

# The science of psychology

# 1

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## ▼ CHAPTER-AT-A-GLANCE

<i>Detailed Outline</i>	<i>Instructor Resources</i>	<i>Revel Multimedia</i>
<b>The History of Psychology</b> Wundt, Titchener, and James Gestalt, Psychoanalysis, and Behaviorism	<b>Learning Objectives:</b> 1.1, 1.2 <b>Lecture Launchers:</b> 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9 <b>Activities &amp; Exercises:</b> 1.1, 1.2, 1.3, 1.4, 1.5 <b>Handouts:</b> 1.1, 1.2	<b>Video:</b> Why Study Psychology?  <b>Survey:</b> What Do You Know About Psychology?  <b>Interactive:</b> Timeline of the History of Psychology
<b>The Field of Psychology Today</b> Modern Perspectives Psychological Professionals and Areas of Specialization	<b>Learning Objectives:</b> 1.3, 1.4 <b>Lecture Launchers:</b> 1.10, 1.11, 1.12 <b>Activities &amp; Exercises:</b> 1.6, 1.7, 1.8 <b>Writing Assignment:</b> 1.1	<b>Video:</b> Diverse Perspectives <b>Video:</b> Careers in Psychology  <b>Interactive:</b> Work Settings and Subfields of Psychology
<b>Scientific Research</b> The Scientific Approach Descriptive Methods Correlations: Finding Relationships The Experiment Experimental Hazards and Controlling for Effects	<b>Learning Objectives:</b> 1.5, 1.6, 1.7, 1.8, 1.9 <b>Lecture Launchers:</b> 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19 <b>Activities &amp; Exercises:</b> 1.9, 1.10, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18 <b>Handouts:</b> 1.3, 1.4, 1.5, 1.6 <b>Writing Assignment:</b> 1.2	<b>Video:</b> Research Methods <b>Video:</b> Experiments – Independent vs. Dependent Variables <b>Video:</b> Experiments – Experimental Group vs. Control Group  <b>Survey:</b> Participating in a Research Survey  <b>Interactive:</b> Scatterplots <b>Interactive:</b> A Sample Experiment
<b>Ethics of Psychological Research</b> The Guidelines for Doing Research with People Animal Research	<b>Learning Objectives:</b> 1.10, 1.11 <b>Lecture Launchers:</b> 1.20, 1.21	<b>Video:</b> The Ethics of Psychological Research with People
<b>Applying Psychology to Everyday Life: Thinking Critically About Critical Thinking</b>	<b>Learning Objectives:</b> 1.12 <b>Lecture Launchers:</b> 1.22	<b>Video:</b> Critical Thinking

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## ▼ Lecture Guide

### I. THE HISTORY OF PSYCHOLOGY

#### **Lecture Launchers and Discussion Topics**

- 1.1 - How Do We Know What We Know?
- 1.2 - Psychology and Common Sense
- 1.3 - African Americans in the History of Psychology in America
- 1.4 - Women in the History of Psychology in America
- 1.5 - Biographical Profiles
- 1.6 - Scandal in Psychology—John B. Watson's Fall from Grace
- 1.7 - The Study of Bumps on the Head
- 1.8 - Wundt's Other Method
- 1.9 - Dates in the Development of Psychoanalysis

#### **Classroom Activities, Demonstrations, and Exercises**

- 1.1 - Misconceptions About Psychology
- 1.2 - Psychology's Goals Applied to Matchmaking
- 1.3 - Pseudopsychology and the Mozart Effect
- 1.4 - A Jigsaw Approach to Learning the Early History of Psychology
- 1.5 - Which Famous Psychologist Am I?

- REVEL Multimedia
- MyPsychLab Multimedia

*Learning Objective 1.1 - Describe the contributions of some of the early pioneers in psychology.*

- A. The history of psychology
  - 1. Psychology is the scientific study of behavior and mental processes
    - a. A “hub science” in many meaningful ways
- B. In the beginning: Wundt, Titchener, and James
  - 1. In 1879, psychology began as a science of its own in Germany
    - a. Wundt developed the method of objective introspection
  - 2. Titchener and structuralism in America
    - a. Edward Titchener brought psychology in the form of structuralism to America
    - b. Margaret F. Washburn was the first woman to receive a PhD in psychology in 1894
  - 3. William James and functionalism
    - a. Stresses the way the mind allows us to adapt
      - i. Mary Whiton Calkins
      - ii. Several women and minorities contributed to the early days of psychology
    - b. Functionalism influenced educational, evolutionary, and industrial psychology

*Learning Objective 1.2 - Summarize the basic ideas and the important people behind the early approaches known as Gestalt, psychoanalysis, and behaviorism.*

- C. Three influential approaches
  - 1. Gestalt psychology: The whole is greater than the sum of its parts
    - a. Wertheimer and others studied sensation and perception
    - b. Called their new perspective Gestalt (organized whole) psychology
  - 2. Sigmund Freud's theory of psychoanalysis
    - a. The unconscious mind controls much of our conscious behavior
    - b. Childhood events are important in influencing later behavior
    - c. Adler, Jung, Horney, and Anna Freud were adherents to one degree or another
  - 3. Pavlov, Watson, and the dawn of behaviorism
    - a. Watson proposed a science of behavior called behaviorism, which focused only on the study of observable stimuli and responses

- b. Watson and Rayner demonstrated that a phobia could be learned by conditioning
- c. Jones later demonstrated that learned phobias could be counterconditioned

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## II. THE FIELD OF PSYCHOLOGY TODAY

### ***Lecture Launchers and Discussion Topics***

- 1.10 - *Psychology in the Framework of Emerging Transdisciplinary Science*
    - 1.11 - *Over the Edge*
  - 1.12 – *Clinical, Psychiatric, and Other Types of Psychological Training*
- Classroom Activities, Demonstrations, and Exercises***
- 1.6 - *Perspectives in Psychology*
  - 1.7 - *What Psychologists Know*
  - 1.8 - *Thinking About Your Interests in Psychology*
- *REVEL Multimedia*
  - *MyPsychLab Multimedia*

*Learning Objective 1.3 - Summarize the basic ideas behind the seven modern perspectives in psychology.*

