohort effects are sometimes inextricably tangled. (As a scientific and critical thinker, can you see how *cohort effects* are a unique research problem for cross-cultural studies, just as the *third-variable problem* poses a unique threat to correlational studies, discussed earlier in this chapter?)

SoumenNath/iStock Unreleased/Getty Images

Like cross-sectional research, longitudinal studies also have their share of limits and disadvantages. They are expensive in terms of time and money, and it is difficult to generalize their results. Given that participants often drop out or move away during the extended test period, the experimenter may end up with a self-selected sample that differs from the general population in important ways.

In short, each method of research has differing strengths and weaknesses (as you can see in **Figure 1.22**). Keep these differences in mind when you read the findings of developmental research.

ANIMATION CONTENT

Cross-Sectional vs. Longitudinal Research

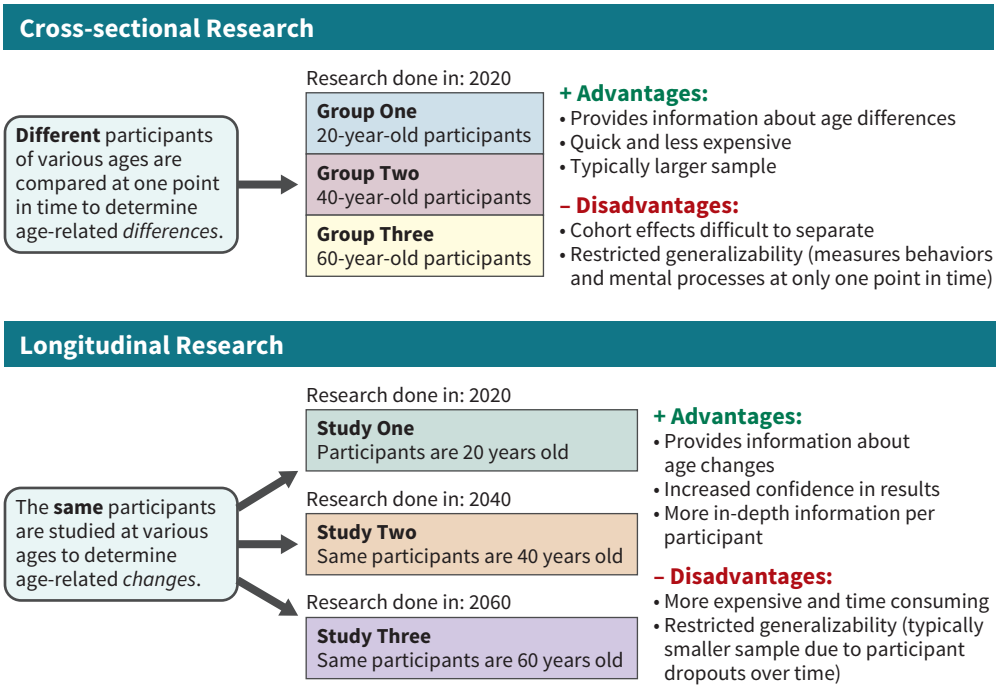


FIGURE 1.22 Cross-sectional versus longitudinal research To study development, psychologists may use a cross-sectional research design, a longitudinal research design, or both.

Combining Cross-Sectional and Longitudinal Design Before we go on, it's important to point out that modern researchers sometimes combine cross-sectional and longitudinal designs into one study. For example, when researchers examined both cross-sectional and longitudinal data from two independent samples taken over 30 years, they initially found that well-being *declined* with age. However, when they then controlled for the fact that older cohorts started out with lower levels of well-being, they found that well-being among all cohorts *increased* rather than decreased with age (Sutin et al., 2013).

They suggested that the reversal in findings was likely due to the fact that the older group of people had experienced instances of major turmoil in their younger years, including America's Great Depression during the 1930s. This means that this group started out with lower levels of well-being—yet their levels still increased over time.

Why is this combination of two research designs important? It offers a more accurate and reliable view of well-being at various ages than what was indicated in either the cross-sectional design or the longitudinal design.

Why is this combination of two research designs important? It offers a more accurate and reliable view of well-being in various ages than what was indicated in either the cross-sectional design or the longitudinal design. As you've seen, descriptive, correlational, and experimental research methods are valuable sources of scientific information, but they also have serious limits and potential biases. To offset these problems, researchers have created several safeguards to protect against potential sources of error on the part of both the researcher and the participants. In this section, we'll examine issues that can limit the conclusions we draw from research studies, as well as strategies to give us more confidence in our findings.

Potential Researcher Issues

VIDEO CONTENT

LO 1.4.5 **Identify** potential researcher issues that influence findings.

In the preceding section, we described several potential biases that can limit the conclusions we draw from experimental studies, such as sample bias and lack of random assignment. But there are other factors that can influence research findings in unintentional ways.

During experiments, the researcher must be aware of and control for extraneous **confounding variables** (such as time of day, lighting conditions, and room temperature). These variables must be held constant across both experimental and control groups. Otherwise, these variables might contaminate (or confound) the research results (**Figure 1.23**).

Researchers also need to be alert for signs of their own personal beliefs and expectations. Imagine what might happen if an experimenter inadvertently breathed a sigh of relief when a participant gave a response that supported the researcher's hypothesis. This type of behavior, known as **experimenter bias**, can easily influence the research results in the experimenter's expected direction. A closely related type of bias, **demand characteristics**, refers to any aspect of a study that unknowingly communicates to the participants how the experimenter wants them to behave. Rather than influencing the results in an expected direction (experimenter bias), the researchers, or subtle cues or signals within the study, create an implicit *demand* for how participants should behave.

A good example of both experimenter bias and demand characteristics is provided by the case of Clever Hans, the famous mathematical "wonder horse" (**Figure 1.24**). One way to prevent such biases from destroying the validity of participants' responses is to establish objective methods for collecting and recording data, such as using computers to present stimuli and record responses.

Experimenters can also skew their results if they assume that behaviors typical in their own culture are typical of all cultures—a bias known as **ethnocentrism**. One way to avoid this problem is to have researchers from two cultures each conduct the same study twice, once with participants from their own culture and once with participants from at least one other culture. This kind of *cross-cultural sampling* isolates group differences in behavior that might stem from any researcher's personal ethnocentrism.

Confounding variable
An extraneous factor that, if not held constant, may contaminate, or confound, the experimental results; also known as the third-variable problem in correlational research.

Experimenter bias
A problem that occurs when the experimenter's behavior and/or expectations inadvertently influence (bias) the outcome of the research.

