Introduction to the Science of Psychology

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CHARACTER OVERVIEW

The Chilean Miners
Thursday, August 5, 2010, seemed like an ordinary workday to the 33 men who arrived that morning at the San José copper mine in Chile. Little did they know that in just a few short hours, they would be trapped together underground in a life-changing ordeal. After a tunnel collapse, the men were able to make their way to a safety shelter and close the door. They had enough supplies to sustain 10 men for 2 days. Aside from the physical dangers these men faced, they were about to face enormous mental stress that would test their limits. Although the first hours and days brought short tempers and arguments, the men soon banded together to ration food and attempt to find a means of escape.

These extreme circumstances did sometimes bring out the worst in the miners, but it also helped them to create order and work together, each taking the job to which he was best suited. They created a schedule to inject normalcy into their lives underground and became a family, supporting those who needed it when they needed it most. After 2 weeks, with a severely reduced food supply and dismal health situation, the men received a bit of hope when a drill bit broke through their shelter.

Once the first hole was opened, two more were drilled to facilitate the delivery of food, medicine, and communication, including therapy from a team of psychologists on the outside. Although these communications helped at first, the restrictions placed on the men by the therapists soon backfired when the miners stopped communicating with them. The psychologists were in uncharted waters, and professionals from around the globe began to weigh in on the correct response to the miners’ difficult situation. The outsiders were left to look to the research available to them to best help the men underground. At the request of the miners, the lead therapist was let go and a new man was brought in. Some responded well to his more laid-back approach, but the newcomer also sparked dissent among those who were trapped. There was no quick remedy to ease their stressed minds.
Throughout their nation and, in fact, all over the world, people were committed to the rescue of these 33 men and offered food, medication, supplements, advice, and engineering in order to bring them back to the surface. After 10 weeks, a rescue tunnel finally reached the men; over the next 2 days, all 33 were safely brought out. The joy in their emergence was felt not only by them and their families, but also by the millions watching the scene on television around the world. Although some of the miners enjoyed a bit of celebrity in the following weeks, many of them also suffered from depression and anxiety, and nearly one third experienced post-traumatic stress disorder. Despite these negative effects, their story and the stories of all of those involved in helping them offer a feeling of hope to many who hear about this ordeal.

**BRIEF CHARACTER OVERVIEW**

**The Chilean Miners**
In August 2010, 33 Chilean miners were trapped underground in a massive tunnel collapse. Though they suffered physically and mentally, with the help of many on the outside and their own strength, they were successfully rescued 10 weeks later. The actions of the miners and those in the outside world offer a look into many facets of human behavior and mental processes.

**LEARNING OBJECTIVES**

After reading and studying this chapter, your students should be able to:

LO 1 Define psychology and describe its scope.
LO 2 Summarize the goals of the discipline of psychology.
LO 3 Identify influential people in the formation of psychology as a discipline.
LO 4 List and summarize the major perspectives in psychology.
LO 5 Evaluate pseudopsychology and its relationship to critical thinking.
LO 6 Describe how psychologists use the scientific method.
LO 7 Summarize the importance of a random sample.
LO 8 Recognize the forms of descriptive research.
LO 9 Explain how the experimental method relates to cause and effect.
LO 10 Demonstrate an understanding of research ethics.
LECTURE GUIDES AND CLASS ACTIVITIES

PRESENTING PSYCHOLOGY

What Is Psychology?

Although many people may associate it with the abnormal—therapy, medications, and perhaps even crime—*psychology* is actually defined as the scientific study of all behavior and mental processes. *Psychologists* can be found in many different fields, from education and government to hospitals and, of course, therapy. Even in these diverse areas, many subfields exist. Within these subfields, psychologists conduct two major types of research: basic, which focuses on data collection, and applied, which focuses on changing outcomes. Many people may have the misconception that psychology is just “common sense,” but it is, in fact, a *science*, which seeks to gather information through experimentation and to share and duplicate the results.

*Student Project: Levels of Analysis*

In order to help students gain a further understanding of the different subfields within psychology, assign each student—or small group—a different subfield (e.g., developmental, social, learning, cognitive, etc.) to evaluate. Ask students to use additional sources (e.g., the textbook, scholarly sources, Web sites, etc.) to identify the main areas of interest for each specialization and then provide a brief synopsis to the class. To aid students in connecting their assigned subfield with real-world experiences, ask students to think about the following questions while they are researching their topics:

1. Would individuals with this specialization be interested in the experience of the Chilean miners? If so, what kind of questions or topics might interest them?

2. Would researchers in this field be more likely to conduct basic research or applied research? How could each type of research in this subfield be utilized by individuals working with the Chilean miners?

*15-Minute In-Class Activity: Psychomythology*

This activity works well as an ice breaker for the class by introducing students to the importance of thinking critically and not accepting as fact information that may be perceived as “common sense.” On the first day of class (before students read Chapter 1), provide the students with [Handout 1-1](#) and ask them to answer each of the true-false statements. Once they have completed this task individually, divide them into groups of two to three students. Instruct students to come to an agreement on whether the statement is true or false. There may be disagreements between group members; this is actually beneficial. Once each
group has reached a consensus, read the statement and ask students to indicate whether they believe the answer was true or false. Go through each statement—one at a time. The majority of students will answer true to each statement, even though all of the answers are false. Ask students why they thought the statement was true. Many will provide anecdotal evidence to support their answers. If this occurs, ask students if we should rely on one person’s experiences to believe in a phenomenon. Through this short exercise, students will hopefully start to see that psychology is more than just common sense and that anecdotal evidence has limited value.

15-Minute In-Class Activity: You’re Not a Scientist!
As most General Psychology course instructors can tell you, when students are asked if they think psychology is a science, the vast majority say no. This may be, at least in part, due to students viewing psychologists as primarily mental health professionals. Before proceeding, ask your students whether or not they see psychology as a science. Then, help them generate ideas about what defines a science and the scientific method. They may need some assistance identifying the key concepts, which should include a brief overview of how a scientist would generate a hypothesis, devise a way to test his or her hypothesis with the intentional manipulation of variables, evaluate the data with the use of statistical methods, and then either discard, revise, or accept the hypothesis depending on the nature of the results. Show students the LaunchPad video clip titled “Creating False Memories: A Laboratory Study.” Then, ask students if they can identify whether any of the elements of the scientific method can be observed or inferred from the study. Can they identify a potential hypothesis that is being investigated? Did they observe a methodical approach to testing this hypothesis? It is often helpful to ask students to revisit the question of whether or not psychology is a science, following this discussion, to see if any of their opinions have shifted. Ask students to consider this question throughout the semester, as they see more examples of how psychologists use the scientific method and how the field encompasses many more professional activities than therapy.

