

Thinking Critically With Psychological Science

Chapter Preview

Psychology traces its roots back to Greek philosophers' reflections on human nature. Psychologists' initial focus on mental life was replaced in the 1920s by the study of observable behavior. As the science of behavior and mental processes, psychology has its origins in many disciplines and countries.

Psychology's most enduring issue concerns the relative contributions of biology and experience. Today, psychologists recognize that nurture works on what nature endows. The biopsychosocial approach incorporates biological, psychological, and social-cultural levels of analysis. Although different perspectives on human nature have their own purposes and questions, they are complementary and together provide a fuller understanding of mind and behavior.

Some psychologists conduct basic or applied research; others provide professional services, including assessing and treating troubled people. With its perspectives ranging from the biological to the social, and settings from the clinic to the laboratory, psychology has become a meeting place for many disciplines.

The scientific attitude reflects an eagerness to skeptically scrutinize competing ideas with an open-minded humility before nature. This attitude, coupled with scientific principles for sifting reality from illusion, prepares us to think critically. Three reliable phenomena—hindsight bias, judgmental overconfidence, and the tendency to perceive order in random events—illustrate the limits of everyday intuition and our need for scientific inquiry and critical thinking.

Psychologists construct theories that organize observations and imply testable hypotheses. In their research, they use case studies, naturalistic observation, and surveys to describe behavior; correlation to assess the relationship between variables; and experimentation to uncover cause-effect relationships.

The chapter briefly answers several questions that students commonly ask about psychology. These include concern over the simplification of reality in laboratory experiments, the generalizability of research in terms of culture and gender, the purpose of animal studies, the adequacy of research ethics, and the potential misuse of psychology's knowledge.

The chapter concludes with suggestions for using psychology to improve your ability to learn and remember. Mastering psychology requires active study. A survey-question-read-retrieve-review study method boosts students' learning and performance.

Chapter Guide

Introductory Exercise: Fact or Falsehood?

The Preface to these Lecture Guides includes a Fact or Falsehood questionnaire that covers the entire text, with one item from each chapter. If you have not already used it, you may want to do so now as part of your introduction to the discipline and the text as a whole. Alternatively, you may use Handout 1–1 (p. 8), the Fact or Falsehood exercise that relates only to the material in this chapter.

The correct answers to Handout 1–1 are as follows: 1. F 2. T 3. F 4. T 5. F 6. F 7. T 8. F 9. F 10. F

What Is Psychology?

- ▶ Lectures: Aristotle’s Psychology (p. 2*); Psychology’s First Experiment (p. 2); History of Psychology (p. 3); William James—Founding Father of American Psychology (p. 4)
- ▶ Exercise: Eminent Psychologists (p. 5)
- ▶ PsychSim 5: Psychology’s Timeline (p. 5)
- ▶ Video: *Discovering Psychology, Updated Edition: Past, Present, and Promise*
- ▶ Worth Video Anthology: *The History of Psychology*

1-1. Describe some important milestones in psychology’s development.

Early philosophers, such as Aristotle, theorized about learning and memory, motivation and emotion, perception and personality. Their thinking about thinking continued until Wilhelm Wundt established the first psychological laboratory in 1879 in Leipzig, Germany. He sought to measure the fastest and simplest mental processes. His student Edward Titchener introduced **structuralism**, which also used *introspection*—self-examination of one’s own emotional states and mental processes—to search for the basic elements of the mind. However, self-reports proved somewhat unreliable, varying from person to person and from situation to situation. Under the influence of evolutionary theorist Charles Darwin, William James thought it more fruitful to study how consciousness serves a purpose. Thus, **functionalism** focused on how mental and behavioral processes enable the organism to adapt, survive, and flourish. James also wrote a textbook for the new discipline of psychology. He mentored Mary Whiton Calkins, the first female president of the American Psychological Association. Margaret Floy Washburn, who was the first female psychology Ph.D., was the second female president of APA.