### A. Modern perspectives

1. Psychodynamic perspective
  - a. Change of emphasis from Freud's original ideas
2. Behavioral perspective
  - a. Operant conditioning became a major force in the twentieth century
  - b. Skinner introduced the concept of reinforcement to behaviorism
3. Humanistic perspective
  - a. Free will and the human potential for growth are emphasized
  - b. Developed as a reaction to behaviorism and psychoanalysis
4. Cognitive perspective
  - a. Study of learning, memory, language, and problem solving
  - b. Includes the field of cognitive neuroscience
5. Sociocultural perspective
  - a. Combines two areas of study: social psychology and cultural psychology
6. Biopsychological perspective
  - a. Biological bases of behavior, such as hormones, heredity, neurotransmitters
7. Evolutionary perspective
  - a. Behavior is seen as having an adaptive or survival value
  - b. Applications to mating and reproduction are a primary focus

*Learning Objective 1.4 - Differentiate between the various types of professionals within the field of psychology.*

### B. Psychological professionals and areas of specialization

1. Psychologists have academic degrees and can counsel, teach, or research
2. Psychologists may specialize in any one of a large number of areas within psychology
3. Psychiatrists are medical doctors who provide diagnosis and therapy
4. Psychiatric social workers have special training in the influences of the environment on mental illness

### C. Psychologists engage in research, teaching, and application

1. Basic research: Adding information to scientific knowledge

2. Applied research: Practical solutions to actual problems
3. Psychologists investigate a broad range of topics
  - a. Social, personality, cognitive, health, sport, industrial, clinical, developmental, etc.

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### III. SCIENTIFIC RESEARCH

***Lecture Launchers and Discussion Topics***

- 1.13 - Case Studies of Vietnam War Experiences
  - 1.14 - Online Polls
  - 1.15 - Correlation and Causality
  - 1.16 - Damned Lies, Damned Statisticians
  - 1.17 - Basic Research versus Applied Research
    - 1.18 - Size Matters
- 1.19 - The (Tobacco) Road from Hypothesis to Conclusion

***Classroom Activities, Demonstrations, and Exercises***

- 1.9 - Inference or Observation?
  - 1.10 - Contradictory Beliefs
  - 1.11 - Name That Research Method
  - 1.12 - Making Statistics Relevant
- 1.13 - Observational Research in the Dining Hall
  - 1.14 - Understanding Correlations
  - 1.15 - Correlating Shoe Size and Height
- 1.16 - Wonder Horse Dials 911 To Save Boy's Life
  - 1.17 - Softens Hands While You Do Dishes
  - 1.18 - Testing Random Assignment

- REVEL Multimedia
- MyPsychLab Multimedia

***Learning Objective 1.5 - Recall the five steps of the scientific approach.***

**A. The scientific approach**

1. Psychology's goals
  - a. Description: What is happening?
  - b. Explanation: Why is it happening?
  - c. Prediction: When will it happen again?
  - d. Control: How can it be changed?
2. Steps in the scientific approach
  - a. Perceiving the question
  - b. Forming a hypothesis
  - c. Testing the hypothesis
  - d. Drawing conclusions
  - e. Reporting the results
    - i. Replication, falsifiability, transparency, reliability, etc., all apply

***Learning Objective 1.6 - Compare and contrast some of the methods used to describe behavior.***

**B. Descriptive methods**

1. Naturalistic observation involves watching animals or people in natural environments
  - a. Advantages are realism and insights gained through participant observation
  - b. Disadvantages are a lack of control and possible observer bias
2. Laboratory observation involves watching animals or people in an artificial but controlled situation, such as a laboratory

3. Case studies are detailed investigations of one subject
  - a. Information gained from case studies may not be applied to other cases
4. Surveys involve asking standardized questions of large groups of people
  - a. Respondents may not always tell the truth or remember information correctly
  - b. Representativeness and sampling issues in general are a consideration

*Learning Objective 1.7 - Explain how researchers use the correlational technique to study relationships between two or more variables.*

C. Correlations: Finding relationships

1. Allows researchers to discover and predict relationships between variables
  - a. Positive correlations exist when increases in one variable are matched by increases in the other variable
  - b. Negative correlations exist when increases in one variable are matched by decreases in the other variable
2. Correlations cannot be used to prove cause-and-effect relationships

*Learning Objective 1.8 - Identify the steps involved in designing an experiment.*

D. The experiment

1. Tightly controlled manipulations of variables that allow researchers to determine cause-and-effect relationships
  - a. Independent and dependent variables
  - b. Control and experimental groups
  - c. Random assignment
  - d. Operational definitions

*Learning Objective 1.9 - Recall two common sources of problems in an experiment and some ways to control for these effects.*

E. Experimental hazards and controlling for effects

1. Placebo effects and experimenter effects
2. Importance of single- and double-blind designs

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## IV. ETHICS OF PSYCHOLOGICAL RESEARCH

***Lecture Launchers and Discussion Topics***

- 1.20 - *Using Animals in Psychological Research*
- 1.21 - *An Historical Perspective on Research Ethics*
  - *REVEL Multimedia*
  - *MyPsychLab Multimedia*

*Learning Objective 1.10 - Identify some of the common ethical guidelines for doing research with people.*

A. Guidelines for conducting research with people

1. Protection of rights and well-being of participants
2. Informed consent
3. Justification when deception is used
4. The right of participants to withdraw at any time

5. Protection of participants from risks
6. Debriefing of participants at the conclusion of the study
7. Confidentiality
8. Remediation of ill effects

*Learning Objective 1.11 - Explain why psychologists sometimes use animals in their research.*

B. Animals in psychological research make useful models because they are easier to control than humans, have simpler behavior, and can be studied in ways that are not permissible with humans

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## V. APPLYING PSYCHOLOGY TO EVERYDAY LIFE: THINKING CRITICALLY ABOUT CRITICAL THINKING

### ***Lecture Launchers and Discussion Topics***

- 1.22 - *The Characteristics of Good Reasoners*
  - *REVEL Multimedia*
  - *MyPsychLab Multimedia*

*Learning Objective 1.12 - Recall the basic criteria for critical thinking that people can use in their everyday lives.*

- A. Criteria for critical thinking
1. Critical thinking is the ability to make reasoned judgments
  2. Four basic criteria:
    - a. There are few concepts that do not need to be tested
    - b. Evidence can vary in quality
    - c. Claims by experts and authorities do not automatically make something true
    - d. Keeping an open mind is important

