

CHAPTER 1
Introduction to the Science of Psychology
CHAPTER OUTLINE

I. THE WORLD OF PSYCHOLOGY: AN OVERVIEW

What is psychology and how did it grow?

Psychology is the science that seeks to understand *behavior and mental processes*, and to apply that understanding in the service of human welfare.

A. Subfields of Psychology

Psychologists in different subfields of psychology study different topics.

1. **Cognitive psychologists** study basic mental processes and their relationship to behavior in areas such as sensation, perception, learning, memory, judgment, decision making and problem solving.
2. **Biological** or *physiological psychologists* or *neuroscientists* study how biological structure and function affect behavior and mental processes.
3. **Personality psychologists** study individuality—the uniqueness of each person—and whether some combinations of personality traits predict patterns of behavior.
4. **Developmental psychologists** study and describe changes in behavior and mental processes over the life span.
5. **Quantitative psychologists** use statistical methods to describe, analyze, and interpret data collected by psychologists in other subfields.
6. **Clinical psychologists** provide therapy for behavior disorders and may study the causes of disorders. **Counseling psychologists** have either a Ph.D. or master's degree in psychology and work as mental health counselors. **Community psychologists** try to help prevent stressful conditions that lead to disorders.
7. **Educational psychologists** conduct research and develop theories about teaching and learning.
8. **School psychologists** specialize in testing and diagnosing learning disabilities, and establish programs to improve student achievement and success.
9. **Social psychologists** study the ways that people influence one another.
10. **Industrial-organizational psychologists** study factors that affect the efficiency, productivity, and satisfaction of workers and the organizations that employ them.
11. Others include **health psychologists, sports psychologists, forensic psychologists, engineering psychologists, environmental psychologists**, and many others.

B. Linkages within Psychology and Beyond

1. The overlapping subfields are somewhat arbitrary descriptors of a diverse field. Most psychologists “fit” several subfields, and interact with psychologists in other subfields.
2. Psychology embraces and overlaps with many other academic disciplines.

C. A Brief History of Psychology

1. Interest in behavior and the mind can be traced back to ancient Greek philosophers such as Socrates, Plato, and Aristotle.
 - a) Scientific psychology has its roots in philosophy.
2. In the 1600s philosophers such as John Locke, George Berkeley, and David Hume argued for **empiricism**—that knowledge comes through experience and observation.

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- a) A person is born a *tabula rasa*—a “blank slate,” with no inborn knowledge, but on which experiences of life “write” to give knowledge through direct sensation.
 - b) Charles Darwin’s 1859 *Origin of Species* described evolution as a process of natural selection: those members of a species whose unique features were best adapted to their environment were the ones most likely to survive, passing on their genetic codes to the next generation.
3. Wilhelm Wundt founded the first psychology research laboratory in Leipzig, Germany, in 1879. He attempted to use empirical research methods to study **consciousness**—the mental experiences that arise from our sensory-perceptual systems. Five research directions emerged in psychology in the late 1800s.
- a) Wundt, and later Edward Titchener in the United States, used the technique of *introspection*, in which highly trained subjects carefully describe each aspect of their conscious sensory experiences. This approach was called *structuralism*, because it focused on describing each of the separate elements that make up conscious experience.
 - b) *Gestalt* psychologists from Europe, led by Max Wertheimer, Kurt Koffka, and Wolfgang Kohler saw consciousness as a whole experience that could not be studied as separate parts.
 - c) In Vienna, Austria, Sigmund Freud developed *psychoanalysis*, a theory that many aspects of behavior and conscious experience stem from unconscious conflicts and desires.
 - d) In the United States, William James was influenced by Charles Darwin’s theory of evolution. James’s approach, *functionalism*, emphasized the study of what consciousness does—how it functions to help people adapt to their environments. The focus was on ever-changing patterns of sensations, memories, and other mental events rather than on the parts that make up consciousness.
 - e) John Watson, also in the United States, argued that psychologists should ignore mental events and only concentrate on observable behaviors. His *behaviorism* approach held that *learning* is the most important cause of behavior.
 - (1) Behaviorism was developed further by B. F. Skinner’s functional analysis of behavior, which focused on how rewards and punishments shape behavior.
 - f) In psychology today the focus is once again on mental activity as information processing. Biotechnology has opened new ways to study the biological bases of mental processing.