- ▶ Exercise: Psychology as Science (PAS) Scale (p. 6)
- ▶ Project/Lecture: The Twentieth Century’s Most Eminent Psychologists (p. 5)
- ▶ Worth Video Anthology: *Why Do People Help? Explaining Behavior; Postpartum Depression: The Case of Andrea Yates*

Until the 1920s, psychology was defined as the science of mental life. From the 1920s through the 1960s, American psychologists, led by John Watson and later by B. F. Skinner, both **behaviorists**, redefined psychology as the science of observable behavior. In responding to *Freudian psychology* and behaviorism, **humanistic psychology** emphasized our growth potential and the importance of meeting our needs for love and acceptance. In the 1960s, **psychology** began to recapture its initial interest in mental processes. Cognitive psychology and **cognitive neuroscience** explore scientifically the ways we perceive, process, and remember information. Today, **psychology** is defined as the scientific study of behavior and mental processes. Behavior is anything an organism does. Mental processes are the internal subjective experiences we infer from behavior, for example, perceptions, thoughts, and feelings. Psychology is growing and globalizing.

*These page numbers refer to the Instructor’s Resources page on which the item can be found.

Contemporary Psychology

- ▶ Exercises: The Scientific Approach (p. 6); Self-Assessment on Psychology's Big Issues (p. 7); Is Human Nature Fixed or Changeable? (p. 7)

Psychology developed from the more established fields of philosophy and biology. Its pioneers included Russian physiologist Ivan Pavlov, Austrian personality theorist Sigmund Freud, Swiss biologist Jean Piaget, and American philosopher William James.

1-2. Summarize the nature–nurture issue in psychology.

Psychology's biggest and most persistent debate concerns the **nature–nurture issue**: the controversy over the relative contributions of genes and experience to the development of psychological traits and behavior. Included in the history of this debate is Charles Darwin's concept of **natural selection**, which states that among the range of inherited trait variations, those contributing to reproduction and survival will most likely be passed on to succeeding generations. Evolution has become an important principle for twenty-first-century psychology. Today, contemporary science recognizes that *nurture works on what nature endows*. Our species is biologically endowed with an enormous capacity to learn and adapt. Moreover, every psychological event is simultaneously a biological event.

- ▶ Lectures: Illustrating Psychology's Complementary Perspectives: The Case of Andrea Yates (p. 8); The Biopsychosocial Approach and Obesity (p. 9); The Allure of the Neuroscience Perspective (p. 11); Complementary Perspectives (p. 11); Human Freedom and Choice (p. 12); Social Cognitive Neuroscience (p. 12)
- ▶ Exercise: Metaphors and Psychology's Perspectives (p. 10)
- ▶ Exercise/Project: Applying Psychology's Specific Theoretical Perspectives (p. 10)

1-3. Describe psychology's levels of analysis and related perspectives.

The different systems that make up the complex human system suggest different **levels of analysis**: biological, psychological, and social-cultural. Together, these levels form an integrated **biopsychosocial approach**. Psychology's varied perspectives therefore complement one another. Someone working from the

neuroscience perspective studies how the body and brain work to create emotions, memories, and sensory experiences.

evolutionary perspective considers how the natural selection of traits promoted the survival of genes.

behavior genetics perspective considers how heredity and experience influence our individual differences.

psychodynamic perspective views behavior as springing from unconscious drives and conflicts.

behavioral perspective examines how observable responses are acquired and changed.

cognitive perspective studies how we encode, process, store, and retrieve information.

social-cultural perspective examines how behavior and thinking vary across situations and cultures.

- ▶ Lectures: Psychology's Important Role in Basic Scientific Research (p. 14); Psychology's Applied Research (p. 14)
- ▶ Classroom Exercise: Psychologist as Scientist (p. 13)
- ▶ Classroom Exercise/Critical Thinking Break: Personalizing Psychology in Current Events (p. 14)
- ▶ Classroom Exercise/Lecture Break: Categorizing Professions in Psychology (p. 16)
- ▶ Project: Interviewing a Psychologist (p. 13)
- ▶ Worth Video Anthology: *Industrial-Organizational Psychology: Psychology in the Workplace*

1-4. Identify psychology's main subfields.

Some psychologists conduct **basic research**. For example, biological psychologists explore the link between brain and behavior, developmental psychologists study our changing abilities from womb to tomb, and personality psychologists investigate our persistent traits.

Other psychologists conduct *applied research*. For example, industrial-organizational psychologists study behavior in the workplace and suggest ways of boosting morale and performance.