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## VI. CHAPTER SUMMARY

### ***Classroom Activities, Demonstrations, and Exercises***

- 1.19 - *Crossword Puzzle*
- 1.20 - *Fill-in-the-Blanks*

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## ▼ LEARNING OBJECTIVES

- 1.1 Describe the contributions of some of the early pioneers in psychology.
- 1.2 Summarize the basic ideas and the important people behind the early approaches known as Gestalt, psychoanalysis, and behaviorism.
- 1.3 Summarize the basic ideas behind the seven modern perspectives in psychology.
- 1.4 Differentiate between the various types of professionals within the field of psychology.
- 1.5 Recall the five steps of the scientific approach.
- 1.6 Compare and contrast some of the methods used to describe behavior.
- 1.7 Explain how researchers use the correlational technique to study relationships between two or more variables.
- 1.8 Identify the steps involved in designing an experiment.
- 1.9 Recall two common sources of problems in an experiment and some ways to control for these effects.
- 1.10 Identify some of the common ethical guidelines for doing research with people.
- 1.11 Explain why psychologists sometimes use animals in their research.
- 1.12 Recall the basic criteria for critical thinking that people can use in their everyday lives.

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## ▼ RAPID REVIEW

**Psychology** is the scientific study of behavior and mental processes. Wilhelm Wundt established the first psychology laboratory in Germany in 1879, using the method of **objective introspection** in an attempt to study human thought processes. Edward Titchener, a student of Wundt, expanded Wundt's ideas and brought the method of introspection to the United States, calling his approach **structuralism**. William James was focused on discovering how our mental processes help us to function in our daily lives and began to promote his viewpoint known as **functionalism**. **Gestalt psychologists** were studying how sensation and perception create a pattern that is greater than the sum of the individual components. Sigmund Freud developed his theory of **psychoanalysis**, assigning a primary role to the unconscious. John Watson expanded the findings of Russian physiologist Ivan Pavlov to promote the perspective of **behaviorism**. Today seven major perspectives make up the field of psychology: **psychodynamic**, **behavioral**, **humanistic**, **biopsychological**, **cognitive**, **sociocultural**, and **evolutionary**. The field of psychology offers a range of professional opportunities, many based on direct practice. For example, **psychiatrists**, psychoanalysts, and **psychiatric social workers** provide varying forms of mental health care with varying specializations and training. **Psychologists** might also perform clinical work, but can specialize in many other areas and work in many different settings.

Psychologists, like all scientists, use the **scientific method**. The goals of psychology are to describe, explain, predict, and control the behaviors and mental process of both humans and animals. Specific research techniques include **naturalistic observation**, **participant observation**, **case studies**, **surveys**, and strategies that take a **correlational** approach. In an **experiment**, the researcher manipulates an **independent variable** and measures some response from the participants on the **dependent variable**. In order to accomplish this, the researcher usually observes two groups: an **experimental group** and a **control group**. The researcher will most likely use **random assignment** to determine which participants will go into which group. Often, the control group receives a bogus treatment in order to control for the **placebo effect**. Normally, the participants are not told which group they are in (**single-blind study**). In order to control for any expectations the experimenter might have (the **experimenter effect**), the study might be designed so that neither the participants nor the experimenter know who is in which group (**double-blind study**). Relying on the scientific method can help foster a more general attitude of **critical thinking**.

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## ▼ CHANGES FROM THE THIRD EDITION TO THE FOURTH EDITION

### Chapter 1 - The Science of Psychology

- Topics have been reorganized and Learning Objectives have been updated
- The chapter now begins with *History of Psychology*
- The discussion of *Goals of Psychology* has been moved to later in the chapter
- The *Issues in Psychology* feature has been deleted
- Section headings have been reworded to a more compact form
- Videos, photos, figures, and tables have been updated
- APA Learning Objective 2 feature (*A Sample Experiment*) has been added
- A new video on critical thinking accompanies the *Applying Psychology* feature
- New research has been incorporated on psychology as a “hub science”
- Coverage of some early minority pioneers in psychology has been moved into the narrative, and material on APA's Office of Ethnic Minority Affairs website has been added
- A new example of the sociocultural perspective (examining the bystander effect in India) has been incorporated
- Information on the biopsychological perspective and schizophrenia has been updated
- Research in the evolutionary psychology section has been updated
- Material on work settings and subfields of psychology has been updated
- A revision of terminology to focus on the “scientific approach” (vs. scientific method) and “operationalization” (vs. operational definition) has been incorporated, and the key term “theory” has been added
- An expanded discussion of forming a hypothesis (to include more information on how hypotheses relate to theories) is present
- A discussion of the “replicability crisis” has been added
- Material on the challenges involved in finding a representative sample for a study is presented

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## ▼ LECTURE LAUNCHERS AND DISCUSSION TOPICS

- 1.1 - How Do We Know What We Know?
- 1.2 - Psychology and Common Sense
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- 1.7 - The Study of Bumps on the Head
- 1.8 - Wundt's Other Method
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- 1.10 - Psychology in the Framework of Emerging Transdisciplinary Science
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- 1.19 - The (Tobacco) Road From Hypothesis to Conclusion
- 1.20 - Using Animals in Psychological Research
- 1.21 - An Historical Perspective on Research Ethics
- 1.22 - The Characteristics of Good Reasoners

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### Lecture Launcher 1.1 - How Do We Know What We Know?

Dependence on observation is one of the hallmarks of science, but it is not the only way humans acquire knowledge. There are, in fact, many questions that cannot be answered by scientific methods and for which other means of acquiring knowledge are more appropriate. Begin your discussion by asking students the following questions:

- How do you know that George Washington was the first president of the United States?
- How do you know that you really have a stomach?
- What makes you so sure the sun will rise tomorrow?
- How do you know the color of the shirt I'm wearing?
- How can you be sure that there aren't little creatures inside computers that are responsible for the things computers do?
- Are you sure you don't have a big hole in the back of your pants or skirt?

*Authority* is one source of knowledge. We know, or believe, that Washington was the first president because we trust the authority of historians and history books. During the centuries that Western civilization was dominated by the Church, the authority of holy writings was believed to be the only dependable way of knowing.

*Reason* was considered by Renaissance scholars to be the most reliable source of knowledge. If you say, "All humans have stomachs; I am human; therefore, I have a stomach," you have used deductive reasoning. If you say, "The sun rose today, yesterday, the day before yesterday, and for as long as I or anyone can remember," you are using inductive reasoning.