The Goals of Psychology

We know that psychology is the scientific study of behavior and mental processes, but what are the goals that this study seeks to accomplish? The first goal is simple: to describe and report what is observed and to use this to plan for future research. The second goal is to organize and understand these observations in an attempt to develop an explanation for the findings. Goal three is to predict behaviors or outcomes, followed by the fourth goal, which is using these findings to shape, modify, and control behavior.

Just-in-Time Activity: Name That Goal
We often find ourselves in situations where we are likely to ask questions about everyday types of behaviors that relate to the four main goals of psychology:
description, explanation, prediction, and control. For example, when interacting with a boyfriend, girlfriend, roommate, etc., we may sometimes misunderstand some of their behaviors (e.g., spending too much time watching sports, talking on the phone, or being on the computer). At a very basic level, the first question we often ask ourselves about behavior that we do not fully understand is “What are they doing?”

This question requires us to describe the behavior of interest, but our curiosity usually does not stop there. Our next question is usually “Why are they doing that?” This is our attempt to explain why someone would engage in such a behavior (e.g., Why would somebody browse the Internet for 5 hours straight?). Once we have an idea about why the person is behaving that way, we may begin to make predictions about ways to modify that person’s behavior (e.g., I bet if I ignore the complaining, it will stop.). Following the predictions, and based on modifications we make in our environment, we may find ways to then control an individual’s behavior in order to benefit those involved.

Have your students name and describe various ways in which their own behaviors align with the four goals of psychology.

LaunchPad Resource Suggestions
Consider assigning the following publisher-provided resources to your students when teaching this section.

- **Student Video Activity: The History of Psychology** (LO 1)
- **Concept Practice: Psychology’s Subfields** (LO 1)

ROOTS, SCHOOLS, AND PERSPECTIVES OF PSYCHOLOGY

Philosophy and Psychology

Psychology’s roots grow from diverse areas, one of which is philosophy. From the Greek philosopher Plato and his student Aristotle came one of the central themes in the field—that of nature versus nurture. Plato posited that humans are born with some innate knowledge, and Aristotle argued that knowledge is a result of our experiences. Later, French philosopher René Descartes discounted Aristotle’s ideas and proposed the view of dualism, or the idea that the mind and body are two separate entities.

In 1850, German physicist Gustav Theodor Fechner connected mind and body by reasoning that in studying our physical ability to sense stimuli, we are in fact experimenting on the mind. With this, he laid the foundation for physiological psychology and the groundwork for later research on sensation and perception.
Discussion Topic: Nature vs. Nurture
The textbook introduces the debate between the role of nature (i.e., the influence of genetics and the presence of certain innate qualities) and nurture (i.e., the importance of experience on knowledge acquisition). Studies of twins reared apart provide a fascinating introduction to the complex interplay between nature and nurture. Ask your students if they feel nature or nurture more strongly influences our preferences, personality makeup, intelligence, etc. The students may be fairly divided in their opinions, which can generate thought-provoking discussion. Provide students with a brief overview of the twin research by Thomas Bouchard of the University of Minnesota. He studied identical twins separated at or shortly after birth and then reared apart, often with no knowledge that their twin even existed. Because the twins were all identical twins, they share the same genetics, meaning that any differences in the behaviors under investigation are more attributable to environment (nurture) rather than genetics (nature). Bouchard located these separated twins as adults, and found remarkable similarities in certain areas, particularly with regard to personality and personal preferences. For a detailed description of the “Jim twins” and their amazing similarities, visit the Minnesota Center for Twin and Family Research at https://mctfr.psych.umn.edu/research/UM%20research.html.

After sharing details about the study and the “Jim twins,” ask your students how such findings fit with the nature versus nurture controversy, and if their opinions have shifted in the course of this discussion. Some students may take this information as evidence that nature is of paramount importance in determining our personality makeup. However subsequent meta-analyses of the twin studies completed to date, indicate that nature and nurture play their parts fairly equally in the development of a variety of behaviors and traits. This discussion can provide students with an introduction to the idea that even in the face of a particularly compelling piece of evidence, the body of research must be weighed before forming conclusions about psychological research.

Psychology Is Born
Philosophers and physicists may have laid the foundation for psychology, but the discipline did not really begin until Wilhelm Wundt, the “father of psychology,” founded the first psychology lab in 1879. His main objective was to measure psychological processes through introspection, which is the examination of one’s own conscious activities. Wundt’s students then furthered the field by opening additional labs. Edward Titchener developed structuralism, an early school that used introspection to determine the structure and most basic elements of the mind, whereas William James, inspired by Charles Darwin, developed the school of functionalism, which focused on the function of thought processes, feelings, and behaviors and how they help us adapt to the environment. Though early psychology was a male-dominated field, women played their
part thanks to early trailblazers such as Mary Whiton Calkins, Margaret Floy Washburn, and Mamie Phipps Clark.

**Psychology’s Perspectives**

Many early schools of psychology contributed to the vast field that it is today. One of the most well-known is the psychoanalytic perspective started by Sigmund Freud, which focused on the conflict between one’s inner desires and the expectations of society. When Russian scientist Ivan Pavlov was studying canine digestion, he also began research into learning, specifically **classical conditioning**.

Building on Pavlov’s research, John B. Watson established **behaviorism**, which viewed psychology as the scientific study of observable behaviors. In this school, B. F. Skinner studied the relationship between behaviors and their consequences, focusing on **operant conditioning**. Carl Rogers and Abraham Maslow took another view, founding **humanistic psychology**, which suggested that human nature is by and large positive, and the human direction is toward growth.

Based on Darwin’s theory of natural selection, the process through which inherited traits either increase in frequency because they are adaptive or decrease because they are maladaptive, **evolutionary psychology** examines a similar process for human traits and behaviors. **Biological psychology** also examines underlying physiological factors to explain mental processes. The **sociocultural perspective** examines the influences of culture on behavior.

The **biopsychosocial approach** suggests that all of these factors interact to explain behavior. When considering these diverse approaches, remember that human behavior is complex and needs more than one avenue to explain all of its many facets.

### 30-Minute In-Class Activity: Psychology Taboo

Michelle Merwin (2003) describes a fun way for students to actively review material for upcoming exams using a modified version of the popular board game Taboo©. In the game Taboo©, the goal is for a person to get teammates to name the term on the card (e.g., place, person, action, etc.) without using the term’s name and five additional terms that are forbidden or “taboo” while describing the item.

In the classroom exercise, students are given a number of psychology terms in advance—in this case, it is recommended that the various psychological perspectives and individuals discussed in Infographic 1.1 and the preceding pages are used—and told to identify five “forbidden words” that students will not be allowed to use when describing the term to their teammates. Alternatively, as the instructor, you could identify five taboo words for each term.
For example, if using the term/name “Wilhelm Wundt,” students are not allowed to use the following five terms: introspection, structuralism, laboratory, Leipzig (Germany), or father of psychology. By forbidding these common terms, students must draw from their previous knowledge to identify relevant information that could aid their teammates in identifying the correct term at the top of the card. You can then select the most common or five best “taboo” words and make a set of cards for each of the terms being used. The class is divided into teams, with each team earning a point when they correctly identify the term. An opposing team member can look at the card to ensure that the student does not use any of the taboo words when describing the term. The team with the most points at the end of the session wins.