II. APPROACHES TO THE SCIENCE OF PSYCHOLOGY

Why don’t all psychologists explain behavior in the same way?

- A. Each of the approaches to psychology explains behavior or mental processes from a different point of view. Most psychologists are *eclectic*, combining the features of several approaches.

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1. A **biological approach** presumes that biological factors (e.g., genes, hormones, brain systems) affect behavior and mental events.
2. An **evolutionary approach** emphasizes how behavior and mental phenomena emerge as generation-to-generation adaptations to help organisms survive in their environments.
3. The **psychodynamic approach**, founded by Freud, sees constant unconscious conflicts within a person as the main determinant of behavior and mental life.
4. The **behavioral approach**, from the behaviorism of Watson and Skinner, focuses entirely on observable behaviors and how these behaviors are learned.
 - a) The cognitive-behavioral or social-cognitive approach studies the ways we learn thoughts, attitudes, and beliefs and how these affect our observable behaviors.
5. The **cognitive approach** focuses on how people take in, mentally represent, and store information.
 - a) Cognitive science is a multidisciplinary field focusing on the study of intelligent systems in humans and computers.
6. The **humanistic approach** sees each person's unique perceptions of the world as guiding his/her thoughts and actions.

III. HUMAN DIVERSITY AND PSYCHOLOGY

How does your cultural background influence your behavior?

As diversity among psychologists has increased, so too has their interest in the diversity of people in general. They no longer presume that all humans are essentially the same and all research findings are universally applicable.

- A. All humans probably are alike in certain behavioral and mental abilities. For example, all newborn humans have reflexes that slowly recede over several months as their brains develop.
- B. **Sociocultural variables** are factors such as gender, ethnicity, social class, and culture that produce real differences in behavioral and mental processes.
 1. **Culture** is the accumulation of values, rules of behavior, forms of expression, religious beliefs, occupational choices, and the like for a group of people with a common language and environment.
 - a) In *individualist* cultures people focus on and value personal goals rather than group goals.
 - b) In *collectivist* cultures people often tend to think of themselves as part of family or work groups rather than as individuals.
 - c) Most countries are *multicultural*, hosting many *subcultures* within their borders.
 2. Not only psychologists interested in *cross-cultural* research, but also psychologists in general, explore culture variables as psychology strives to be the science of "all" behavior.

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IV. THINKING CRITICALLY ABOUT PSYCHOLOGY (OR ANYTHING ELSE)

How can critical thinking save you money?

- A. **Critical thinking** is the process of assessing claims and making judgments on the basis of well-supported evidence. Five main questions form the basis of good critical thinking.
1. What am I being asked to believe or accept?
 2. Is there evidence available to support the claim?
 3. Can that evidence be interpreted another way?
 4. What evidence would help to evaluate the alternatives?
 5. What conclusions are most reasonable?
- B. Psychologists use critical thinking in scientific research.
1. Questions about behavior and mental processes are phrased in terms of a **hypothesis**—a specific, testable statement. Research is done to gather evidence to support or refute this statement.
 2. **Operational definitions** are descriptions of the exact methods or operations that will be used in a research study of the hypothesis. For example, an operational definition of height would be inches.
 3. **Variables** are the specific factors or characteristics that can be altered and measured in research. Height would be a variable.
 4. Then the quality of the evidence is evaluated.
 - a) **Reliability** refers to whether the results are consistent or repeatable.
 - b) **Validity** refers to whether the results accurately reflect what they claim.
 5. Research evidence gathered from numerous studies is organized into a **theory**—an in-depth explanation of the phenomena studied. The theory forms the basis for further research in the area that may lead to revision or even abandonment of the theory, if it is not supported.