*Observation* is yet another way of acquiring knowledge. You know the color of my shirt because you can see the shirt. You assume that you do not have a hole in the posterior of your clothing because you have not observed stares and giggles from others.

One might use any of these ways of knowing to deny the existence of little creatures in computers. People you perceive to be authorities about computer innards may have told you how they work. You may have reasoned that creatures need nourishment and there is no food supply inside microprocessors. Or you may have looked inside a computer and failed to see little creatures waiting to solve your problems. But there is no way one can absolutely refute the computer-creature hypothesis; so if you want to keep your computer running, maybe you should find out what the little creatures eat.

All these ways of knowing—authority, reason, and observation—are used by scientists, but observation must be the basis for knowledge that is scientific. Science puts greater emphasis on evidence provided by the senses than on authority of others or reasoning. In short, science relies on empirical evidence.

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## Lecture Launcher 1.2 - Psychology and Common Sense

A common refrain voiced by laypeople and some scientists is that most, if not all, of behavioral science “is just common sense.” Introductory psychology students are particularly apt to make this claim, given that much of their prior exposure to psychology is likely to have been very commonsensical (though perhaps not well established) claims by a variety of “professionals” on the talk-show circuit. In a nutshell, it’s difficult to counter the “commonsense” stigma when so much of behavior seems to be explainable at an intuitive surface level.

Mark Leary shares some suggestions for discussing this issue with your students. It is true that the subject matter of psychology is much more familiar to most people than is the subject matter of subatomic physics or gastroendocrinological biology; we see behavior all around us but rarely stumble over a gluon. Psychology would be an odd science of thought and behavior if it only considered thoughts and behaviors completely foreign to people’s experiences or if its findings always ran counter to most people’s beliefs. But neither greater visibility of subject matter nor popular consensus guarantees greater understanding. Many people believed wholeheartedly in flat Earths and cheese moons, only to find their commonsense views dismantled in the face of scientific evidence. So too with psychology. Although most people would like to believe that large rewards produce greater liking for a boring task, that the behavior of men and women is determined by their biology, or that absence makes the heart grow fonder, researchers studying cognitive dissonance, sex-role stereotypes, and close relationships would be happy to share their findings to the contrary. In short, the popularity of a commonsense belief may not always support the weight of scientific evidence.

More importantly, psychologists (like all scientists) are primarily engaged in the task of explaining behavior, rather than merely cataloging it. The difference between theory and description—“why” versus “what”—echoes the difference between science and common sense. Common sense certainly helps describe *what* takes place in behavior but doesn’t compel us to understand *why* it takes place. The development of theory in understanding behavior sets science apart from everyday commonsense accounts.

Leary, M. (2016). *Behavioral research methods* (7<sup>th</sup> ed.). Hoboken, NJ: Pearson.

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## Lecture Launcher 1.3 – African Americans in the History of Psychology in America

Like women, African Americans faced many obstacles to their education and participation in psychology. Most white institutions would not accept African American students, and when they were able to enroll, they often experienced discrimination. In addition, few undergraduate black colleges offered a major in psychology until after the 1940s. Howard University, the only major black university offering graduate study, awarded 32 PhDs to African Americans from 1920 to 1950. During the same period only eight African Americans earned a PhD from one of the ten most prestigious white universities. Not only was earning the PhD difficult, employment opportunities were scarce for African American psychologists since neither white universities nor organizations in the private sector would hire them. Most taught at black colleges where opportunities to engage in research were limited, thus restricting opportunities for professional recognition. The situation for African American students has improved dramatically in recent years. Kenneth B. Clark, best known for his research on the effects of racial segregation, became the first African American elected as APA president in 1970.

Guthrie, R. V. (1976). *Even the rat was white: A historical view of psychology*. New York: Harper and Row.  
Schultz, D. P., & Schultz, S. E. (2016). *A history of modern psychology* (11<sup>th</sup> ed.). Boston: Cengage.

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## Lecture Launcher 1.4 - Women in the History of Psychology in America

Psychology has renewed its appreciation of diversity in human behavior. Part of that diversity includes celebrating the accomplishments and contributions of women to the field of psychology. Share with your students the stories of some key figures from psychology's history:

**Mary Whiton Calkins** (1863–1930) attended Harvard University and worked with William James, but because Harvard did not officially admit women into graduate programs, Calkins never received a PhD from Harvard. At best, Harvard offered her the degree from its sister school Radcliffe. She refused, stating that she ought to be given the degree from the institution where she earned it. Calkins collaborated with Edmund Sanford from neighboring Clark University on a variety of research projects. At that time, women with advanced degrees or training primarily received faculty positions at female colleges, such as Wellesley and Vassar Colleges. Calkins received a position at Wellesley College in 1887 and established a prolific laboratory in 1891 producing short-term memory research (Madigan & O'Hara, 1992). In 1906, Calkins was the first woman elected president of the APA.

**Margaret Floy Washburn** (1871–1939) was the first person, male or female, to receive a PhD from Edward B. Titchener in 1884, the leading structuralist in American experimental psychology at that time (Goodwin, 1999). She was also the first female to receive a PhD in the United States. Interestingly, Washburn never believed Titchener taught her much, as she became a leading comparative psychologist at Vassar College. She produced her most influential work in *The Animal Mind* in 1908, and in 1921, she was elected the second woman president of APA. She suffered a cerebral hemorrhage in 1937 and died from its complications in 1939 (Scarborough & Furumoto, 1987).

**Christine Ladd-Franklin** (1847–1930) was a mathematician who developed an interest in visual perception and made great contributions to theories of color vision (Furumoto, 1992). She married a math professor from Columbia University, and she occasionally taught adjunct courses there. However, she was rarely paid. Like Calkins, she did not receive her PhD, although she had completed all of the required work. Johns Hopkins University finally granted her the degree shortly before her death. She accepted the degree in person.

At the turn of the 20th century, one popular belief held that there was more variability in intelligence in men than in women. One implication of this belief was that even the brightest of women would never be as bright or even “outshine” the brightest of men. African American psychologist **Leta Stetter Hollingworth** (1886–1939) challenged these beliefs with her research, which showed no evidence that the distribution of

intelligence test scores differed between men and women (Hollingworth, 1914). She also challenged the popular belief that women's intellectual abilities were affected by their menstrual cycles, again finding no statistical evidence to support such claims (Silverman, 1992). Hollingworth's contributions are often seen as the seedlings for the formal study of the psychology of women.