This activity requires some advanced planning and can be used throughout the semester to encourage students to actively participate in the learning process. This is also a great ice breaker early in the semester, when students may be a little apprehensive about participating in class. For additional details on the game, see the original article by Merwin (2003).


**LaunchPad Resource Suggestions**
Consider assigning the following publisher-provided resources to your students when teaching this section.

- *PsychSim 5 Tutorial and Quiz: Psychology’s Timeline* (LO 3)
- *Infographic 1.1: Psychology’s Roots* (LO 3 and 4)
- *Concept Practice: Psychology’s Current Perspectives* (LO 4)

**SCIENCE AND PSYCHOLOGY**

While examining human behavior, many explanations may appear to make sense when there is no evidence to back them up—such as seeing significance in the number 33 in the story of the Chilean miners. This approach to explaining and predicting behavior that appears to be psychology but has no empirical or objective evidence to back it up is known as pseudopsychology. It may sometimes be difficult to tell the difference between real psychology and pseudopsychology, but a telltale feature of any pseudoscience is the use of explanations so broad and vague that they cannot easily be refuted.
**30-Minute In-Class Activity: It’s in the Stars**

Ask a student what his or her “sign” is and he or she will likely be able to tell you. For those individuals who are firm believers in astrology and their horoscopes, they truly believe that their personalities and future events are influenced by the location of the moon, sun, and other celestial bodies. But is astrology a true science or a pseudoscience? Ask your students if they believe in astrology and, specifically, if their personality types are associated with their zodiac sign. If astrology were a true science, then we should be able to accurately select our personality profiles from a list that is paired with the corresponding zodiac sign—even when we are “blind” to the correct label.

Give your students **Handout 1-2** (or display it on a projector), which describes the personalities associated with the various zodiac signs. Then, ask them to select the letter that they believe best describes them. Once they have made their choices, show them **Handout 1-3** and ask how many of them accurately selected their description based on their zodiac sign. About 8% of the class should have selected the correct choice—your students should be at or below this value. Proceed to discuss why results like these demonstrate that astrology is a pseudoscience and not a science.

For additional activities related to why people may believe in pseudosciences such as astrology, Michael Birnbaum at California State University, Fullerton has a helpful [Web page](http://example.com) that demonstrates the Forer effect (Barnum effect) using an online personality test. The Barnum effect is when individuals indicate that statements about their personalities are highly accurate, even when the statements are intentionally vague (or, in this example, given to every student in the class).


**Critical Thinking**

One important element that is missing from pseudopsychology is the use of **critical thinking**, the process of weighing different pieces of evidence, synthesizing them, and determining the contributions of each. True psychology is driven by critical thinking. Critical thinking requires one to go beyond definitions and verification of facts to examine the underlying concepts and applications. Critical thinking is an important life skill, no matter what your place or profession is.

**15-Minute In-Class Activity: The Amazing Mr. Hans?**

Show your students the video of Clever Hans, and ask them how a horse could know the answer to a math problem. (This video can be found on YouTube. Several different videos are available on YouTube, but the clip titled Health 335-
21 is a good overview of this case.) Then, ask the class how many of them believe that horses are capable of acquiring math skills.

Proceed to tell them the story of Clever Hans. Clever Hans was a horse owned by an individual named Wilhelm von Osten in Germany during the early 1900s. The owner of Hans believed that horses (and other animals) were intelligent creatures capable of acquiring more complex skills—such as mathematics—if people actually took the time to teach them. To test his theory, von Osten attempted to teach Hans various types of math skills during the course of a year. By the end of his training, von Osten was pleased to see that he was, in fact, correct; Hans had learned math!

Revisit your earlier question, and ask the class again whether horses are capable of learning math skills or if there is another explanation for these results. If your students think critically, they will likely suggest that perhaps the trainer was “feeding” answers to Hans. This is a fair assumption; however, the trainer would actually remove himself from the horse’s line of sight, so he could not have given Hans the answers. In fact, von Osten encouraged everyone in attendance to ask Hans different questions—and the majority of the time, Hans would answer them correctly!

It was not until a psychologist named Oscar Pfungst visited Hans that it was determined how a horse could answer such complex math problems. What Pfungst noticed was that when audience members (and the trainer alike) were interested in something, they leaned slightly forward. This movement had become a signal to Hans to start “pawing” the ground. Once Hans had reached the proper number of “paws,” the audience would lean back in amazement! This subtle backward movement had become a cue for Hans to stop tapping the ground. When Pfungst put blinders over the horse’s eyes, he was no longer able to answer the questions correctly. This clearly demonstrates the value of skepticism and critical thinking.

Returning to the opening video, ask your students again how the horse knows the correct answer. In this example, it is not the audience that is helping the horse, it is the trainer. If no one detects it, replay the video and ask the class to watch the trainer’s feet. Once the horse gets to the correct number, the trainer moves his foot slightly forward, signaling the horse to stop.

This activity can also be integrated into a class discussion of facts, theories, and hypotheses.
THE SCIENTIFIC METHOD

Critical thinking is also crucial in the **scientific method**, the process scientists use to conduct research, which also includes a continuing cycle of exploration and systematic observation. The goal of the scientific method is to gather **empirical evidence from experiments**, which are controlled procedures involving careful examination through the use of scientific observation and/or manipulation of variables.

The scientific method follows five steps in the pursuit of evidence. The first is to simply come up with a question, typically when a researcher notices something interesting in the environment. Once a researcher knows what question he or she wants to answer, the second step is to formulate a **hypothesis**, a statement that can be used to test a prediction. The data gathered will either support or refute this statement.

While developing a hypothesis, it is important for researchers to look for information that may support the phenomenon they are studying, including looking for **theories** on the subject, which synthesize observations in order to explain phenomena and guide predictions. It is important to remember that theories are not merely guesses; they are well-established principles based on sound scientific evidence.

Once a researcher has a hypothesis to test, the third step of designing a study and collecting data begins. To do this, one must establish **operational definitions** that specify the precise manner in which a variable of interest is defined and measured. The researcher then gathers data while controlling for errors.

The fourth step is to analyze the data collected in an organized and meaningful way, using statistical methods. After analysis, the researcher must ask questions to test the hypothesis. Did the results support the hypothesis? Were the predictions met? Analysis may lead the researcher to form a new hypothesis and design a new study on the same subject or to expand the research based upon the findings. This is an important part of the process, allowing us to think critically about results.