V. RESEARCH METHODS IN PSYCHOLOGY

How do psychologists learn about people?

The scientific method generally consists of four main goals: *describe* the phenomenon, *make predictions* about the phenomenon, *control* the phenomenon to ask specific questions about it, and *explain* the phenomenon.

- A. **Naturalistic Observation**
1. In a naturalistic observation, a researcher watches and records phenomena in their natural settings without interfering with it.
 2. Subjects may act differently if they know that they are being observed.
 3. Observations can be distorted or incomplete if observers are not well trained or are biased about what they expect to see.
 4. Observation alone cannot lead to conclusions about cause and effect.
- B. **Case Studies**
1. A case study intensively examines some phenomenon or event in a particular individual, group, or situation.

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2. Case studies are useful for new, complex, or rare phenomena, such as those studied by neuropsychologists.
3. Case studies must be interpreted cautiously because they may not represent people in general and may contain only the evidence a particular researcher considered important.

C. Surveys

1. Surveys use interviews or questionnaires to ask people about their behavior, attitudes, beliefs, opinions, or intentions.
2. The validity of survey data depends partly on the wording of survey questions.
3. A survey's validity also depends on who is surveyed and who chooses to respond.
4. People may be reluctant to admit undesirable or embarrassing things about themselves.

D. Experiments

An experiment is the only research method that gives the control needed to directly test cause-and-effect relationships between variables, or factors.

1. While all other variables are held constant, one variable is directly manipulated and its effect on another variable observed. The variable that the researcher manipulates is the **independent variable**. The variable that the researcher observes for an effect is the **dependent variable** because it *depends* on the independent variable
2. The **experimental group** receives the experimental "treatment," and the **control group** receives no treatment or some other treatment. Control groups provide baselines against which to compare the performance of the experimental group.

FOCUS ON RESEARCH: STUDYING EMDR

a) What was the researcher's question?

Hypotheses are stated as clear, precise predictions that can be tested. Dr. Shapiro's hypothesis was *EMDR treatment causes significant reduction in anxiety*.

b) How did the researcher answer the question?

An operational definition describes exact methods or measurements. In Dr. Shapiro's hypothesis, the independent variable, *EDMR treatment*, was operationally defined as a certain number of back-and-forth eye movements per second for a particular period of time. The dependent variable, *significant reduction in anxiety*, was defined as a certain amount of reduction in clients' self-reported discomfort.

c) What did the researcher find?

The researcher found that those receiving EMDR treatment experienced a complete and nearly immediate reduction in anxiety related to their traumatic memories while the control group showed no change.

d) What do the results mean?

The structure or design of the experiment was flawed because the experimental group's session lasted for 50 minutes, whereas the control group focused on their memories only for 8 minutes.

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- e) *What do we still need to know?*
Experiments that control the treatment situation to evaluate alternative explanations for the EMDR effect are being conducted. *Confirmation bias* occurs when people look only for evidence that supports their hypothesis.
- 3. Beware of flaws in experimental control.
 - a) **Confounding variables** are other factors that might have influenced the dependent variable. These extra differences “confound” or confuse interpretation of experiments because you cannot know results were caused by the independent variable or by the confounding variable.
 - b) **Random variables** are uncontrolled, sometimes uncontrollable factors like weather, current events, and so forth. The **random assignment** of participants to different groups will reduce the impact of random variables by spreading their effects across groups.
 - c) Participants’ expectations about the experiment can affect results. For example, if participants expect a treatment to help them, they may show improvement just because of their expectations. This is called the **placebo effect**.
 - (1) To directly avoid such effects, a control group may receive a **placebo**, a treatment that appears to be the same as the experimental treatment, but which lacks the critical “ingredient.”
 - d) Unintentional experimenter expectations can also affect results. **Experimenter bias** occurs when researchers inadvertently encourage certain results. To guard against this, researchers might use a **double-blind design**, in which both the experimenter and the participants are unaware of who is in the experimental and who is in the control group.
- E. Selecting Human Participants for Research
 - 1. **Sampling** is the process of selecting research participants to study from the overall population.
 - a) For the study results to apply, or *generalize*, to the entire population, a **random sample** should be selected. Truly random samples (an ideal seldom obtained) allow every member of a population an equal chance of being selected.
 - b) A **biased sample** occurs if everyone does NOT have an equal chance of being chosen.
 - c) A *representative* sample is a random sample from a population that is typical or representative of some specific population of interest.

