

### Chapter in Review

1. Psychology is the scientific study of mental processes and events (*mind*) and any potentially observable or measurable activity of a living organism (*behavior*). Psychological science uses methods grounded in modern scientific knowledge to conduct research in order to advance psychological knowledge. Variable topics and points of view characterize psychology.
2. Although people have always been interested in questions of mental life and the connection between mind and behavior, psychology as a concept did not exist in the ancient world. Early attempts to treat psychological questions include the teachings of Buddha, Aristotle, Chinese philosophers such as Confucius and Lao-tze, and Renaissance philosophers such as René Decartes (*dualism*) and John Locke (*British empiricism*).
3. Scientific psychology was born during the late 19th century as a union between philosophy and biology. Some important early schools of scientific psychology include *structuralism* (Titchener), *functionalism* (James), *psychoanalysis* (Freud), *behaviorism* (Watson, Skinner), and *humanism* (Rogers, Maslow).
4. Psychology today is distinguished by employment setting (university, hospital, business, clinic) and focus (research or application of research to solving real-world problems); by the psychologist's field of study (e.g., developmental psychology, clinical psychology, cognitive psychology, etc.); and by the psychologist's perspective, or point of view. Contemporary perspectives include *cognitive*, *biobehavioral*, *psychodynamic*, *evolutionary*, *sociocultural*, and *positive psychology*.
5. Science is an empirical method of gaining knowledge of the natural world. It is not the only empirical method of gaining this knowledge, but it is the best one. This is because science is less prone to bias than other methods, has built-in methods to change errors in thinking, and constantly refines knowledge gained in the past. Yet, it is not a perfect method of gaining knowledge, and bias may sometimes creep in unnoticed.
6. Science has goals and methods. Goals include *description*, *classification*, *explanation*, and *prediction*. Methods are varied, but they are based upon a general model known as the *scientific method* (make an observation, form hypotheses, collect data, analyze data, draw conclusions).
7. *Skepticism* is the point of view of science, and *critical thinking* is the key to balancing skepticism with openness to new ideas. Science uses *theories* to explain *facts*, but even if a theory proves to be wrong, the facts it tries to explain do not vanish. Science differs from *pseudoscience* in a number of ways. Pseudoscience is nonscience performed for nonscientific goals with the surface appearance of science.
8. There are three main categories of research methods in psychological science: *descriptive*, *correlational*, and *experimental*. Only the *true experiment* allows the researcher to determine causal effects with certainty.
9. Descriptive research such as *surveys*, *case studies*, and *naturalistic observations* allow the researcher to create "snapshots" of individuals or groups of individuals at one point in time. They *describe* some individual or group in relation to characteristics of interest to the researcher. These studies answer questions of

- who, what, when, and how*, but they cannot determine if one variable is associated with another, or if changes in one variable result in changes in another. In the survey, issues of sampling become important because results will not be valid unless the *sample* being used truly represents the *population* of interest.
10. Correlational methods allow the researcher to determine if one variable is associated, or correlated, with another variable. Correlations may be *positive* (as the value of one variable increases, the value of the other variable increases) or *negative* (as the value of one variable increases, the value of the other variable decreases). Although correlational research is useful (and sometimes necessary), one can never infer causality from correlational studies because *correlation does not equal causation*. Issues of *directionality* and the *third variable problem* may mislead researchers into believing they have discovered a causal relationship between variables when they have not.
  11. Experimental methods can establish causal relations with certainty, but only in the case of the *true experiment*. True experiments include at least: *random assignment to conditions*, *use of control conditions*, and *control over confounding variables*. A confounding variable is any unknown variable that changes along with changes in the *level* of the *independent variable* and exerts a measurable effect on the *dependent variable* without the experimenter realizing it. Common types of confounding variables include *experimenter effects* and *participant effects*. The “Achilles heel” of the experimental method is the problem of *external validity*—the application of laboratory research findings to the “real world” outside the laboratory.
  12. Statistics are an essential part of psychological research. *Descriptive statistics*, such as the *mean*, *median*, and *mode*, describe a set of data and characterize its basic “shape.” However, in psychology, descriptive statistics are usually not enough because many findings occur strictly by chance or are not strong enough to be meaningful in real-world settings. *Inferential statistics*, such as *statistical significance* and *effect size*, allow researchers to achieve a level of confidence that their results did not occur by chance and are strong enough to be meaningful in the real world. *Statistical literacy* is important for the average person to be able to interpret the many statistical claims which appear in the media.
  13. *Ethics* are important in psychology. Concerns about ethics pertain primarily to *rules of scholarship* and *treatment of research participants*. *Institutional review boards* are ethics committees designed to protect human and nonhuman research participants. Guidelines for these boards were created after controversies erupted over unethical treatment of human research participants. Nonhuman animals also have rights, and major controversies continue to exist regarding the ethics of using nonhuman animals as research participants.