Finally, a researcher must publish the findings to share them with others who may build upon the work. This usually takes the form of writing a scientific article to be published in a scholarly, peer-reviewed journal. Peer-review is meticulous and incredibly important in ensuring that data is genuine. Publishing is also a crucial step in the scientific method because it allows other scientists to **replicate** or repeat an experiment with a new sample and/or other changes to provide further support for the findings of the original study.

**Discussion Topic: The Misuse of Scientific Terminology**

Tia Ghose of *Scientific American* describes seven terms pertaining to the scientific method that the general public frequently misuses (including “theory,” “hypothesis,” and “nature vs. nurture”). This article can be located on the
Scientific American Web site (http://www.scientificamerican.com) by searching for the April 2, 2013 article titled, “‘Just a Theory’: Seven Misused Science Words.” Before discussing these terms in class, ask your students to define what the terms mean.

30-Minute In-Class Activity: Hypothesis Development
Ask your students to define the word hypothesis, and an overwhelming majority will say “an educated guess.” To help students understand that hypotheses are more complex than just educated guesses, expand your lecture on hypotheses to include a discussion on the factors that contribute to the development of a strong hypothesis (e.g., testable, falsifiable, etc.) and the various types of hypotheses (i.e., nondirectional, directional, null, etc.).

Interest in a specific topic usually begins the research process. Following an examination of existing research, we may find that certain questions have yet to be asked or studied. Once a research question has been identified, a hypothesis is developed. When writing a hypothesis, it is important to make sure that the hypothesis is testable because hypotheses that are not testable are of little use. For example, I may have a hypothesis that children who are kept in complete darkness for the first two years of their lives will develop increased auditory skills. While testable in principle, for obvious ethical reasons, this is a hypothesis could never be tested.

Hypotheses should also be falsifiable. Falsifiable means that based on an observation or data that are collected, the hypothesis could be proven false. For example, saying that Adam Lanza, the individual who killed 26 people at Sandy Hook Elementary School, did so because he had a psychological disorder is not falsifiable.

Various types of hypotheses are used. Some hypotheses will be nondirectional. Nondirectional hypotheses simply predict a relationship between two variables will exist (e.g., the number of hours I spend studying will influence my exam score). Directional hypotheses are more specific because they indicate not only that a relationship between the variables exists, but a specific direction of that relationship exists (e.g., the more hours that I study, the higher the grade I will get on my exam).

When assessing our hypotheses, both directional and nondirectional hypotheses are often referred to as an alternative hypothesis because they both indicate that an expected relationship, or effect, exists between the variables being measured. The hypothesis that there is no observed effect of these variables is called the null hypothesis. If we obtain a statistically significant result, then we can reject the null hypothesis.
To provide students with the opportunity to practice writing hypotheses, they can complete Handout 1-4.

**Discussion Topic: Operational Definitions**

To give students practice in generating operational definitions, as well as an understanding of the complexity this can involve, an exercise by Steven Specht, called “Bucket o’ constructs” can be used. In this exercise, students work in pairs or small groups. Before this discussion, create slips of paper and write one psychological construct, such as “helpful,” “nice,” “intelligent,” “shy,” or “angry” on each slip. Fold the slips and place them in a bucket or large cup. Each group begins by selecting one slip of paper from the bucket. They must then generate an operational definition of their construct that meets the following criteria: 1) it is behavioral (therefore, self-report or physiological measures are not acceptable), 2) it is objectively measurable, and 3) it is quantifiable. For example, if students selected the construct “helpful,” they might define this term for a hypothetical research study as “the number of times a child picks up a book dropped by the researcher over the course of 20 minutes.” Once the students have generated their definitions, have them read the definitions to the class to see if the other students are able to identify what construct they are interested in measuring. The other students will likely answer with related, but incorrect constructs, such as “politeness” instead of “helpfulness.” This can be useful to explain the need to be as precise as possible in operationally defining a variable, to carefully consider what it is they seek to measure, and what they do not wish to measure.


**Discussion Topic: The Scientific Method—Clever Hans Revisited**

After discussing information related to the scientific method (see Infographic 1.3), ask your students to revisit the story of Clever Hans. Have your students describe how Wilhelm von Osten used the scientific method to assess his theory about animal intelligence. How did Oscar Pfungst use the same scientific method to contradict von Osten’s claims?

**Discussion Topic: The Many Labs Replication Project**

As discussed in the text, one of the key hallmarks of the scientific process is the replication of studies. Unfortunately, the results reported in scientific journals are not always accurate, and in the case of Andrew Wakefield’s research on vaccination and autism rates, fraudulent. This is not an isolated incident, because other reports of fraudulent data in the social sciences have been documented.
To address some of the scientific community’s concern about the replicability of psychological findings, the Many Labs Replication Project was created. The Many Labs team was composed of a set of international researchers who attempted to replicate some classic studies within the field of psychology as well as some more modern studies. The results from their studies showed that they were able to replicate 10 out of the 13 studies they conducted—with two studies not being able to reproduce the results from previously published experiments. The group’s findings are certainly encouraging and a step in the right direction.

Ask your students why projects such as the Many Labs Replication Project are so valuable to the field of psychology and why this type of initiative has not occurred more frequently.


LaunchPad Resource Suggestions
Consider assigning the following publisher-provided resources to your students when teaching this section.

- Infographic 1.2: How to Read a Scientific Article (LO 6)
- Infographic 1.3: The Scientific Method (LO 6)
- Labs: Empirical Reasoning (LO 6)

RESEARCH DESIGNS

Research Basics

In order to collect the most relevant data, a researcher must choose the correct research design. There are two major categories of research design—descriptive and experimental—but certain concepts pertain to both. Psychology studies nearly always include variables, which are measurable characteristics that can vary over time or across people. Examples from psychology might be personality characteristics, cognitive characteristics, gender, or socioeconomic status. After choosing the variables for a study, researchers must then set the operational definitions that offer their descriptions and means of measurement.

When studying people, as in most psychological research, scientists must decide whom to include in their studies. This choice depends on the population (i.e., all members of the identified group) to be examined. If this group is large, a subset, or sample, must be chosen to be included.
One method of choosing a sample is to use a procedure that ensures that all members of the population have an equal chance of being selected, creating a **random sample**. It is also important to create a **representative sample** by selecting those who have characteristics that closely reflect those of the population of interest. Choosing a representative sample allows us to apply the findings to the larger population.

It is also vital that those chosen to participate in the research are comfortable with what might be involved. To ensure that this is the case, the researcher must obtain **informed consent**, or acknowledgement, from the participants to indicate that they understand what their participation entails. It is also important that after a study has been completed, another step of disclosure takes place in the form of a **debriefing**, in which the researcher shares information with the participants, including the purpose of the study and any deception used in it. To be sure that any study involving human beings or animals is ethical, it must first pass an **Institutional Review Board (IRB)**, a committee that reviews research proposals to protect the rights and welfare of all participants.