Psychology is also a helping profession. *Counseling psychology* assists people with problems in living and in achieving greater well-being. *Clinical psychology* involves mental health professionals who study, assess, and treat people with psychological disorders. *Psychiatry* sometimes involves medical treatments as well as psychological therapy.

To balance historic psychology's focus on human problems, researchers have called for more research on human strengths and human flourishing, referred to as *positive psychology*.

Psychology is a meeting ground for different disciplines, with its diverse activities, from biological experimentation to cultural comparisons.

NOTE: In the next two sections, several items in the Instructor's Resources (indicated here by a †) have alternative uses. See page 26 in the Instructor's Resources for explanations of those uses.

The Need for Psychological Science

- ▶ Lecture: Misremembering the Causes of Behavior (p. 26)
- ▶ Exercises: The Limits of Human Intuition (p. 26); The Birthday Coincidence and Other Remarkable Facts (p. 28); Extraordinary Events and Chance: Your Birth Date in Pi? (p. 28); The Hindsight Bias and Predicting Research Outcomes (p. 28); The Overconfidence Phenomenon (p. 29); Overconfidence and the Confirmation Bias (p. 30); The Gambler's Fallacy (p. 31)
- ▶ Exercise/Project: The Propensity Effect (p. 29)

- 1-5. *Explain how hindsight bias, overconfidence, and the tendency to perceive order in random events illustrate why science-based answers are more valid than those based on intuition and common sense.*

Hindsight bias, also known as the *I-knew-it-all-along phenomenon*, is the tendency to believe, after learning an outcome, that one would have foreseen it. Finding out that something has happened makes it seem inevitable. Thus, after learning the results of a study in psychology, they may seem to be obvious common sense. However, experiments have found that events seem far less obvious and predictable beforehand than in hindsight. Sometimes, psychological findings even jolt our common sense.

Our everyday thinking is also limited by our tendency to think we know more than we do. Asked how sure we are of our answers to factual questions, we tend to be more confident than correct. Experts' predictions of world events made with 80 percent confidence on average were right less than 40 percent of the time.

A third limitation in everyday thinking is the tendency to perceive order in random events because *random sequences often don't look random*. In actual random sequences, patterns and streaks occur more often than people expect.

- ▶ Lectures: Your Teaching Strategies and Critical Thinking† (p. 31); Critical Thinking (p. 33)
- ▶ Exercises: Critical Inquiry and Psychology† (p. 32); A Psychic Reading (p. 32)
- ▶ Project: Evaluating Media Reports of Research† (p. 37)

- 1-6. *Explain how the three main components of the scientific attitude relate to critical thinking.*

The scientific attitude reflects a hard-headed *curiosity* to explore and understand the world without being fooled by it. The eagerness to *skeptically* scrutinize competing claims requires *humility* because it means we may have to reject our own ideas. This attitude, coupled with scientific principles for sifting reality from illusion, helps us winnow sense from nonsense. It carries into everyday life as **critical thinking** in which we examine assumptions, discern hidden values, evaluate evidence, and assess conclusions.

How Do Psychologists Ask and Answer Questions?

- ▶ Exercise: Astrology and the Scientific Method (p. 35)
- ▶ Project/Exercise: Testing Proverbs (p. 36)
- ▶ PsychSim 5: What's Wrong With This Study? (p. 35)
- ▶ Worth Video Anthology: *Research Methods*

1-7. Describe how theories advance psychological science.

A useful **theory** effectively organizes a wide range of observations and implies testable predictions, called **hypotheses**. By enabling us to test and reject or revise a particular theory, such predictions give direction to research. They specify in advance what results would support the theory and what results would disconfirm it. As an additional check on their own biases, psychologists report their results precisely with clear **operational definitions** of concepts and procedures. Such statements of the procedures used to define research variables allow others to **replicate**, or repeat, their observations. Often, research leads to a revised theory that better organizes and predicts observable behaviors or events.

- ▶ Lectures: Case Studies (p. 38); The Power of Vivid Cases (p. 39); Surveys, Evaluation Apprehension, and Naturalistic Observation (p. 40); Predicting Elections (p. 44); Survey Research and Random Samples (p. 45)
- ▶ Exercises: The Wording of Survey Questions (p. 40); Conducting a National Survey (p. 43); Choosing a Random Sample† (p. 43); An M&M's Sampling Demonstration (p. 44)
- ▶ Exercise/Lecture Break: Finding the Good and Bad in Case Studies (p. 39)
- ▶ Project/Exercise: Naturalistic Observation in the Dining Hall (p. 39)

1-8. Describe how psychologists use case studies, surveys, and naturalistic observation to observe and describe behavior, and explain the importance of random sampling.