Demand characteristic
Any aspect of a study that unknowingly communicates to participants how the experimenter wants them to behave; either the researcher or subtle cues or signals within the study create an implicit demand for how participants should behave.

Ethnocentrism The belief that one's culture is typical of all cultures; also, viewing one's own ethnic group (or culture) as central and "correct," and judging others according to this standard.

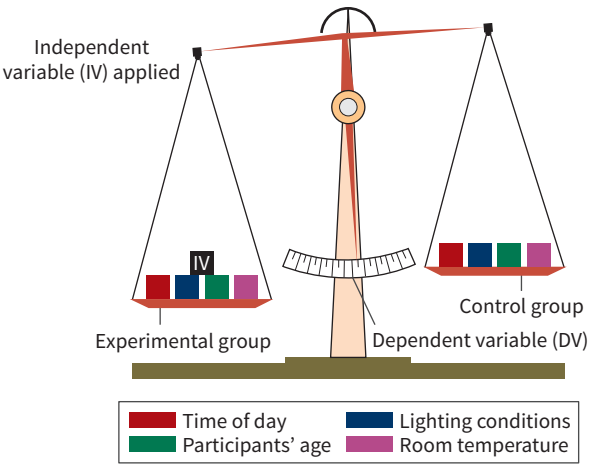


FIGURE 1.23 Controlling for confounding variables Recognizing that certain extraneous variables, such as time of day or lighting conditions, may affect their experimental findings, researchers work to make sure the variables are the same for both the experimental group and the control group. Once a particular level of the independent variable (IV) is added to the experimental group, the experimenters check to see if the scale's balance is significantly disrupted. If so, they can then say that the IV *caused* the change. However, if the IV is not "heavy" enough to make a significant difference, then the hypothesis was not supported, and experimenters go back to further refine their approach, start over, or go on to a new project.

Urheberrechte bei Karl Krall/Wikimedia Commons/Public domain

FIGURE 1.24 Can a horse add, multiply, and divide? Clever Hans and his owner, Mr. Von Osten, convinced many people that this was indeed the case (Rosenthal, 1965). When asked to multiply 6 times 8, minus 42, Hans would tap his hoof 6 times. Or if asked to divide 48 by 12, add 6, and take away 6, he would tap 4 times. Even when Hans's owner was out of the room and others asked the question, he was still able to answer correctly. How did he do it? Researchers eventually discovered that all questioners naturally lowered their heads to look at Hans's hoof at the end of their question. And Hans had learned that this was a signal to start tapping. When the correct answer was approaching, the questioners also naturally looked up, which signaled Hans to stop. Can you see how this provided an early example of both experimenter bias and demand characteristics?

Potential Participant Issues

VIDEO CONTENT

LO 1.4.6 Examine potential participant issues that influence findings.

Participant bias A problem that occurs when a research participant's behavior and/or expectations inadvertently influence (bias) the outcome of the research.

An error similar to researcher bias but produced by participants is called **participant bias**. It may arise if researchers use surveys as their main research method. When participants are asked to self-report on sensitive topics, such as their sexual behaviors, their alcohol and other drug consumption, or even their sleeping arrangements with pets, they often distort their own behaviors (**Figure 1.25**).

One study, for example, found that people are far less supportive of voting for political candidates from various stigmatized groups (e.g., gay men and lesbians, Muslims, atheists) when asked for such preferences indirectly rather than directly, presumably because many people want to appear open-minded and unprejudiced (Brown-Iannuzzi et al., 2019).

How do researchers deal with this type of participant bias, also known as *social desirability bias*? One way is to offer anonymous participation, along with guarantees of privacy and confidentiality. When necessary, researchers can temporarily deceive participants about the true nature of the research project. Obviously, this is a controversial approach, but there are times when it's necessary. In studies examining when and how people help others, participants may not be told the true goal of the study because they might try to present themselves as more helpful than they actually would be in real life.

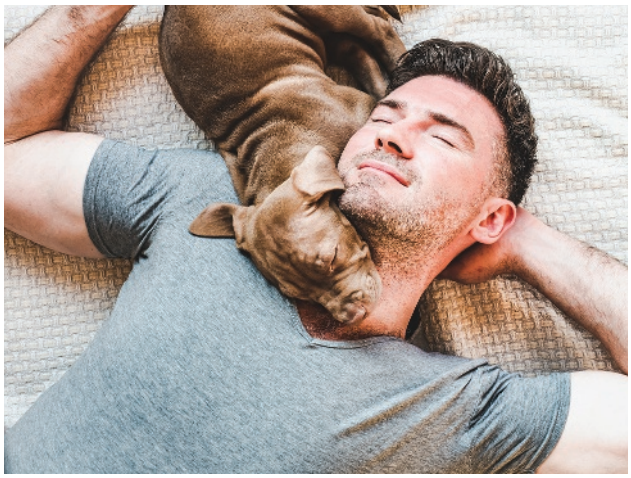
Single-blind study An experimental technique in which only the participants are unaware of (blind to) who is in the experimental and control groups.

Double-blind study An experimental technique in which both the participants and the researcher(s) are unaware of (blind to) who is in the experimental and control groups.

Additional Research Safeguards

We've discussed several researcher and participant issues, along with methods for preventing these problems and protecting the integrity of any experiment. Now we'd like to offer a few additional safeguards, which are actually some of the best-known, but most-often confused, types of research controls. We saved them for here because they're designed to minimize both experimenter and participant issues.

Let's begin with **single-blind** and **double-blind studies**. As you can see in **Figure 1.26**, this approach requires experimenters to keep themselves and/or their participants blind to



Svetlana/Adobe Stock

FIGURE 1.25 Participant bias and co-sleeping with pets
Research shows that a little over half of all pet owners share their bed with their pets, with about 40 percent reporting that it helps or doesn't significantly interfere with their sleep (Krahn et al., 2015). Interestingly, the researchers noted that pet owners appeared eager to report their sleeping arrangements, but reluctant to reveal any undesirable consequences. Can you see how this type of potential participant bias might unintentionally affect research results?