**30-Minute In-Class Activity: A Sweet Activity About Sampling**

Randolph Smith provides the class with a sweet activity that uses M&M® candies to demonstrate sampling principles. To begin this demonstration, pass out a small “fun-size” bag of M&Ms® to each student (for larger classes you may choose to pass out one bag per 2–4 students). After discussing the differences between samples and populations, ask your students if they think they can accurately predict the total distribution of colors in each bag of M&Ms®.

Display the data sheet in **Handout 1-5** and ask each student (or group of students if the class is larger) to write down the observed frequency of each color in the sample. Once they have done so, ask them to form a hypothesis of the percentage of each color that should be present in other individual’s packages by determining the predicted percentage (divide the observed frequency by the total number of M&Ms® in the pack). Once students have completed the handout, provide them with the actual color distribution for plain M&Ms®—24% blue, 20% orange, 16% green, 14% yellow, and 13% for both brown and red (as reported by Mars, Inc.).

Ask students to present their findings. Their results will likely vary greatly from the true population. However, if we ask students to begin combining their data (e.g., add all of the scores together for students in the first row, etc.), we will see that the new predicted percentage will more accurately approximate the distribution of colors in the population. Ask students to predict what would happen if we were to add up all of the scores for the entire class. Emphasize that the larger the sample size, the more likely we are to have a good representation of the selected population. You may also choose to include a discussion of measures of central tendency and variation.

**Video: The Importance of Random Sampling: Landon in a Landslide (1:03)**
The *Literary Digest* made a fatal error (it went out of business several months later) when it predicted the outcome of the 1936 presidential election—it did not use a random sample. Show your students this brief YouTube video to see what led to their grossly inaccurate prediction. (The video can be located by searching YouTube with the terms “Landon sampling bias video” and then selecting the clip titled “1936 Election: Biased Sampling Procedure.”) You may also use this example when talking about representative samples later in the chapter. Ask your students to complete an online search for additional historical examples of problems with sampling bias.

**20-Minute Discussion Topic/Video: Informed Consent and Deception in Research**

*Note:* This discussion is based on Jane Elliott’s classic blue eyes versus brown eyes study, which can be viewed in its entirety on PBS. To locate the study, go to http://www.pbs.com and search the site with the phrase “a class divided.” You will then be able to access the full Frontline program, and I recommend showing the clips titled “The Daring Lesson” and “Day Two” from this program.

Numerous examples exist throughout history of studies that violated the basic rights of the participants and could never be performed today for ethical reasons. Jane Elliott, an Iowa teacher, devised an experiment to teach her third-grade students about the effect of racism, in the wake of the Martin Luther King Jr. assassination. Share the video footage of this study with students; however, it is advisable to inform students ahead of time that several racial slurs are used in the video. After viewing the footage, ask your students if they believe that adequate informed consent was obtained. Although Ms. Elliott did explain that the class would be experimenting with this idea, and the students enthusiastically agreed, did these young children adequately understand what the study and their participation would entail? Ask your students what other ethical problems they observed in the study (e.g., clear use of deception, no attempt to minimize distress to the participants, no interruption of the study even when it was clearly distressing to the children, no apparent attempt to obtain informed consent from the parents of the children, etc.).

To expand the discussion about research ethics further, discuss with your students the infamous Tuskegee Syphilis Experiment. This was a clinical study
intended to examine the progression of syphilis in untreated individuals. Begun in 1932, African American men in the rural Alabama town of Tuskegee were made to believe that they were receiving free health care from the United States Public Health Service. Of the 600 participants in the study, 399 of them had contracted syphilis previously but were not informed of this medical condition. Although by the mid-1940s the drug penicillin had been shown to be an effective form of treatment, study participants were not provided with the drug.

The study continued until 1972, when a leak to the media caused the termination of the experiment. A number of discussions on the ethics of human research followed, with the Belmont Report being published in 1979, which summarized ethical principles and guidelines for research on human subjects. Among those guidelines is obtaining informed consent from participants. The Tuskegee study also directly led to the National Research Act, which required the establishment of Institutional Review Boards (IRBs) at institutions receiving federal aid.

An even more disturbing example of unethical research practices occurred from 1946–1948, when U.S. researchers not only studied a Guatemalan prison population without their consent, but also deliberately infected them with syphilis for the study’s purpose. To test the effectiveness of several medications, including penicillin, researchers intentionally infected more than 1,300 individuals with syphilis and other sexually transmitted diseases. The majority of the study participants were prisoners, but the study also tested other vulnerable populations, including sex workers, children in orphanages, and the mentally ill. This study remained an unknown event until discovered by a historian in 2003.

**LaunchPad Resource Suggestion**
Consider assigning the following publisher-provided resource to your students when teaching this section.

- *Concept Practice: Steps in the Scientific Method* (LO 6)

**DESCRIPTIVE RESEARCH**

Descriptive research is used to describe and explore behaviors, although the findings cannot definitively state cause-and-effect relationships. It is used for studying new or unexplored topics for which researchers may not yet have expectations about the outcomes.

Naturalistic observation studies participants in their natural environments through systematic observation. Natural environment simply means the environment in which the person can be found, including his or her office, home, school, etc. In this type of
study, researchers do not disturb the participants and try to be as unobtrusive as possible, so that the behaviors of the participants do not change from their normal routines. As with all research, naturalistic observation centers on variables that must be described by operational definitions.

This type of study allows research to observe participants in their normal environments without the intrusions of the laboratory setting, but problems still occur with this setup. A variety of unwanted variables exist in the environment, and the environment is difficult to control, making replication challenging. Observer bias, in which errors are introduced into the recording of observations due to the researcher’s value system, expectations, or attitudes, is also a problem. This bias can be minimized with the use of multiple observers, whose recordings can be compared.

**Student Project: Do Blondes Really Have More Fun?**

*Note*: It may be beneficial to assign this project after discussing independent, dependent, and extraneous variables.

Everyone has heard the old saying that “blondes have more fun,” but is it true? One way to gain information about this question would be to conduct a naturalistic observation. Create research teams composed of three to four students, and ask them to identify the steps that need to be completed in order to successfully conduct a naturalistic observation. Ideally, one of the first steps that they will identify is the need to develop a hypothesis, followed by writing operational definitions for their different variables. For instance, how would you measure “fun” (e.g., smiles, laughs, etc.)? What constitutes blonde hair (e.g., naturally blonde, dyed, blonde highlights, etc.)? The students should also identify the locations to be used in the study. Do blondes have more fun in every setting? If so, then we could conduct our naturalistic observation in any location. How will we try to control for observer bias and other extraneous variables? Once they have answered these types of questions, ask the groups to go out on campus and conduct their naturalistic observations, and report their findings during the following class period.