The **case study** is the method by which psychologists analyze one or more individuals in great depth in the hope of revealing things true of us all. While individual cases can suggest fruitful ideas, any given individual may be atypical, making the case misleading.

Naturalistic observation consists of observing and recording the behavior of organisms in their natural environment. Like the case study and survey methods, this research strategy describes behavior but does not explain it.

The **survey** looks at many cases in less depth and asks people to report their behavior or opinions. Asking questions is tricky because even subtle changes in the order or wording of questions can dramatically affect responses. In everyday experience, we are tempted to generalize from a few vivid but unrepresentative cases. The survey ascertains the self-reported attitudes or behaviors of a **population** by questioning a representative, **random sample**.

- ▶ Lectures: Understanding Correlation† (p. 46); Misinterpreting Correlations† (p. 47)
- ▶ Exercises: Correlation and Predicting Exam Performance† (p. 45); Correlating Test-Taking Time and Performance† (p. 46); Illusory Correlation† (p. 48); The Power of Disconfirming Evidence: Do Dreams Predict the Future?† (p. 49)
- ▶ PsychSim 5: Statistics: Correlation† (p. 45)
- ▶ Television Show: Homer Simpson and Illusory Correlation† (p. 48)
- ▶ Worth Video Anthology: *Correlation and Causation*

1-9. Describe positive and negative correlations, and explain why they enable prediction but not cause-effect explanation.

When surveys and naturalistic observations reveal that one trait or behavior accompanies another, we say the two **correlate**. A **correlation coefficient** is a statistical measure of the relationship between two things. A positive correlation indicates a direct relationship, meaning that two things increase together or decrease together. A negative correlation indicates an inverse relationship: As one thing increases, the other decreases. The correlation coefficient helps us to see the world more clearly by revealing the extent to which two things relate.

Perhaps the most irresistible thinking error is to assume that correlation proves causation. Correlation reveals how closely two things vary together and thus how well one predicts the other. However, the fact that events are correlated does not mean that one causes the other. Thus, while correlation enables prediction, it does not provide explanation.

- ▶ Lecture: Description, Prediction, Explanation (p. 50)
- ▶ Exercise: Introducing the Experiment (p. 51); Random Assignment (p. 52); Main Effects and Interactions or “It All Depends”† (p. 52)
- ▶ Project/Exercise: The Placebo Effect (p. 52)
- ▶ Worth Video Anthology: *Experimental Design*; *Schachter’s Affiliation Experiment*; *Does Self-Confidence Intimidate Others?*; *Brain Transplants in Parkinson’s Patients*

1-10. *Describe the characteristics of experimentation that make it possible to isolate cause and effect.*

The **experiment** is a research method in which the investigator manipulates one or more factors to observe their effect on some behavior or mental process, while controlling other relevant factors. If a behavior changes when we vary an experimental factor, then we know the factor is having a causal effect.

In many experiments, control is achieved by **randomly assigning** people either to an **experimental group**, which is exposed to the treatment, or a **control group**, which is not exposed.

Often, the research participants are **blind** (uninformed) about what treatment, if any, they are receiving. One group might receive the treatment, while the other group receives a **placebo** (a pseudotreatment). Often, both the participant and the research assistant who collects the data will not know which condition the participant is in (the **double-blind procedure**). The **placebo effect** is well documented in reducing pain, depression, and anxiety. Just thinking one is receiving treatment can lead to symptom relief.

A **variable** is anything that varies. The **independent variable** is the experimental factor that is manipulated. It is the variable whose effect is being studied. The **dependent variable** is the variable that may change in response to the manipulations of the independent variable. It is the outcome factor. **Confounding variables** are factors other than the independent variable that might produce an effect.