African American psychologist **Mamie Phipps Clark** (1917–1983) received her bachelor's and master's degrees from Howard University and her PhD from Columbia University in 1944. She is well known for her studies of racial differences in racial identity and self-concept (Clark & Clark, 1950). In the 1940s and 1950s racial segregation was becoming institutionalized, and Clark became interested in the effects of segregation on African American children. She conducted a series of studies in which African American and white children were shown black and white dolls. The children were first asked to pick the doll they most looked like, establishing a measure of racial identity. Then, children were asked which doll they would most like to play with. Both white and African American children preferred the white doll, suggesting for both races of children a preference and perhaps more value on being white. Clark's work was considered and noted in the Supreme Court's 1954 ruling in *Brown v. Board of Education* desegregation case, which ruled that public school segregation was unconstitutional.

Clark, K. B., & Clark, M. P. (1950). Emotional factors in racial identification and preference in Negro children. *Journal of Negro Education*, 19, 341–350.

Furumoto, L. (1992). Joining separate spheres: Christine Ladd-Franklin, woman-scientist. *American Psychologist*, 47, 175–182.

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## Lecture Launcher 1.5 –

### Brief Biographical Profiles of Major Contributors to Psychology

In the television show, *Dragnet*, Sergeant Joe Friday famously intoned, “Just the facts, ma’am.” If you’d like to share some fast facts about some pioneers in psychology, the snippets below may be of interest to you.

#### **Wilhelm Wundt (1832–1920)**

Born in Neckarau, Germany, Wilhelm Wundt was the fourth child of a Lutheran minister. Despite coming from a family that boasted numerous scholars, scientists, and physicians, Wundt initially was not a good student. After he dropped out of one high school, a teacher suggested that a reasonable goal for Wundt would be a career in the postal service. Wundt's scholastic abilities improved, however, and in 1855 he graduated at the top of his class in medical school. Wundt then went to Berlin to study physiology with Johannes Müller, and he subsequently decided to become an experimental physiologist himself. Wundt then returned to the University of Heidelberg, where he worked as an assistant for Herman von Helmholtz. It was at Heidelberg in 1862 that Wundt taught his first course in psychology.

In 1879, at the University of Leipzig, where he held a chair in philosophy, Wundt established the Institute for Experimental Psychology, the first laboratory whose formal purpose was the scientific investigation of the human mind. Wundt is one of the most prolific contributors to the field of psychology ever. It is estimated that between the years of 1853 and 1920, Wundt wrote 53,735 pages of text. Wundt was not only a voracious writer; he was also responsible for training numerous researchers, some of whom, such as Edward Titchener, brought versions of Wundt's psychology to America.

**Edward Titchener (1867–1927)**

Edward Titchener, an Englishman and a student of Wilhelm Wundt, taught at Cornell University during the late 19th and early 20th centuries. Titchener is best known as the major proponent of structuralism, which focused on investigating the structure of conscious experience.

**Sigmund Freud (1856–1939)**

Sigmund Freud was born in Pribor, Czechoslovakia, in 1856. Although Freud was a gifted student, it took him eight years to finish his medical degree at the University of Vienna, partly because he was interested in so many topics. Freud first pursued a career as a neurologist, but financial concerns forced him into general medical practice. In cooperation with his friend Joseph Breuer, Freud began to treat hysterical women. This is unusual, because at the time there was no known cure for hysteria, which is now known as a conversion disorder. Through trial and error and feedback from his clients, Breuer and Freud developed the technique known as psychoanalysis. Its fundamental rule is honesty; clients must relay all thoughts and feelings uncensored to the analyst. Clients then follow their stream of thought wherever it may lead, a process known as free association. In the course of free association, clients often uncover traumatic events in the past and, upon reliving these events, often experience relief from their symptoms. Freud's first major work, *The Interpretation of Dreams* (1900), detailed the process of dream interpretation, which he felt was the "royal road to the unconscious." Although it took six years to sell the first 600 copies printed, this work was reprinted eight times during Freud's lifetime. Although the technique of psychoanalysis is perhaps Freud's most important legacy, he made many other substantial contributions to psychology. These include the recognition of the importance of sexuality and unconscious processes, a fully developed system of personality, and an appreciation for the conflict between individual desires and the constraints of society.

**William James (1842–1910)**

William James, often considered the father of American psychology, was born in New York City but spent much of his childhood traveling between the United States and Europe, where he attended several private schools. James's interest in such varied fields as philosophy, religion, and science were cultivated at home in an enriched environment shared with his brother Henry James, the famous author. William James struggled to find a vocation that suited his various interests, trying his hand at art, chemistry, and finally, medicine. He received his MD from Harvard in 1868.

In 1872, James began teaching physiology at Harvard but was preoccupied by his ongoing and deep interest in such philosophical issues as free will and determinism. Though James considered himself a temporary dabbler in the discipline of psychology, his two-volume textbook, *Principles of Psychology* (1890), stood as the field's definitive textbook through the first half of this century. It is still considered one of the best-written texts on psychology and a source of many original ideas. James's contributions to psychology include the notion of a stream of consciousness, the importance of habit and instinct, and a complex theory of the self, theory of emotion, and opening the boundaries of psychology to include topics such as religious beliefs.

**John Broadus Watson (1878–1958)**

Watson is best known for his insistence that as a true science, psychology's research methods must be objective and its subject matter observable. Often called "the founder of behaviorism," Watson is one of the most dynamic, if enigmatic, figures in the history of American psychology. Born in 1878 in Greenville, South Carolina, Watson had a fairly unremarkable childhood, displaying neither the drive nor the vivid imagination that characterized him in his adult life. His enthusiasm for research and academic accomplishment first developed when he became involved in research work at the University of Chicago. Throughout his career at the university, he studied physiology of behavior in laboratory animals, and the patterns he observed later became the basis for his behavioristic theories.

In 1908, he left the University of Chicago to join the faculty at Johns Hopkins University where he entered the limelight of academia with the publication of an article in which he clearly stated the behaviorist point of view. A manifesto of sorts, the paper argued that psychology must become an objective science, an experimental branch of the natural sciences whose goal would be to predict and control behavior. Watson was disenchanted with the introspective methods characterizing psychology at the time and advocated a purely objective and experimental means of studying behavior.