**Student Project: Test Your Observation Skills**

This project uses the LaunchPad exercise titled Labs: Naturalistic Observation. In the exercise, students will watch a video of children playing on a playground, and then code for the occurrences of both aggressive and pro-social behavior. The activity then assists students with calculating the degree of inter-rater reliability by comparing their coding data with the data of a normative panel of judges. After discussing the basics of naturalistic observation, assign your students this activity for homework. Ask them to jot down their results and bring these to the next class. Did your students find that they had high or low inter-rater reliability in completing this exercise? Did they have difficulty determining whether a behavior constituted an aggressive or pro-social act, or in determining whether
or not a sequence of behaviors constituted a single act or multiple acts of aggression? These types of difficulties are useful for examining the importance of operational definitions, because the degree of inter-rater reliability will be lessened if the observers aren’t clear or don’t agree on what is being measured. Ask your students if they can see how their own expectations could potentially influence their coding data. For example, if they believe that boys are more aggressive, might they be more likely to miss an instance of a girl behaving aggressively?

**Case Study**

Another type of descriptive research is the **case study**, which is a close examination of an individual or small group. This type of research involves collecting as much data as possible on the person or group being studied using multiple means. These may include interviews with the subject and other people associated with the person as well as questionnaires about medical history, career, and mental health. Case studies are important for studying rare events, circumstances, or conditions.

Case studies provide clues to further develop theories, but cannot support or refute a hypothesis. They do not allow for comparison of conditions and do not lend themselves to generalization to a larger population.

**Survey Method**

The **survey method** uses questionnaires or interviews to gather data. It can be used to gather data quickly from a large number of participants with methods that range from face-to-face interviews, telephone interviews, e-mail surveys, or Web site surveys. Surveys can be used on their own or along with other research methods, and may complement other data such as demographics or psychological assessments.

Although it may be fast and gather large amounts of data, the survey method also has its drawbacks. Wording of questions may lead to bias in the answers, and participants are not always honest in answering. Surveys also tend to give a superficial view of people’s beliefs or attitudes, because it encourages less in-depth explanations. The representativeness of the sample used in a survey may also be problematic because not everyone chosen will respond, and those who do respond may not reflect the target population.

*Video: Leading Questions and Skewed Surveys (2:17)*

To demonstrate to students the role that leading questions can play in how individuals respond to surveys or questionnaires, show them a video clip from the television show *Yes, Prime Minister*, which aired from 1986 to 1988 in the United Kingdom. (To locate this clip, search YouTube with the terms “leading questions yes prime minister” and choose the clip that is 2:17 in duration.) In this
clip, Sir Humphrey Appleby demonstrates how the wording and sequence of questions can alter the way people respond to the questions—in this case, it is regarding National Service (military conscription).

Additional discussion about leading questions can also occur when reviewing Elizabeth Loftus’s research on false memories (see Chapter 6).

**Correlational Method**

The *correlational method* of descriptive research examines the relationships among variables and is used to assist researchers in making predictions. When collecting data on multiple variables, it is useful to see if they are related. A *correlation* is the relationship between variables. In a positive correlation, as one variable increases, the other does too; in a negative correlation, as one variable increases, the other decreases.

Correlations indicate whether or not variables are related, if they are negative or positive correlations, and the strength of the relationship. The *correlation coefficient* is the statistical measure ($r$) that indicates the strength of the relationship between two variables. The correlation coefficient ranges from −1.00 to +1.00, with positive numbers denoting a positive relationship and negative numbers a negative relationship. The closer the value is to .00, the weaker the relationship. Correlation coefficients are displayed as *scatterplots*.

It is important to remember that even if a strong relationship exists between variables, this does not prove a causal link. While there may appear to be a cause-and-effect relationship, the possibility exists that a *third variable* (i.e., an unaccounted-for characteristic of the participants or the environment) may explain the changes in the variables being studied. Correlational research is often done when other types of experiments are unethical or impossible.

**Discussion Topic and Video: Correlation Does Not Equal Causation**

This exercise uses the LaunchPad video activity titled Correlation and Causation. Many introductory psychology students have difficulty understanding that correlation does not equal causation, and they are tempted to use correlational data to make a causal inference. Expand your discussion of this important principle of correlational research by showing this video during class, because it gives several examples of the differences between a correlation and a causal relationship. After viewing the video, it may be useful and interesting to give additional examples of correlations where either a third variable is operating or the correlation is more coincidental. For example, a positive correlation exists between ice cream consumption and shark attacks. As another example, there exists a positive correlation between the number of churches in a city and the crime rate of that city. Ask your students if they believe that ice cream consumption causes shark attacks, or that more churches would lead to more
crime. Can they identify a third variable that may be operating in these two examples (e.g., higher temperatures, higher population rates)?

Explain to students how commonly the results of correlational research are erroneously reported by the media as evidence of causal relationships. Ask your students to complete a brief homework exercise, so they can observe the extent of this misuse of correlational data. Have students complete an Internet search for an example of an article on a health-related topic, where a causal link is asserted, despite the study being correlational in nature. Ask your students to share their findings at the next class. They will likely have found numerous examples of these studies! This exercise helps to emphasize the point that causal relationships cannot be inferred from correlational data, while simultaneously providing introductory training on how to be wise consumers of research.

**Video: Pop Music and Misery—The Third Variable (0:51)**
Show students a video clip from the movie *High Fidelity*, in which John Cusack poses the question, “Did I listen to pop music because I was miserable, or was I miserable because I listened to pop music?” (To locate the video, search YouTube with the terms “high fidelity music and misery,” and choose the clip that is 51 seconds in duration.) According to Cusack’s character, these two variables seem to be related. Ask your students what kind of correlation this would be (positive or negative). Remind your students that when examining correlations, even if you have a very strong correlation coefficient, it cannot determine a causal relationship. So if pop music was correlated with feeling miserable, what other unaccounted-for or third variables could be affecting the variables of interest? Ask your students how they would design an experiment to test these variables.

Adapted from an exercise posted by Eric Kim on Worth Publishers’ Psychology Faculty Lounge.

LaunchPad Resource Suggestions
Consider assigning the following publisher-provided resources to your students when teaching this section.

- **Infographic 1.4: The Correlation Coefficient** (LO 8)
- **Concept Practice: Positive and Negative Correlation** (LO 8)
- **Video Activity: Research Methods** (LO 6 and 8)
- **PsychSim 5: Correlation** (LO 8)

**EXPERIMENTAL RESEARCH**

Experimental Method
Whereas all of the research methods discussed thus far have been able to provide only clues and no causes, the experimental method tells us about cause and effect because it manipulates a variable to uncover that relationship. To isolate the cause of an outcome, participants are assigned to two or more groups and, aside from the manipulation done by the experimenter, the groups are equal. If the groups differ on a measure of interest at the end of experimentation, we can confidently say that the manipulation caused the change.