Frequently Asked Questions About Psychology

- ▶ Lectures: Field and Laboratory Experiments† (p. 53)

1-11. *Explain whether laboratory experiments can illuminate everyday life.*

The experimenter intends the laboratory experiment to be a simplified reality, one in which important features can be simulated and controlled. The experiment’s purpose is not to re-create the exact behaviors of everyday life but to test **theoretical principles**. It is the resulting principles—not the specific findings—that help explain everyday behavior.

- ▶ Lectures: Differences in Cultural Norms (p. 58); Physical Differences Between the Sexes (p. 58)

1-12. *Discuss whether behavior depends on one’s culture and gender.*

Although **culture** shapes our specific ideas, attitudes, values, traditions, and behaviors, the principles that underlie them vary much less. Our shared biological heritage unites us as members of a universal human family. Studying gender differences is not only interesting but also potentially beneficial in preventing conflict and misunderstanding in everyday relationships. It is important to remember, however, that psychologically as well as biologically, women and men are overwhelmingly similar.

- ▶ Lectures: Invasion of Privacy (p. 60); Research Ethics (p. 61)
- ▶ Exercise: Animal Rights (p. 59)
- ▶ Video: Segment 4 of the Scientific American *Frontiers* series, 2nd ed.: *Return to the Wild*
- ▶ Worth Video Anthology *Ethics in Animal Research: The Sad Case of Booe the Chimp*; *Ethics in Human Research: Violating One's Privacy*; *Death of a Subject: The Ethics of Mental Health Research*

- 1-13. *Explain why psychologists study animals, and describe the ethical guidelines that safeguard human and animal research participants.*

Some psychologists study animals out of an interest in animal behaviors. Others do so because knowledge of the physiological and psychological processes of animals enables them to better understand the similar processes that operate in humans.

The debate between animal protection organizations and researchers has raised two important issues: Is it right to place the well-being of humans above that of animals? What safeguards are in place to protect the well-being of animals in research? Many professional organizations and funding agencies have developed extensive guidelines for the humane use of animals.

Ethical principles for the treatment of human participants urge investigators to obtain *informed consent*, protect participants from harm and discomfort, treat information about individuals confidentially, and fully explain the research afterward (*debrief* them).

- ▶ Lectures: Psychology and Human Values† (p. 61); Interrogations and the Use of Torture (p. 62); The Instructor's Perspectives and Values† (p. 63)
- ▶ Exercise: Observing Versus Interpreting† (p. 62)

- 1-14. *Discuss whether psychology is free of value judgments.*

Psychologists' values can influence their choice of research topic, their theories and observations, their labels for behavior, and their professional advice.

Knowledge is power that can be used for good or evil. Applications of psychology's principles have so far been mostly for the good, and psychology addresses some of humanity's greatest problems and deepest longings.

Improve Your Retention—and Your Grades

- ▶ Exercise: Eliciting “Metaphors” for Learning and Teaching (p. 16)

- 1-15. *Explain how psychological principles can help you learn and remember.*

What helps you learn new material is repeated self-testing and rehearsal of previously studied material, called the *testing effect* (or *retrieval practice effect* or *test-enhanced learning*). To master information, one must *actively process it*. People learn and remember material best when they put it in their own words, rehearse it, and then retrieve and review it again. **SQ3R**, an acronym for Survey, Question, Read, Retrieve, and Review, is a study method that encourages active processing of new information. Distributing study time, learning to think critically, listening actively in class, and overlearning will also boost learning and performance.

HANDOUT 1-1

Fact or Falsehood?

- T F 1. Sigmund Freud established the first psychology laboratory at the University of Vienna, Austria.
- T F 2. The science of psychology developed from the more established fields of biology and philosophy.
- T F 3. *Psychology* is best defined today as the study of mental life.
- T F 4. The biggest and most persistent issue in psychology concerns the nature–nurture controversy—that is, the relative contributions of biology and experience to psychological traits and behavior.
- T F 5. Human intuition is remarkably accurate and free from error.
- T F 6. Most people seem to lack confidence in the accuracy of their beliefs.
- T F 7. The opinions of 1500 randomly selected people can provide a very accurate picture of the opinions of an entire nation.
- T F 8. The scientific finding that depressed people tend to have low self-esteem proves that depression causes people to be down on themselves.
- T F 9. The purpose of the experiment is to re-create behaviors exactly as they occur in everyday life.
- T F 10. As a science, psychology is objective and value-free.