In 1914, Watson published a very important book, *Behavior: An Introduction to Comparative Psychology*, in which he advocated the study of animal behavior without resorting to “mentalistic concepts.” This was the impetus behind the widespread study of rats and other animals for the purpose of developing behavior models in American psychology.

Watson's ideas leapt to prominence in a few short years. Because his redefinition of the discipline of psychology seemed to presage the course that modern psychology would take, he was elected president of the APA in 1915. In his presidential address, he linked Pavlovian theories of conditioning to his own behaviorist concepts.

The indefatigable Watson, meanwhile, had launched experiments in which he applied behavioristic concepts to child rearing. The “Little Albert” experiment, in which he conditioned fear in an infant, is probably his most famous work. His book, *Psychological Care of the Infant and Child*, was the product of his research, and its enthusiastic reception made him a sought-after expert on child care.

The whole range of human behavior fascinated Watson, and as early as 1917, he had begun studies into human sexual response. He observed sexual behavior in laboratory animals but wanted to explore the more complex changes that occurred in humans. The tenor of the times required the utmost discretion in pursuing this avenue of research. Watson used himself as a subject in his sexual response research. He secretly monitored his female laboratory assistant and himself during their sexual intercourse. When Watson's wife discovered the content of his experiments, she sued for divorce and had all of his records confiscated and destroyed. A major scandal resulted; Watson was dismissed from Johns Hopkins and married his research assistant. Unable to find an academic institution that would allow him a position on its faculty, he finally turned to private industry for employment in 1921.

During the years that followed, he applied the principles of behaviorism to public relations and advertising techniques. He collected demographic data as a basis for marketing campaigns and instituted the use of subliminal suggestion and hidden symbolism in advertisements. His expertise and enthusiasm for research in this new field made him a successful executive in one of the nation's largest advertising firms.

Although Watson continued to publish papers in scientific journals, he never again gained recognition from the scientific community. He died embittered at the age of 80.

### ***B.F. Skinner (1904–1990)***

Burrhus Frederic Skinner was born and raised in Susquehanna, Pennsylvania and received a bachelor's degree in English from Hamilton College in New York. Skinner enrolled in the experimental psychology program at Harvard and studied under E.G. Boring, earning his master's degree in 1930 and PhD in 1931. In 1936, he began his academic career at the University of Minnesota; then, in 1945, he took a position as chairman of the psychology department at Indiana University. In 1948, however, Harvard offered him a position, which he accepted, and he remained there for the rest of his life. Skinner died of leukemia in 1990.

While Skinner was at Harvard, he was heavily influenced by the work of John B. Watson. From this influence, Skinner dedicated his life's work to studying the relationship between reinforcement and observable behavior. Throughout his career, he insisted that psychology be a scientific, empirically driven discipline. He is considered by many to be one of the most important figures in 20th-century psychology, and his contribution to both clinical and experimental psychology is evident in the work of psychologists who followed his lead, and to this day, extend his work in associative learning research. The principles of reinforcement that he outlined were built on by clinical psychologists and applied to the conceptualization and treatment of mental disorders. The application of behaviorism to clinical psychology was not short lived, as empirically supported treatments for anxiety disorders (e.g., panic disorder, simple phobia) and child conduct problems are based upon behavioral principles.

### ***Max Wertheimer (1880–1943) and Kurt Koffka (1886–1941)***

Max Wertheimer and Kurt Koffka were early Gestalt psychologists who argued that psychological experience cannot be reduced to its basic elements. Rather, they asserted that behavior and thought as a whole must be studied in order to understand psychological experience.



Wertheimer was born in Prague, Austria-Hungary in 1880. His father directed a private business college and his mother was an accomplished amateur violinist. Wertheimer studied law, philosophy, and psychology at Charles University in Prague. He later studied philosophy and psychology at the University of Berlin under Carl Stumpf, and then moved to the University of Surzburg in 1904, obtaining his PhD under Oswald Kulpe. Wertheimer first discovered the phenomenon of apparent motion during a train trip, and later conducted studies on the phi illusion at Frankfurt, where Wolfgang Kohler and Kurt Koffka, his cofounders of the Gestalt school, participated as his research subjects. In 1933, Wertheimer fled Germany due to Hitler's rise to power, coming to the United States. He taught at the New School for Social Research in New York City until his death in 1943.

### **Abraham Maslow (1908–1970)**

Maslow was a humanistic psychologist best known for his development of a hierarchy of needs that must be fulfilled in order for an individual to reach self-actualization—the ability to realize one's unique potential as a human being.

Maslow received his PhD at the University of Wisconsin in 1934 under Harry Harlow. He then taught at Wisconsin for a year, followed by appointments at Teachers College of Columbia University, Brooklyn College, and finally, Brandeis University, where he spent most of his academic career. He moved to Menlo Park, California in 1969 as a resident fellow of the Laughlin Foundation.

Maslow is considered one of the foremost proponents of humanistic psychology and was the founder of the *Journal of Humanistic Psychology*. He is particularly known for his theory of motivation and the concept of a hierarchy of needs, ranging from basic survival needs to the need for self-actualization. His influential writings include *Toward a Psychology of Being* (1962) and *Religion, Values and Peak Experiences* (1964). He served in 1968 as president of the APA.

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## **Lecture Launcher 1.6 – Scandal in Psychology: John B. Watson's Fall from Grace**

John B. Watson was a very famous person in his day, something students might not realize, as he usually gets only a few short paragraphs in introductory psychology textbooks. In fact, at the end of his career in psychology he was an esteemed professor at the world-renowned Johns Hopkins University in Baltimore, Maryland. At one time he was recognized as an authority on caring for babies, much as Dr. Spock and Dr. Brazelton would later become. He was married, a father, and respected in his field.

All of that ended when he was fired over his affair with a graduate student, Rosalie Rayner. Mary Watson, his wife, insisted that the affair stop, as did Watson's employers. But neither Watson nor Rayner wanted the affair to end (in fact they married in 1921 while his divorce from Mary Watson was still pending), and finally Johns Hopkins insisted that he resign. The subsequent divorce from Mary was front page news at the time.