### Section Summaries

#### *What is psychology?*

1. Psychology is the scientific study of mind and behavior. Psychology is distinct from psychiatry, a medical specialty concerned exclusively with mental health problems (psychological disorders).
2. Psychological science can be distinguished in three basic ways: by employment setting, field of study, and perspective. Field of study refers to the topics a psychologist is trained to study. Perspective refers to the psychologist's beliefs about what sorts of questions are important to ask and which answers to these questions are most satisfying.
3. In ancient societies and prior to the European Age of Reason, it was generally believed that thoughts and emotions did not originate in people's own minds, but were largely spiritual in origin. Modern psychological science was born as a union between philosophy and biology in the laboratory of Wilhelm Wundt in the late 1800s. The most important schools of early psychological science were structuralism, functionalism, psychoanalysis, behaviorism, and humanistic psychology.

#### *What is science?*

1. Two primary types of empirical methods for coming to know something about the natural world were discussed in the chapter: intuition and science.
2. Science has four goals: description, classification, prediction, and explanation.
3. The term *scientific method* is shorthand for the classical sequence of scientific inquiry: (a) make an observation, (b) form a hypothesis, (c) collect data, (d) analyze data, (e) draw conclusions.
4. Skepticism is the point of view of the scientific method. Scientific ideas (other than mathematical ideas) can never be proven—they are accepted provisionally because overwhelming evidence exists in their favor.
5. Pseudoscience is nonscience performed for nonscientific goals, but with the appearance of science.
6. Hypotheses are specific testable predictions about what will happen under particular circumstances; theories are interconnected ideas and statements used to explain facts. Theories often differ in level of analysis as well as point of view.
7. Psychology is a true science, although the quality of published research and applied research may vary considerably due to unique difficulties faced by psychological scientists.

#### *What research methods are used in psychological science?*

1. There is an important difference between scientific evidence and the opinions of experts, which may or may not be based upon scientific evidence.
2. There are three categories of research methods: descriptive, experimental, and correlational.
3. Descriptive studies describe characteristics of a population of interest to a researcher but do not examine associations or effects among variables. Descriptive studies include case studies, surveys, and naturalistic observations.
4. A true experiment is the only type of research study that can establish cause-and-effect relations among variables. Three cornerstones of a true experiment are

- random assignment to conditions, use of control groups, and control over confounding variables. The most serious problem faced by researchers using the experimental method is external validity.
5. Correlational studies examine associations among variables and are passive-observational in nature. Because correlation does not equal causation, the directionality problem and the third variable problem can make it difficult to interpret results of correlational studies, and these studies cannot determine cause and effect. However, correlational studies sometimes are more externally valid than experiments, and they are particularly valuable if their results jibe with those of experiments using analogue operational definitions.

*Why are statistics important?*

1. Descriptive statistics report the way that most research participants respond, what the range of responses is like, and how people vary in their responses.
2. Inferential statistics allow the researcher to compute the probability that research results were due to chance or coincidence (statistical significance). They also allow one to compute the magnitude or strength of results (effect size).
3. A lack of statistical literacy can have important negative consequences for the individual and society.

*Why are ethics important?*

1. Ethics are sets of orderly rules for correct behavior within a specific discipline or workplace. In psychology and science generally, concerns about ethics pertain primarily to rules of scholarship and treatment of research participants.
2. As a consequence of controversies over the treatment of research participants in studies such as the Milgram study of obedience and the Humphreys “tea-room trade” study, explicit principles of ethical conduct in research have been devised. These principles are implemented by Institutional Review Boards (IRBs).
3. Concern over the treatment of human research participants has increased dramatically over the past several decades due to financial as well as humanitarian considerations.
4. The rights of nonhuman animals are controversial. Animal rights advocates propose that philosophically flawed and immoral rationales are generally given for why it is “okay” to treat nonhuman animals during research in a manner that would be considered abusive were the subjects human. Those advocating the use of animals in research point out that very few animals are actually harmed in research, and the results of animal research are used to eliminate suffering—of nonhuman as well as human animals.