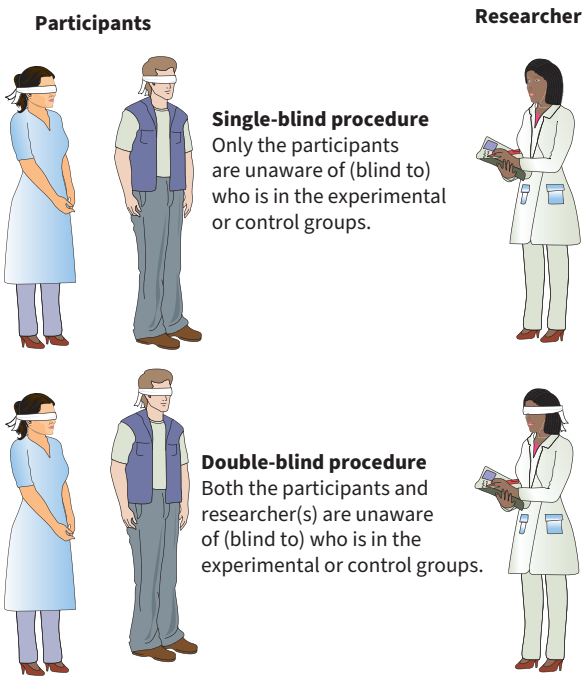


FIGURE 1.26 A single- or double-blind experimental design To scientifically evaluate the effectiveness of something like a new drug, researchers administering the experimental drug, and the participants taking the drug, must be unaware of (or "blind" to) who is receiving a *placebo* (a fake pill), and who is receiving the drug itself. Placebos are necessary because researchers know that participants' beliefs and expectations can change their responses and the experimental outcome—the so-called placebo effect (Leibowitz et al., 2019; von Wernsdorff, 2021).

(unaware of) of the treatment or condition to which the participants have been assigned.

Imagine yourself in an experiment in which you are told that the pill you're taking for eight weeks will stop your headaches. Can you see how it's critical that you as a participant, and possibly the experimenter who collects your data, should be unaware of whether you are in the control or experimental group? It would mean that if you were a participant you wouldn't know if you were being given the actual, experimental drug or an inactive **placebo** that had no physiological effects. Researchers do this because your expectations or beliefs, rather than the experimental treatment, can produce a particular outcome, called a **placebo effect**. Giving members of the control group a placebo, while giving the experimental group a pill with the active ingredients, allows researchers to determine whether changes are due to the pill that's being tested or simply to the participants' expectations.

Before going on, be sure to complete the following **Retrieval Practice** and **Research Challenge**.

Placebo An inactive substance or fake treatment used as a control technique in experiments; often used in drug research.

Placebo effect A change that occurs when a participant's expectations or beliefs, rather than the actual drug or treatment, influences the experimental outcome.

Retrieval Practice Module 1.4: Psychology's Research Methods

INTERACTIVE SELF-SCORING QUIZZES

Key Terms and Concepts Write a definition for each term or concept, using your own words.

- archival research
- case study
- confounding variable
- control group
- cross-sectional design
- demand characteristic
- dependent variable (DV)
- descriptive research
- double-blind study
- ethnocentrism
- experiment
- experimental group
- experimental research
- experimenter bias
- illusory correlation
- independent variable (IV)
- longitudinal design
- observation
- participant bias
- placebo
- placebo effect
- quasi-experimental design
- random sample
- sample bias
- single-blind study
- third-variable problem

Self-Test Completing this self-test and checking your answers in Appendix B provides immediate feedback and helpful practice for exams.

1. Briefly explain what's wrong (and funny) about this **cartoon**.

Jeremy Banx/CartoonStock

2. If researchers gave participants varying amounts of a new memory drug and then gave them a story to read and measured their scores on a quiz, the _____ would be the IV, and the _____ would be the DV.

a. response to the drug; amount of the drug

b. experimental group; control group

c. amount of the drug; quiz scores

d. researcher variables; extraneous variables

3. _____ studies are the most time-efficient method, whereas _____ studies provide the most in-depth information per participant.

4. An inactive substance or fake treatment used as a control technique in experiments, often used in drug research, is called a(n) _____.

5. A problem that occurs when a research participant's behavior and/or expectations inadvertently influence the outcome of the research is known as _____.

Test Your Scientific/Critical Thinking

1. **Which form of research would you most trust: descriptive, correlational, experimental, or a meta-analysis? Why?**
2. **Cigarette companies have suggested that there is no scientific evidence that smoking causes lung cancer. How would you refute this claim?**
3. **Which of the three forms of research methods do you think is most valuable to the average person? Why?**

Real World Application Question

[AQ4] Do people who attend college live longer?
Hint: Look in the text for **[AQ4]**.

Research Challenge | How Do Men and Women Lie About Sex?

Chatfield, Jason/Cartoon Stock

In many cases, researchers rely on self-report, or survey, data to examine various research questions. But this type of data collection can be problematic when participants are asked questions about sensitive topics, like drug use, cheating, or sexual behavior (see **cartoon**). In these cases, researchers are often concerned about *social desirability bias* that can lead to inaccurate data.

A fascinating example comes from a study that asked randomly assigned college students to complete a questionnaire regarding how often they engaged in 124 different gender-typical behaviors (Fisher, 2013). Some of these behaviors were considered more typical of men (such as wearing dirty clothes and telling obscene jokes), whereas other behaviors were more common among women (such as writing poetry and lying about their weight). Half of the participants completed these questionnaires while attached to what they were told was a polygraph machine (or lie detector), although in reality this machine was not working. The other half completed the questionnaires without being attached to such a machine.

Can you predict how these groups of student participants responded? Among those who believed they were attached to the supposed lie detector, and that it could reliably detect their lies, men were more likely to admit that they sometimes engaged in behaviors seen as more appropriate for women, such as writing poetry. Similarly, women were more likely to admit that they sometimes engaged in behaviors judged more appropriate for men, such as telling obscene jokes. Even more intriguing, men reported having had more sexual partners when they weren't hooked up to the lie detector than when they were. The reverse was true for women. They reported fewer partners when they were not hooked up to the lie detector than when they were.

How does the social desirability response help explain these differences? We're all socialized from birth to conform to norms (unwritten rules) for our culturally approved male and female behaviors. Therefore, participants who were *not* attached to the supposed lie detector provided more "gender appropriate" responses. Men admitted telling obscene jokes and reported having more sexual partners, whereas women admitted lying about their weight and reported having fewer sexual partners.

These findings were virtually reversed when participants believed they were connected to a machine that could detect their lies. This fact provides a strong example of the dangers of the social desirability response. It also reminds us, as both researchers and consumers, to be careful when interpreting findings regarding sexual attitudes and behaviors. If you'd like to try your hand with

informal research on how social desirability bias may lead to inaccurate reporting and exaggerated gender differences, **Try This**.

Try This **Building Your Research Skills** You can easily and informally recreate the basics of this study by starting with a list of questions in which people might be motivated to respond in a particular way, such as how often they exercise, their GPA, or whether they are willing to donate blood.