Watson, however, began a second successful career in advertising, working for the J. Walter Thompson agency and eventually becoming a vice president. Ironically, his ad campaigns for Maxwell House coffee and Ponds cold cream probably influenced many more people (at the time) than did his academic writing. It's also plain that he made much more money as an ad executive than he ever did as a professor! A happy ending? Perhaps not. Rosalie Rayner died in 1935, aged only 35 years, and Watson lived alone on their farm until his own death in 1958. By that point he had become embittered and reclusive, and had burned his vast collection of letters and personal papers, effectively putting an end to an important chapter in the history of psychology.

Benjamin Jr, L. T., Whitaker, J. L., Ramsey, R. M., & Zeve, D. R. (2007). John B. Watson's alleged sex research: an appraisal of the evidence. *American Psychologist*, 62(2), 131.

Buckley, K. W. (1989). *Mechanical man: John Broadus Watson and the beginnings of behaviorism*. New York: Guilford Press.

Duke, C., Fried, S., Piley, W., & Walker, D. (1989). Contributions to the history of psychology: LIX. Rosalie Rayner Watson: The mother of a behaviorist's sons. *Psychological Reports*, 65(1), 163-169.

Todd, J.T., & Morris, E.K. (1994). *Modern perspectives on John B. Watson and classical behaviorism*. New York: Greenwood Press.

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## Lecture Launcher 1.7 - The Study of Bumps on the Head

Franz Joseph Gall (1758–1828) was a skilled brain anatomist whose descriptions of the brain's gray and white matter, cerebral commissures, and contralateral innervation remain an important part of the knowledge base of neurology and psychology. Also, Gall was among the first to discuss the relationship between brain and behavior. Unlike the dualism of Descartes, Gall's view asserted that the mind was located in the brain. His studies of the brains of animals and of people of various ages and types indicated that cognitive abilities are based on the amount and placement of healthy cortical tissue, and that greater amounts of cortical tissue are usually associated with superior functioning. This field was named *phrenology*. An additional important aspect of Gall's view was that personality characteristics and abilities are determined by independent, genetically determined, neurologically distinct structures (Fodor, 1983). Gall postulated 27 faculties, including amativeness (sexual behavior), acquisitiveness, reverence, verbal memory, marvelousness, love of the picturesque, defensiveness, and number.

Gall's neuroanatomy research and "faculty" theory led to the notion of phrenology. Unfortunately, it is phrenology for which Gall is remembered best and as a result, ridiculed. His true accomplishments have been buried under the quackery of phrenology, even though it was his followers, rather than Gall himself, who were responsible for the worst sins of phrenology (Fodor, 1983). What's more, Gall's theories are often misrepresented or misunderstood by critics and modern historians.

Phrenology, as developed by Gall and his followers (such as Spurzheim and Combe), asserted that 1) the mind is located in the brain; 2) mental abilities are determined by innate faculties that are located in specific parts of the brain; 3) the size of the brain devoted to a faculty indicates the strength of that faculty; 4) the shape and external characteristics of the skull at particular locations reflect the brain beneath those locations; and 5) examination of the head/skull allows a description of the individual's personality and abilities (Kurtz, 1985). These ideas supposedly were stimulated by Gall's boyhood observation that several of his classmates who were not generally more intelligent, but who were more scholastically successful because of their superior memory abilities, all had large, bulging eyes (Fancher, 1979), and were furthered by Gall's later anatomical research. Through the study of many individuals, Gall and his associates mapped the regions of the skull they believed corresponded to each of the 27 faculties. For example, Gall's boyhood observation led to the hypothesis that verbal memory ability is reflected in the region of the cortex lying immediately behind the eyes: The brain is overdeveloped at that location when ability is great, and causes the eyes to protrude. Gall's interactions with a "Passionate Widow" revealed a large, hot neck, which he interpreted as a sign that the cerebellum at the lower back of the brain was the seat of sexual behavior ("amativeness") (Fancher, 1979, p. 48).

Phrenology has been attacked on several points. First, the skull does not accurately reflect the underlying brain. Thus, even if the size of the brain at specific locations did indicate the strength of the corresponding faculty, the skull's topology would be worthless for determining this. Second, although certain abilities do seem to be localized in specific parts of the brain (e.g., speech production at Broca's area), the amount of brain tissue does not reflect the level of the ability. Also, the 27 faculties are poorly chosen and described. Many are ill-defined, and others are usually considered to be the result of the combination of several other abilities, not independent faculties. A third major problem was the rather unscientific methods of research used to "confirm" the theory. Gall and his associates reportedly cited only cases that supported the theory, while ignoring or explaining away negative results (Fancher, 1979). Gall employed the concept of "balancing

actions" by one or more of the 27 faculties when the characteristics of the skull did not match the characteristics of the subject. As Fancher (1979) points out, with 27 factors involved, Gall could explain just about any result. Theories that do not allow any chance of disconfirmation are not good scientific theories.

Although most of the scientific community quickly savaged Gall and phrenology, phrenology retained great popularity among the general public. By 1832 there were 29 phrenology societies in Great Britain, and several journals devoted to phrenology were being published there and in America. Eventually, however, the interest in phrenology dissipated, and today phrenology receives attention only as a quaint example of pseudoscience. Kurtz lists three primary criteria for pseudoscience: 1) Stringent experimental methods are not routinely employed in the research; 2) There is no testable, coherent conceptual framework; and 3) Claims of confirmation are made even though questionable methods were used. By these criteria, phrenology is a pseudoscience, not merely an incorrect theory.

Fancher, R. E. (1979). *Pioneers of psychology*. New York: Norton. Pp. 43-58.

Fodor, J. A. (1983). *The modularity of mind*. Cambridge, MA: MIT Press/Bradford Books. Pp. 14-23.

Kurtz, P. (1985). Is parapsychology a science? In P. Kurtz (Ed.), *A skeptic's handbook of parapsychology*. Buffalo, NY: Prometheus Books.

Robinson, D. N. (1982). Cerebral plurality and the unity of self. *American Psychologist*, 37, 904-910.