VI. STATISTICAL ANALYSIS OF RESEARCH RESULTS

What does it mean when scientists announce that a research finding is "significant?"

Data are numbers describing research findings. *Descriptive statistics* summarize a set of data, whereas *inferential statistics* use mathematical procedures to make judgments and conclusions about what data mean. These methods are described in the appendix, “Statistics in Psychological Research.”

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- A. A **correlation** is a statistical calculation that indicates that two variables appear to be related to each other in some way. In other words, one predicts the other to some extent.
 - 1. Variables differ in how strongly and in what direction they are related.
 - a) *Positive correlations*: Two variables increase together or decrease together.
 - b) *Negative correlations*: Two variables move in opposite directions; as one increases, the other decreases.
 - 2. The indicator of the predictability and the direction of a correlation is the *correlation coefficient*. It can vary from +1.00 to -1.00 and is a statistic measuring the strength and direction of a correlation. The absolute value of a correlation indicates the correlation strength. The sign indicates the type of correlation—its direction. A plus sign indicates a *positive correlation*; a minus sign indicates a *negative correlation*.
 - 3. Correlations do not describe cause and effect; they show that a relationship of some kind exists between variables, but not why a relationship exists.
- B. When a correlation or any other statistical calculation is found to be **statistically significant**, it occurs to some extent by more than chance alone.

VII. ETHICAL GUIDELINES FOR PSYCHOLOGISTS

Do psychologists deceive people when they do research?

- A. Psychologists must analyze and report research fairly and accurately. All research must protect the welfare of subjects.
- B. Human subjects must be able to make informed decisions about their voluntary participation. If deception is used, it must be revealed and explained afterward.
- C. Studies show that animals used in psychological research are seldom subjected to extreme pain, starvation, or other inhumane conditions. High standards for animal care and treatment are required by legal and voluntary professional guidelines and by principles of good scientific research.

VIII. LINKAGES: PSYCHOLOGICAL RESEARCH AND BEHAVIORAL GENETICS

Psychologists study the extent to which behavior and mental phenomena are due to an organism's biological nature versus the environmental events that nurture organisms.

- A. Researchers in *behavioral genetics* explore the relative roles of genetic and environmental factors in creating differences among behavioral tendencies in groups of people.
 - 1. Early behavioral genetics research examined the effects of selective breeding on animal behavior. Interpretation of such research is difficult, because behaviors are not inherited but tendencies toward certain behaviors, which are strongly affected by environment.
 - a) Research on behavior genetics in humans must be interpreted with even greater care because environmental influences have an enormous impact on human behavior.
 - b) Legal, moral, and ethical considerations prohibit manipulations such as selective breeding and so control in human studies is imperfect.

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2. Research designs in humans include family studies, twin studies, and adoption studies.
 - a) *Family studies* explore whether or not close family relatives are more likely than distant ones to show similarities in behavior and mental processes.
 - b) *Twin studies* explore the nature-nurture mix by comparing similarities seen in identical twins with those of nonidentical twins. Identical twins' genes are the same whereas nonidentical twins have genes that are no more similar than those of other siblings. Comparing them identifies characteristics that may have a significant genetic component.
 - c) *Adoption studies* examine the behavioral similarity of biological family members who share similar genes but who have been raised separately from birth, thus reducing common environmental experiences.
3. Behavioral genetics primarily focuses on *group* differences. Be careful about interpreting from such data to make decisions about a *particular* person's behavioral and mental abilities.
4. The Human Genome Project, which has deciphered the genetic code of DNA, will help researchers understand how heredity interacts with the environment to contribute to individual differences in human beings.