Then present those questions to different people. For some, announce that their answers will be anonymous (they won't record their name). For others, ask them to write their name on the top of the page. You can then compare answers between these two groups of people. If you've randomly assigned people to the two conditions, any differences that emerge between the results suggest some type of response bias. Can you predict what you'll find?

Typically, people who are responding anonymously report lower levels of positive behaviors, and higher levels of negative behaviors, than those who have to identify themselves. This simple exercise is *not* an example of how professional research is conducted, but it does give you insight into how the methods used in a research study may influence the findings.

Module 1.5 Secrets to Student Success

LO 1.5 **Discuss** succeeding in class, including the role of metacognition and methods to improve study habits, time management, and grades.

MODULE 1.5 KEY TOPICS

Here are the key topics you will read about in this module.

- Metacognition
- Study Habits
- Time Management
- Grade Improvement
- Finding Happiness

In this chapter's closing module, we provide several important, well-documented study tips and techniques guaranteed to make you a more efficient and more successful college student. We begin with the star of the show, *metacognition*—awareness and regulation of your own cognitive processes. We also provide tips for study habits, time management, and grade improvement. Then we close with an uplifting section on five research-based tips for finding happiness.

Study TIP

This special "success" feature in Chapter 1 includes tips specifically for academic and personal success in this and all your other college courses.

Metacognition

VIDEO CONTENT

LO 1.5.1 **Summarize** metacognition's role in student success.

Why is *metacognition* so important to student success? It's the foundation for success throughout life. We discussed metacognition earlier as the essential ingredient for critical thinking, and we're emphasizing it again because "simply" knowing what you know and what you don't know can make all the difference in student success.

When studying for exams or reading their texts, students with weak metacognitive skills are often overconfident about their comprehension and surprised when they do poorly. They fail to recognize that they're not really understanding the terms and concepts when reading, listening to lectures, and studying. When it comes to time management, they're often similarly unaware of how they're spending their time.

The good news is that research shows that increasing overall conscious awareness of your knowledge and regulation of your cognitive processes (metacognition) results in higher academic achievement (Fleur et al., 2021, Stanton et al., 2021). In fact, an experiment with randomly assigned college students found that the group of students who were asked to self-reflect and to identify and use learning resources wisely improved their class performance by an average of one-third of a letter grade compared to the group that did not self-reflect (Chen et al., 2017). For more information and training in metacognition, check out the Wiley online learning platform.

To maximize your implementation of all the valuable information in this section, **Try This**.

Try This: Metacognition in Action!

Answer true or false to each item. Then, for each item that you identified as "True," pay particular attention to the corresponding heading throughout this section of Module 1.5.

Student Success Skill 1: Study Habits

_____ **1.** While reading, I often get lost in all the details and can't pick out the most important points.

_____ **2.** When I finish studying a chapter, I frequently can't remember what I've just read.

_____ **3.** I generally study with either the TV or music playing in the background.

_____ **4.** I tend to read each section of a chapter at the same speed, instead of slowing down on the difficult sections.

Student Success Skill 2: Time Management

_____ **5.** I go to almost all my classes, but I often don't take notes, and find myself texting, playing games on my computer, or daydreaming.

_____ **6.** I typically wait to study, and then "cram" right before a test.

_____ **7.** I can't keep up with my reading assignments given all the other demands on my time (see **photo**).

Student Success Skill 3: Grade Improvement

_____ **8.** I study and read ahead of time, but during a test I frequently find that my mind goes blank.

_____ **9.** Although I study and read before tests and think I'll do well, I often find that the exam questions are much harder than I expected.

_____ **10.** I wish I could perform better on tests and read faster or more efficiently.

_____ **11.** I feel like going to class is a waste of time.

_____ **12.** I just can't do well on tests.

Pepscostudio/Adobe Stock

Study Habits

VIDEO CONTENT

LO 1.5.2 **Describe** the four steps you can take to improve your study habits.

If you answered "True" to one or more of questions 1–4, try these four ways to improve your study habits, which will also help you read more successfully and remember more information in this and most other texts.

1. **Familiarization.** The first step to good study habits is familiarizing yourself with the text so that you can take full advantage of its contents. Begin by scanning through the Chapter Outline, which will give you a bird's-eye view of each chapter. Next, note the various tables, figures, photographs, and special feature boxes, all of which will enhance your understanding of the chapter content.
2. **Active reading.** After familiarization, you will need to make a conscious decision to *actively* read and learn the material (Putnam et al., 2016). Reading a text is *not* like reading a novel or fun articles on the Internet. You must tell your brain to slow down, focus on details, and save the material for future recall. **Try This**.

SQ4R method A study technique based on six steps: Survey, Question, Read, Recite, Review, and wRite.

Another way to practice active reading is to use the **SQ4R method**, which was developed by Francis Robinson (1970). The initials stand for the six steps in effective, active reading: *Survey, Question, Read, Recite, Review,* and *wRite* (**Process Diagram 1.4**). Taking notes (wRite) while you're reading and studying can be particularly helpful. Ask yourself, "What is the main idea?" Then write down key ideas and supporting details and examples. As you might have guessed, this text was designed to incorporate each of the six steps in the SQ4R method.

Try This: Demonstrating the Importance of Active Reading

a. Using a stopwatch, test to see how fast you can name the color of each rectangular box.

GREEN	RED	BROWN	RED
BROWN	GREEN	GREEN	BLUE
GREEN	BROWN	RED	BLUE

b. Now, time yourself to see how fast you can state the color of ink used to print each word, ignoring what each word says.

After timing yourself on both tasks, how well did you do? Interestingly, young children who have learned their colors, but have not yet learned to read, easily name the colors in both sections in about the same amount of time. However, virtually every adult takes more time, and makes more errors, on (b) than on (a). Why? It's because, over time, our well-learned ability to read words has become a *passive* task, which interferes with the less common *active* task of naming the colors rather than the words.

We include this famous demonstration, known as the *Stroop effect*, for a "hands on" illustration of the importance of active reading. If you passively read a chapter in a text once, or even several times, you may still do poorly on an exam. Just as it takes more time to state the color in part (b), it will take you more time and effort to override your well-learned *passive* reading. Remember to slow down and focus on the details. This is the key to truly learn and master the material.