**Random assignment** is used when assigning participants to groups in order to ensure that every person chosen has an equal chance of being in either the experimental or the control group. If the groups are not equal regarding some variable, the results can be affected, so it is important to use random assignment to prevent this. Once groups are assigned, the researcher must decide which is the experimental group—the group that will be exposed to the treatment variable or manipulation by the researcher—and which is the control group—the group that will not be exposed to the treatment variable. The control group receives a placebo, an inert substance or fake treatment that has no benefit, but it is administered as if it does. This helps to hide from the participants whether or not they are receiving the treatment, a key element of the experimental method. The two groups of participants should be equal outside of the independent variable (IV), that is, the variable manipulated by the researcher to determine its effect on the dependent variable. The dependent variable (DV) is the characteristic or response that is measured to determine the effect of the manipulation.

When planning an experiment, researchers must take care to identify extraneous variables, that is, those variations in the environment or of the participants that could unintentionally influence the outcome of the study. Psychologists must carefully examine potential extraneous variables when designing studies. One such type of variable is a confounding variable, one which changes in sync with the independent variable, making it difficult to discern which one is causing the changes in the dependent variable. Researchers can eliminate the influences of extraneous variables in many ways, one of which is controlling a variable by either carefully assigning participants or eliminating the results from problem participants. Successfully controlling for all variables aside from the independent variable allows you to make a cause-and-effect statement.

When the participants are unaware of which group they are in, the study is single-blind. Even stronger is a double-blind study, in which neither the participants nor the experimenters know who is getting the treatment and who is getting the placebo. It can be challenging to keep researchers in the dark as to who is being treated, but clever assistants can pull it off. One reason for designing a double-blind study is that the expectations of participants can influence results. The placebo effect works through these expectations, suggesting that our beliefs can change our behavior and physical outcomes. Why is it helpful to keep the researcher out of “the know”? His or her
expectations can also influence the outcome of a study in a phenomenon known as experiment bias.

15-Minute In-Class Activity: Identifying IVs and DVs
Students often struggle with identifying the difference between independent and dependent variables. To help them with this, provide them with Handout 1-6, which asks them to name the independent and dependent variables from a variety of empirical questions. You may also choose to ask students to identify potential extraneous variables that could influence the results.

15-Minute In-Class Activity: Identifying Confounding Variables
Practicing the identification of extraneous variables is always beneficial. Handout 1-7 asks students to read sample research questions and identify potential confounding variables and ways to control for them. This handout can be used as a homework assignment or as part of a small-group activity. Possible answers include:

1. The time of the class is confounded with the independent variable (testing method). It is possible that the 8 a.m. students were more tired than students in the later course, and this led to the difference in the grades. It is also possible that the less frequent meetings (i.e., Tuesday/Thursday) influenced the results. One way to control for this confound would be to test the methods in classes that meet at the same time and for the same number of days. This may require multiple instructors or conducting the experiment over multiple semesters.

2. One potential confound is that two different therapists provided the treatment. It is possible that Dr. Shapiro is a more experienced and efficient therapist than Dr. Burkhart. To control for this, it may be beneficial to assess each therapist’s level of training and experience with the method.

3. The main confound is that the sequence of the bats was not alternated or replicated in additional testing. The player likely became more tired as the cumulative number of swings he took increased. It is not surprising then that the balls he hit earlier in the session traveled the farthest. To control for this confound, the researcher should conduct the study over an extended period of time (or use multiple players) and rotate the sequence in which the player swung each bat, so that each type of bat was used first, second, and third equally.

20-Minute In-Class Activity: Putting It All Together
Students should be divided into small groups for this activity. Provide the research question of whether physical exercise has any impact on college students’ academic performance, and ask each student group to design an experiment to test this. Each group should state the hypothesis, operational definitions for their variables, and an explanation of their study design. Their
explanation should include descriptions of their experimental and control groups, as well as the independent and dependent variables. Have each group share their proposed design with the class. Ask your students if they can identify any potential confounding variables in each of the study designs. How might they address these if they were to perform this research?

LaunchPad Resource Suggestions
Consider assigning the following publisher-provided resources to your students when teaching this section.

- Student Video Activity: Research Methods (LO 9)
- Infographic 1.5: The Experimental Method (LO 9)
- Concept Practice: The Language of Experiments (LO 9)

IMPORTANT ISSUES IN PSYCHOLOGY

Research Ethics

As in most professions, psychologists have agreed to follow certain guidelines to ensure ethical behavior, and professional organizations in the field provide written guidelines to ensure the ethical treatment of research participants, both human and animal. A key ethical issue in psychology is confidentiality. Researchers must safeguard their data and, because it may deal with deeply personal issues, therapists must keep client information from being shared. The important considerations of informed consent and debriefing were mentioned previously.

Online Activity: Protecting Human Research Participants
To provide students with additional information regarding the development of many of the important ethical guidelines that researchers must follow when conducting studies with human participants, have your students complete the National Institutes of Health Office of Extramural Research training on protecting human research participants. (This training can be accessed by visiting the Web site for the training program at the following address: https://phrp.nihtraining.com/users/login.php.) By the end of this free online training program, your students should be able to:

- Describe the history and importance of human subjects’ protections.
- Identify research activities that involve human subjects.
- Discover the risks a research project might pose to participants.
- Understand how to minimize the risks posed by a research project.
- Describe additional protections needed for vulnerable populations.
- Understand additional issues that should be considered for international research.
• Describe appropriate procedures for recruiting research participants and obtaining informed consent.
• Identify the different committees that monitor human subjects’ protections.
• Understand the importance of study design in the protection of research participants.

The entire training program should take students approximately 60 to 90 minutes to complete. At the end of each section, students can take a quiz about the information. After successfully completing the quizzes, students will receive a certificate that they can print out or e-mail to you.

LaunchPad Resource Suggestions
Consider assigning the following publisher-provided resources to your students when teaching this section.

• Student Video Activity: The Death of a Subject: Ethics of Mental Health Research (LO 10)
• Student Video Activity: Ethics in Human Research: Violating One’s Privacy? (LO 10)
BEST PRACTICES FOR TEACHING CHAPTER 1

When students are first learning to distinguish the difference between independent and dependent variables, they often become confused. Be sure to spend enough time covering the differences between these two variables, and provide students with numerous examples. One way of wording this difference that most students find helpful is that the dependent variable (what you are measuring) “depends” on the independent variable (what you are manipulating). Asking students to create their own examples of a study and describe the IVs and DVs is a great way to make sure they understand the distinction.

ADDITIONAL RESOURCES

- Office of Teaching Resources in Psychology – Society for the Teaching of Psychology
- Teaching of Psychology Idea Exchange - Research Methods in the Classroom
- Resources for Teaching Research Methods and Statistics in Psychology – TeachPsychScience.org
- Research Methods in the News
- Teaching Ethics to Undergraduate Psychology Students
- Classics in the History of Psychology
HANDOUT 1-1  PSYCHOMythology

Instructions: Read the following statements, and circle “T” if you believe the statement is true or “F” if you believe the statement is false.