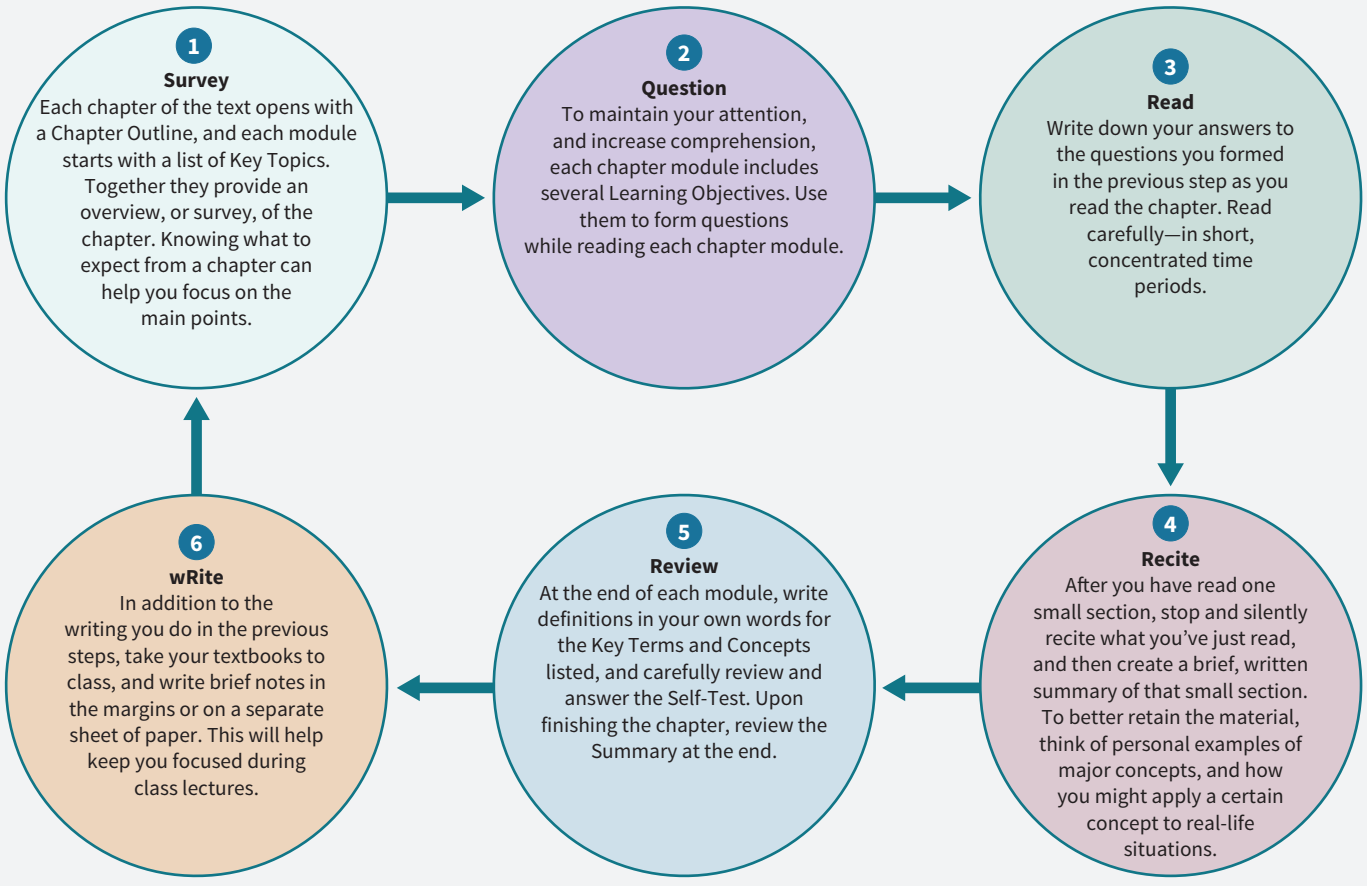
AT-A-GLANCE Process Diagram 1.4

INTERACTIVE FIGURES, CHARTS, & TABLES

Using the SQ4R Method

Follow these six steps to improve your reading efficiency.

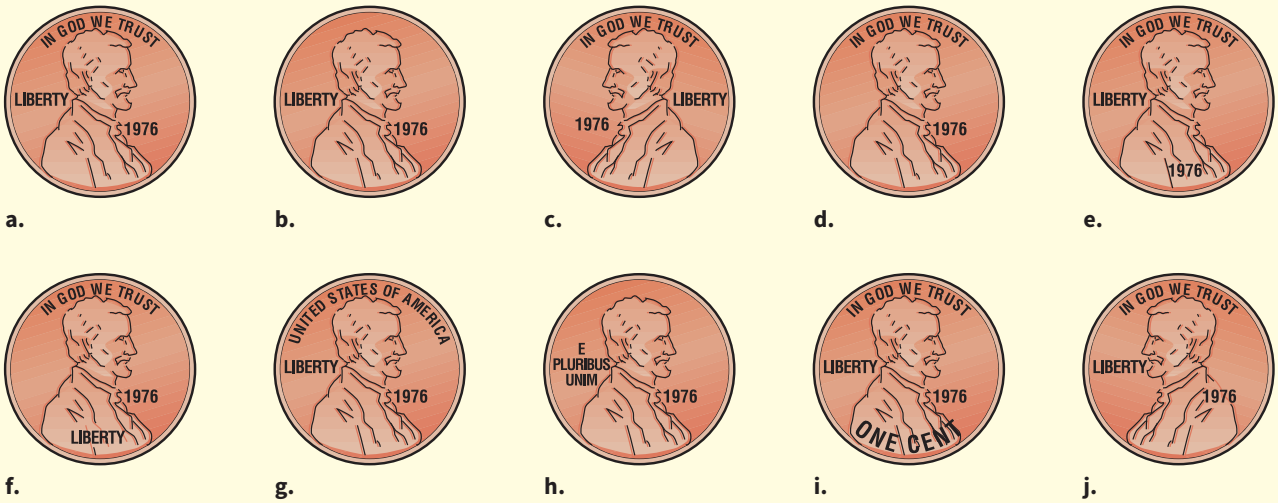
STOP! This Process Diagram contains essential information *not* found elsewhere in the text, which is likely to appear on quizzes and exams. Be sure to study it carefully.



3. **Avoiding highlighting and rereading.** Marking with a highlighter, underlining potentially important portions of material, and rereading text material after initial reading are three common techniques students frequently use while studying. Unfortunately, they are almost always a waste of time! Research clearly shows that highlighting, underlining, and rereading are among the *least* effective of all the major study techniques. In contrast, *distributed practice* and *practice testing* (explained later, in the grade improvement section) are the *most* effective. As previously discussed, you need to actively focus on your reading. Highlighting, underlining, and rereading generally encourage passive reading.
4. **Overlearning.** Many students tend to study new material just to the point where they can recite the information, without attempting to understand it more deeply. For best results, however, you should *overlearn*. In other words, be sure you fully understand how key terms and concepts are related to one another, and that you can generate examples other than the ones in the text. Overlearning also involves carefully reviewing the material (by visualizing the phenomena that are described and explained in the text and by rehearsing what you have learned) until the information is firmly locked in place. This is particularly important if you suffer from test anxiety. If you'd like a quick demonstration of why we sometimes need to overlearn, **Try This**.

Try This: Demonstrating the Importance of Overlearning

Can you identify which one of these 10 pennies is an exact duplicate of a real U.S. penny? Unless you're a coin collector, you probably can't easily choose the correct one without comparing it to a real coin—despite having seen thousands of pennies. Why? As you will discover later in the text (Chapter 7), you must encode (or process) the information in some way before it will be successfully stored in your long-term memory. Given that most of us don't need to carefully study and overlearn the details of what a penny looks like, because we can function in our everyday world with a superficial glance at the coin, why are we providing this demo? The point is that if you're going to take a test on important material (or even pennies), you need to carefully study to the point of *overlearning* in order to do well.



(You can check your answers in Appendix B.)

Time Management

VIDEO CONTENT

LO 1.5.3 **Discuss** ways to improve your time management.

If you answered "True" to one or more of questions 5–7 in the Student Success Checklist at the start of this section, and find that you aren't always good at budgeting your time, here are five reliable time-management strategies:

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
7:00		Breakfast		Breakfast		Breakfast	
8:00		History	Breakfast	History	Breakfast	History	
9:00		Psychology	Statistics	Psychology	Statistics	Psychology	
10:00		Review History and Psychology	Campus Job	Review History and Psychology	Statistics Lab	Review History and Psychology	
11:00		Biology		Biology		Biology	
12:00		Lunch / Study		Exercise	Lunch	Exercise	
1:00		Bio Lab	Lunch	Lunch	Study	Lunch	
2:00			Study	Study			

FIGURE 1.27 Sample record of daily activities To help manage your time, record your daily activities in a grid similar to this. Include daily maintenance tasks and downtime.

1. **Establish a baseline.** Before attempting any changes, simply record your day-to-day activities for one to two weeks (**Figure 1.27**). You may be surprised at how you currently spend your time.
2. **Set up a realistic schedule.** Make a daily and weekly "to do" list, including all required activities, basic maintenance tasks (like laundry, cooking, child care, and eating), and a reasonable amount of downtime. Then create a daily schedule that includes time for each of these. To make permanent time-management changes, shape your behavior, starting with small changes and building on them.
3. **Reward yourself.** Give yourself immediate, tangible rewards for sticking with your *realistic* daily schedule, such as calling a friend, getting a snack, or checking your social media.
4. **Maximize time opportunities.** Time experts point out that people often overlook important *time opportunities*—spare moments that normally go to waste that you might use productively. When you use public transportation, review notes or read your textbook. While waiting for doctor or dental appointments, or to pick up your kids after school, take out your text or electronic device and study for 10 to 20 minutes. Hidden moments like this count. To further increase your efficiency, try paying close attention to the amount of time you spend on true, focused studying versus the time you waste worrying, complaining, and fiddling around getting ready to study ("fretting and prepping").
5. **Maximize each class session.** As you know, the authors of this text are both college professors, so this advice may sound biased. However, solid psychological research (e.g., Putnam et al., 2016) recommends that all students do the following:
   - **Prepare ahead of time.** Be sure to study the assigned material ahead of each class.
   - **Attend every class and take careful notes.** Most instructors provide unique ideas and personal examples that are not in the text, and even when they do repeat what is covered in the text, we all need to have multiple exposures to new material. Also, pay close attention to what your professor emphasizes in class, as this material is likely to appear on exams. Think of your professor's lecture as you would tips from your coach, or an employer who was going out of their way to tell you what you need to know to maximize your performance or paycheck. For more information on note taking, see the **Research Challenge** at the end of this module.

Grade Improvement

VIDEO CONTENT

LO 1.5.4 Identify the key factors in grade improvement.

In combination with the previous study habit and time management tips, the following strategies are virtually guaranteed to improve your overall grade point average (GPA) in all your college classes and your mastery of the material.

1. **Refuse to multitask on new or complex material.** Are you one of the many students who believe that doing more than one task at a time makes you more effective? [AQ5] If so, you'll be surprised to know that this so-called multitasking is just "task-switching," and that it actually *decreases* your GPA, as well as your overall performance and productivity—particularly for new or complex tasks (Aagaard, 2019; Bender et al., 2017; Ralph et al., 2019). As discussed earlier, in the *Try This* involving active reading and the Stroop effect, switching from one task to another (reading a word while trying to state its color) greatly increases your response time—and errors.

   Multitasking also explains why texting and driving (or walking) are so dangerous (Chapter 5), as well as why just casually listening to the professor, while also texting, playing computer games, or talking to other classmates, is largely a waste of time. In fact, a study of an introductory psychology class found that Internet use during lectures was *negatively correlated* with student performance. As we discussed earlier, a negative correlation means that as Internet usage went up, performance went down (Ravizza et al., 2017). An important rule to remember is that *one hour of full attention in class is generally worth about four hours on your own outside of class.*

2. **Improve your general test-taking skills.** Virtually all students can improve their performance on exams by taking courses designed to develop their reading speed and comprehension. Major tips from these courses is that during exams, expect a bit of stress but don't panic. Pace yourself and focus on what you know. Skip over questions when you don't know the answers, and then go back if time allows. On multiple-choice exams, carefully read each question and all the alternative answers before responding. Answer all questions, and make sure you have recorded your answers correctly.

   Also, bear in mind that information relevant to one question is often found in another test question. Do not hesitate to change an answer if you get more information—or even if you simply have a better guess about an answer. Contrary to the belief held by many students (and faculty) that "your first hunch is your best guess," research suggests this is *not* the case (Benjamin et al., 1984; Lilienfeld et al., 2010, 2015). Changing answers is far more likely to result in a higher score (**Figure 1.28**).