1. T  F  “Blowing off steam” or expressing anger is good for you.

2. T  F  In love and friendship, more often than not, opposites attract.

3. T  F  Once you are married and have kids, your sex life goes down the tubes.

4. T  F  To change people’s behavior toward members of ethnic minority groups, we must first change their attitudes.

5. T  F  The high correlation between cigarette smoking and lung cancer proves that smoking causes lung cancer.

6. T  F  Listening to Mozart and other classical music will make an infant smarter.

7. T  F  When people reach approximately 40 years of age, they are likely to have a “midlife crisis.”

8. T  F  People with schizophrenia and other psychological disorders are dangerous.

9. T  F  Once you are born, your brain no longer generates new neurons.

10. T  F  Most older people live sad and solitary lives.
HANDOUT 1-2  IT'S IN THE STARS

Instructions: Read the following statements, and select the letter of the personality characteristics that best describe you.

A) sensitive, nurturing, compassionate, cautious, tactful, secretive, imaginative, shy

B) creative, broad-minded, independent, studious, versatile, idealistic, unconventional, sincere

C) intellectual, versatile, clever, curious, irritable, talkative, adventurous, changeable

D) secretive, forceful, romantic, intolerant, tactless, intense, insightful, loyal

E) idealistic, enthusiastic, arrogant, independent, daring, impatient, witty, quick-tempered

F) ambitious, hardworking, cautious, practical, calm, aloof, possessive, tenacious

G) warm, sensitive, artistic, undisciplined, emotional, compassionate, easygoing, adaptable

H) critical, analytical, precise, intelligent, practical, thorough, discontented, industrious

I) honest, impulsive, optimistic, nonchalant, outspoken, playful, restless, direct

J) loyal, patient, conservative, stubborn, stable, truthful, self-indulgent, sensitive

K) cooperative, impartial, friendly, popular, intellectual, tactful, self-indulgent, sensitive

L) extraverted, generous, authoritative, affectionate, extravagant, warmhearted, impulsive, optimistic
HANDOUT 1-3  IT’S IN THE STARS (KEY)

Instructions: Compare your answers from Handout 1-2 with the zodiac signs below.

B   Aquarius (Jan. 20–Feb. 18)
G   Pisces (Feb. 19–March 20)
E   Aries (March 21–April 19)
J   Taurus (April 20–May 20)
C   Gemini (May 21–June 21)
A   Cancer (June 22–July 22)
L   Leo (July 23–Aug. 22)
H   Virgo (Aug. 23–Sept. 22)
K   Libra (Sept. 23–Oct. 22)
D   Scorpio (Oct. 23–Nov. 21)
I   Sagittarius (Nov. 22–Dec. 21)
F   Capricorn (Dec. 22–Jan. 19)
HANDOUT 1-4  HYPOTHESIS DEVELOPMENT

Instructions: Write both a directional research hypothesis and a non-directional hypothesis for each of the research questions presented below. Make sure that your hypotheses follow the principles discussed in class (i.e., testable, falsifiable). For extra practice, write a null hypothesis for each question.

1) Does the amount of food eaten by a woman differ when she's on a date than if she's eating by herself?

2) What is the relationship between study habits and test anxiety?

3) How are stress and the consumption of junk foods related?

4) What role do multiple concussions over an extended period of time have on experiencing suicidal thoughts?

5) Does the teaching of job skills to prisoners affect their reincarceration rate?

6) Is there a relationship between the dates of academic exams and student-reported illnesses?
HYPOTHESIS DEVELOPMENT (continued)

7) Does prior exposure to an act of generosity affect the observer’s generosity?

8) What role do an individual’s religious beliefs have on drug usage?

9) Does listening to music while studying have an effect on academic performance?

10) Does caffeine consumption influence individuals’ performances on a working memory task?

11) Does the amount of time spent at day care have an effect on the type of attachment a child forms with his or her parents?

12) Will wearing Axe body spray make a guy more attractive to females?
**HANDOUT 1-5  A SWEET ACTIVITY ABOUT SAMPLING**

**Instructions:** Complete the following chart using the M&Ms® in your individual package. To determine the observed frequency, enter the number of M&Ms® of each color that was included in your package. To determine the predicted percentage, divide the observed frequency by the total number of M&Ms® in the package and multiply by 100.

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**HANDOUT 1-6  IDENTIFYING IVs AND DVs**

**Instructions:** Read these empirical questions, and identify the independent and dependent variables in each one.

1) Which is the best treatment method for individuals with autism: behavioral therapy, drug treatment, psychoanalysis, or no treatment (control condition)?

2) Does the number of people present in a specific location influence how likely they would be to help someone who needs assistance?

3) Does playing violent video games affect the level of aggressiveness in children?

4) Will eating breakfast improve a student’s academic performance?

5) Would individuals be more likely to remember information that they have read from an e-book or a hard copy of the text?

6) Which studying method—cramming for hours in one study session or spaced-out study sessions—leads to better performance on exams?

7) During which condition would you be most likely to purchase a new product (i.e., a product you have never tried before)—happy, scared, sad, excited, etc.?

8) Does the order of names on a ballot influence how you vote?

9) Would it be easier to potty-train your puppy using reinforcement or punishment?

10) Does providing candy to students who answer questions during class increase the number of students who participate in class?
HANDOUT 1-7  IDENTIFYING CONFOUNDING VARIABLES

Instructions: Read each research question. Identify potential confounding variables. State how you could control them.

1. Dr. Reese wants to know if it would be better to give students frequent short quizzes or a few long exams. To see which method produced higher final grades, she gave 15 quizzes to her Tuesday/Thursday 8 a.m. class and 4 long exams to her Monday/Wednesday/Friday 11 a.m. class throughout the semester. After reviewing the final grades, she determined that her 11 a.m. section performed the best; hence, she will be using 4 long exams in the future.

2. Dr. Shapiro and Dr. Burkhart are interested in testing the effectiveness of different types of therapies on individuals with substance abuse problems. Dr. Shapiro uses a cognitive–behavioral approach, whereas Dr. Burkhart uses a psychodynamic approach. The results showed that Dr. Shapiro’s patients responded better.

3. A researcher is hired to determine if a baseball bat made of titanium will result in the baseball being hit farther than a bat made of wood or aluminum. A player from the local college baseball team is asked to participate. The researcher gave the player 100 pitches to hit with each of the three kinds of bats. First, he was thrown 100 pitches to hit with the titanium bat. Then, he attempted to hit 100 pitches with the aluminum bat. Last, he used the wooden bat. The results showed that the ball traveled the farthest when the player used the titanium bat.