3. **Distribute your study sessions and retrieval practice self-testing.** Research has firmly established that *distributed practice* and *retrieval practice* are the two *most* important keys to grade improvement (Carvalho et al., 2020; Gagnon & Cormier, 2018; Vaughn et al., 2021)! Why? Spreading your study sessions out over time (distributed practice) and practice testing (retrieval practice) are far more efficient than waiting until right before an exam and cramming in all the information at once (massed practice) (Chapter 7). If you were a basketball player, you wouldn't wait until the night before a big playoff game to practice. Just as you need to repeatedly practice your free-throw shot to become a good basketball player, you need to repeatedly practice your test taking to perform well on exams.

   Based on this growing body of research, and our own teaching success with frequent testing, we've designed this text to include numerous distributed-practice opportunities sprinkled throughout each chapter. As you're actively reading and studying, be sure to complete all these built-in, self-grading practice tests. When you miss a question, it's very helpful, and important, to immediately go back and reread the sections of the text that correspond to your incorrect response. You can also easily access the free flashcards and other forms of self-testing provided with the purchase of this text.

FIGURE 1.28 Should you change your answers? Research clearly shows that answer changes that go from a wrong to a right answer (57.8 percent) greatly outnumber those that go from a right to a wrong answer (20.2 percent).

Source: Adapted from Benjamin et al., 1984.

4. **Adjust your attitude.** We've saved our best student success tip—*attitude adjustment*—for last. You have the power to decide that you can, and will, improve your academic skills. Instead of focusing on negative thoughts, such as "I can't go to the party because I have to study" or "Going to class feels like a waste of time," try counter statements, like "I'm going to learn how to study and make better use of my class time, so that I can have more free time." Similarly, rather than thinking or saying "I never do well on tests," do something constructive like taking a study-skills and/or test preparation course at your college.

Finding Happiness

VIDEO CONTENT

LO 1.5.5 **Discuss** the major components of happiness.

VIDEO CONTENT

Positive Psychology

Having just discussed some tips specifically involved with becoming a successful student, we'd like to close on an even more uplifting note. This section on finding happiness applies not only to your student life but also to your life in general.

Next to going to college and choosing a career that you love, what do you believe is the most important ingredient for overall life satisfaction? If you said "happiness," you're on the right track. **[AQ6]** But does money buy happiness? Although previous studies suggested that once we have enough money to meet our basic needs for comfort and security, additional funds fail to significantly increase our level of happiness (Diener & Biswas-Diener, 2002, 2008; Whillans & Macchia, 2019), more recent research finds that well-being and happiness both continue to rise with an equally steep slope above $80,000 as below it (Killingsworth, 2021).

Note that this doesn't mean that we should focus primarily on money—it's still only a modest determinant of happiness (see **cartoon**). What does psychological research suggest for finding happiness? See the following **Why Positive Psychology Matters**.

"But on the positive side, money can't buy happiness - so who cares?"

Harley Schwadron/CartoonStock

Why Positive Psychology Matters: Practical Applications | What's the Best Way to Increase Your Happiness?

javiindy/Adobe Stock

Having discovered that money is only a modest determinant of happiness, what can we do instead? Here are five research-based suggestions.

1. **Express gratitude.** Numerous studies have found that developing and expressing gratitude is linked with reduced cardiac risk, fewer symptoms of anxiety and depression, improved relationships with others, and a less critical and more compassionate relationship with yourself (Mills et al., 2015; Petrocchi & Couyoumdjian, 2016).
2. **Spend your money and time wisely.** People who spend money on life experiences—*doing things*—show greater enduring happiness than those who spend money buying material possessions—*having things.* Can you see why this approach leads to more happiness? It's because the joy and satisfaction of doing things and giving to others last much longer than when we spend money and time on having things and just ourselves (e.g., O'Brien & Kassirer, 2019).
3. **Build and maintain close relationships.** One of the most consistent findings is that *other people* make us happy. Simply building and maintaining relationships tends to significantly improve our overall happiness and well-being (Amati et al., 2018; Diener & Tay, 2015; Lee & Kawachi, 2019). Keep in mind, however, that the benefits of a rich social life are primarily based on face-to-face interactions, not phones, Facebook, and so on.

4. **Choose and pursue worthy goals.** Make a list of your most personally valuable and worthy goals, along with the specific things you want to accomplish daily and long-term. Note, however, that pursuing happiness (or money) for its own sake can backfire. Have you heard of the **adaptation-level phenomenon**, where we tend to judge new situations or stimuli relative to a neutral level—defined by our previous experiences with them. This so-called *hedonic treadmill* shows us that the pleasures we acquire in all parts of our lives—money, material possessions, status, and even our relationships—can quickly become part of our everyday baseline and taken for granted, until they're taken away.
5. **Change your behavior.** As you'll discover in Chapters 3 and 5, an important behavioral change related to happiness is **mindfulness**, a state of consciousness that attends to ongoing events in a receptive and nonjudgmental way (Bartlett et al., 2021; Behan, 2020; Zhu et al., 2021).

As a final tip regarding behavior change and happiness, be *curious.* To spark your curiosity, we start each chapter with five to six intriguing application questions **[AQ1–6]**, and each chapter contains several unique features: *Why DEI Matters*, *Why Scientific Thinking Matters*, and so on. If you're curious about why we include a special section on *Why Positive Psychology Matters,* here is our personal explanation: *Positive psychology focuses on the study of optimal human functioning and emphasizes positive traits, experiences, and influences in life (e.g., Seligman, 2003, 2018; Wang et al., 2023). As you'll discover throughout this text, studying and applying a positive psychological outlook can improve your personal relationships, academic and career achievements, and virtually every other important life challenge.*

Adaptation-level phenomenon A tendency to judge a new situation or stimuli relative to a neutral, "normal" level based on our previous experiences; we then adapt to this new level and it becomes the new "normal."

Mindfulness A state of consciousness that attends to ongoing events in a receptive and nonjudgmental way.

Take-Home Message

Success in college, and in virtually all parts of life, is largely within your control. Now that you've read Module 1.5 on student success, we're confident that if you follow these suggestions you will do well. As mentioned at the start of this chapter, we invite you to personally contact us. We genuinely want to know how your study of psychology (and this text) helps you in your academic life, and if it leads you to see yourself and other people in completely new ways. You can reach us at casanderson@amherst.edu and khuffman@palomar.edu. We look forward to hearing from you.

Before going on, be sure to complete the following **Retrieval Practice** and **Research Challenge**.

Retrieval Practice Module 1.5: Secrets to Student Success

INTERACTIVE SELF-SCORING QUIZZES

Key Terms and Concepts Write a definition for each term or concept, using your own words.

- adaptation-level phenomenon
- mindfulness
- SQ4R method

Self-Test Completing this self-test and checking your answers in Appendix B provides immediate feedback and helpful practice for exams.

1. Which of the following is *not* one of the recommended study habits?

a. active reading **c.** highlighting
b. familiarization **d.** note taking

2. One of the clearest findings in psychology is that _____ practice is a much more efficient way to study and learn than _____ practice.

3. _____ is particularly important if you suffer from test anxiety.

a. Overlearning **c.** Active studying
b. Hyper-soma control **d.** Passive listening

4. Research suggests that _____ might be two of the most important keys to improving your grades.

a. highlighting and rereading
b. personal control and better time management
c. active studying and the SQ4R method
d. distributed practice and practice testing

5. People who spend money on _____ show greater enduring happiness than those who spend money on _____.

Test Your Scientific/Critical Thinking

1. **What topic or secret for student success do you consider most valuable? Why?**
2. **What prevents you or other students you know from fully employing the strategies for student success presented in this chapter?**

Real World Application Questions

[AQ5] How can multitasking hurt your GPA?
[AQ6] Can money buy happiness?
Hint: Look in the text for **[AQ5]** and **[AQ6]**.

Research Challenge: Practical Applications | What's the Best Note-Taking Strategy?

pressmaster/Adobe Stock

Many students use their laptops to take notes during class (see **photo**), in part because most people type faster than they write by hand. Have you ever wondered if this is the most effective way of mastering material? In 2014, a study was published showing that students who write notes by hand retain information better than those who type them on a laptop (Mueller & Oppenheimer, 2014). This finding received considerable attention in the popular press and led many professors—including the authors of this textbook—to set policies discouraging the use of laptops in their classrooms!

But a recent research study comparing the effects of taking notes by hand versus on a computer revealed quite different findings (Urry et al., 2021). In this study, researchers asked undergraduate students to watch a recorded lecture while taking notes either by hand or on a laptop. Students then took a quiz on the material they had just learned, which included both factual and conceptual questions. The researchers then examined the number of words in the notes students took, as well as the degree of word-for-word overlap with the lecture.

What do you think happened? As you can probably predict, students who wrote more words performed better on the quiz, whereas students whose notes included more direct word-for-word overlap performed worse (probably because they were simply transcribing the lecture instead of thinking carefully about its content).

In short, students taking notes on a laptop performed just as well as students taking notes by hand. The key finding is that thinking carefully about content and taking copious notes was far more effective than "transcribing." The difference in the findings between these two studies also illustrates the importance of repeating, or replicating, research studies, as we noted earlier in this chapter. Are you interested in a possible career as a research psychologist, or simply wondering if this study would hold up with your own group of friends? If so, conduct your own informal research, using the guidelines suggested in the **Try This**.

Try This **Building Your Research Skills** For practice with a simplified, unofficial experiment, begin by recruiting a few friends to watch a brief video lecture, such as a TED talk. Ask some of them to take notes on the talk by hand, and others to take notes using a computer. Finally, give students in each group a quiz to see how well they remember the key points of the talk. This simple exercise demonstrates how psychologists design studies to test particular questions.

Chapter Review & Reflections

Chapter Review

DOWNLOAD DOCUMENTS & TEMPLATES
Visual Summary

INTERACTIVE SELF-SCORING QUIZZES
Practice Quiz

Retrieval Practice Respond to the *Learning Objectives* (repeated from the previous modules) using your own words. Next, check your answers in Appendix B. *(Note that checking your answers provides immediate feedback and helpful practice for exams.)*

Module 1.1 What Is Psychology?

LO 1.1.1 ***Define*** *psychology.*

LO 1.1.2 ***Differentiate*** *psychological science from pseudoscience.*

LO 1.1.3 ***Discuss*** *scientific thinking versus critical thinking.*

LO 1.1.4 ***Review*** *the benefits of studying psychology.*

Module 1.2 Psychology's Past and Present

LO 1.2.1 ***Review*** *psychology's origins, including structuralism, functionalism, and the psychoanalytic perspective.*

LO 1.2.2 ***Discuss*** *psychology's seven modern perspectives.*

LO 1.2.3 ***Describe*** *the three major models of psychology today and the contributions of women and people of color to psychology.*

LO 1.2.4 ***Summarize*** *the major career options and specialties in psychology.*

Module 1.3 Basics of Psychological Research

LO 1.3.1 ***Review*** *psychology's four main goals.*

LO 1.3.2 ***Compare and contrast*** *the fundamental goals of basic and applied research.*

LO 1.3.3 ***Describe*** *the scientific method, its key terms, and its six steps.*

LO 1.3.4 ***Discuss*** *the ethical concerns and guidelines for psychological research.*

Module 1.4 Psychology's Research Methods

LO 1.4.1 ***Review*** *descriptive research and its four key methods.*

LO 1.4.2 ***Discuss*** *correlational research.*

LO 1.4.3 ***Identify*** *the key terms and components of experimental research.*

LO 1.4.4 ***Describe*** *quasi-experimental and developmental research.*

LO 1.4.5 ***Identify*** *potential researcher issues that influence findings.*

LO 1.4.6 ***Examine*** *potential participant issues that influence findings.*

Module 1.5 Secrets to Student Success

LO 1.5.1 ***Summarize*** *metacognition's role in student success.*

LO 1.5.2 ***Describe*** *the four steps you can take to improve your study habits.*

LO 1.5.3 ***Discuss*** *ways to improve your time management.*

LO 1.5.4 ***Identify*** *the key factors in grade improvement.*

LO 1.5.5 ***Discuss*** *the major components of happiness.*

Chapter Reflections

Why Writing Matters: Practical Applications | **Can Writing Improve Both Your Personal and Student Success?**

Research shows that one of the best methods to improve your memory and overall reading comprehension is through writing (Defazio et al., 2010; Graham & Hebert, 2010; Silva & Limongi, 2019). In short, writing is the foundation of learning. To increase your mastery and enrichment of this chapter, list at least two key terms or concepts that you found particularly interesting and/or useful and that you want to remember and apply in your personal life. Then, write a short paragraph in response to two or more of the following questions:

1. Are you a happy person, like the ones depicted in this **photo**? Why or why not?
2. How does psychology's emphasis on scientific thinking contribute to both curiosity and critical thinking?
3. In what ways could scientific thinking help others or possibly provide solutions to world problems, such as the climate crisis?
4. What does it mean to be curious? What are you most curious about?

fizkes/Adobe Stock

5. Describe a successful student you personally know, or have learned about. What do you most admire about the study techniques that this person uses? Will you try to emulate this person's behaviors? If not, why?