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## Lecture Launcher 1.8 – Wundt's Other Method: Historical and Cultural Psychology

An important, although often overlooked, aspect of Wilhelm Wundt's work is his recognition of two kinds of science, and his belief that psychology belongs to both. In German these two sciences are called *Naturwissenschaften* (naturalistic psychology) and *Geisteswissenschaften* (cultural or social psychology). As the historian of psychology, Ernest Hilgard, notes, "in German psychology, the two kinds of science depended upon their distinctive methods." Naturalistic psychology is experimental and follows the methods of physiology, whereas cultural psychology utilizes a historical method and "its substance is the data of cultural residues" (1987, p. 46). Wundt distinguished between questions that were suitable for experimental investigation and those that had to be approached historically, but did not consider these sciences to be mutually exclusive. Rather, "he kept both streams of psychology flowing in the hope of including both in his grand system" (p. 47). Late in his life, between the years 1900 and 1920, Wundt published a 10-volume work in *Volkerpsychologie* (historical-cultural psychology) using the historical method, and included were discussions of language, myth, art, morals, social customs, and laws.

Hilgard notes that in American psychology, there is a long, although muted, history of debate between idiographic and nomothetic science. He writes that this debate "is in some respects parallel to Wundt's distinction between problems that were suitable for experimental investigation and those which had to be approached historically" (Hilgard, 1987, p. 746). Science that seeks general laws, using quantitative and experimental methods, is described as nomothetic, whereas the idiographic approach, using the methods of history and biography, attempts to understand particular events in nature or society.

Gordon Allport is perhaps the best known spokesperson of the idiographic approach. He believed that the individual personality was unique and that a psychology of personality must necessarily be idiographic. Existential and phenomenological psychologists have also argued for the historical method. More recently, however, with the emergence of social constructionism as a growing influence in the field and the increasing recognition of the need to understand behavior within its unique historical and cultural context, Wundt's second science seems to be gaining importance. History seems to be proving Wundt correct in his understanding that psychology must include *both* methods.

Hilgard, E. R. (1987). *Psychology in America: A historical survey*. San Diego, CA: Harcourt Brace Jovanovich.

<https://archive.org/details/elementsoffolkps014744mbp>  
<http://psychclassics.yorku.ca/Wundt/Folk/intro.htm>

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## Lecture Launcher 1.9 - Dates in the Development of Psychoanalysis

The psychodynamic perspective, in both its original and modified versions, was influential in the historical development of psychology. Share with your students some important dates from this perspective's history.

January 7, 1908 ..... Little Hans had his first phobic attack. Eeeek! Horses!!  
February 7, 1870 ..... Alfred Adler was born in Rudolfsheim, Austria.  
March 30, 1896 ..... The term *psychoanalysis* was first used in a paper by Sigmund Freud.  
April 20, 1950 ..... Anna Freud speaks at Clark University.  
May 6, 1856 ..... Sigmund Freud was born in Freiberg, Moravia.  
June 26, 1939 ..... Freud appeared on the cover of *Time* magazine  
July 26, 1875 ..... Carl Jung was born in Kesswil, Switzerland.  
August 21, 1909 ..... Jung and Freud departed Bremen to attend a conference at Clark University  
September 16, 1885 ..... Karen Horney was born in Hamburg, Germany.  
October 1, 1907 ..... Freud began treating the "Rat Man."  
November 4, 1899 ..... *The Interpretation of Dreams* was first published.  
December 11, 1880 ..... Josef Breuer began his treatment of "Anna O."

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## Lecture Launcher 1.10 – Psychology in the Framework of Emerging Transdisciplinary Science

Modern approaches to solving the most challenging public health problems (e.g., smoking, obesity) are beginning to develop transdisciplinary (TD) models to promote population health and reduce morbidity and mortality rates, as well as the billions of U.S. dollars spent related to these public health problems. One-dimensional treatments for complex health problems are not successful from a public health perspective. A TD approach to solving complex public health problems requires coordinated efforts among health professionals from different backgrounds who work together to develop novel approaches to treatment and prevention efforts. It represents an evolutionary step beyond multidisciplinary treatment by encouraging scientists and clinicians to develop a common language that all participating professionals can understand. Such an approach has the potential to truly impact serious public health problems compared to a separate one. For example, smoking is a multidetermined health behavior characterized by periods of recurring use, abstinence, and relapse. Therefore, changing smoking behavior requires long-term multi-dimensional, multi-modal, intensive treatment, in which improved collaboration among health practitioners and researchers, behavioral scientists, behavioral geneticists, biologists, health policy and economy researchers, and health systems researchers can promote improved outcomes. One-dimensional approaches implemented separately from each of these disciplines cannot address the comprehensive issues of complex problems and result in wasted resources and underperforming intervention approaches.

Psychologists are in a unique position to contribute to the development of transdisciplinary science. Their training is grounded in fundamental scientific principles and theory. Psychologists' approach to understanding and explaining complex phenomena parallels other scientific disciplines and can bridge language gaps across a broad range of scientific disciplines. Their perspective allows them to comment with expertise on human behavior, models of behavior change, and variables that influence the behavior change process and the maintenance of changed behavior. Moreover, their understanding of the process of decision

making, group behavior, marketing techniques, and other specific areas can influence the process of TD intervention development, implementation, evaluation, and dissemination.

Although TD science is in its infancy, one objective is to improve translation of science to practice. One way to accelerate the process is to implement treatment studies into real world clinical settings. A well-designed treatment study with behavioral science, public health systems, policy, and practitioners can accelerate dissemination, as well as increase our understanding of the factors that influence treatment outcomes. TD treatment approaches need not be viewed as “one-size-fits-all.” Indeed, TD approaches are problem focused; hence, collaborators who design and implement programs within their system and community may need to address unique factors that influence their patient populations. Thus, psychologists can contribute to the implementation of an intervention model to different groups of people whether groups are defined by psychopathology, community, or culture.

Bernstein, J. H. (2015). Transdisciplinarity: A review of its origins, development, and current issues. *Journal of Research Practice*, 11(1), 1.

Frodeman, R., Klein, J. T., & Pacheco, R.C.D.S. (Eds.). (2017). *The Oxford handbook of interdisciplinarity*. Oxford University Press.

Leavy, P. (2016). *Essentials of transdisciplinary research: Using problem-centered methodologies*. Routledge.

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## Lecture Launcher 1.11 - Over the Edge

As the runners lined up to start the 1986 NCAA 10,000-meter championship, Kathy Ormsby was the odds-on favorite. She had broken high school track records in three distances and recently set a new American collegiate record for the 10,000-meter race. Her parents, who were always supportive fans, watched from the sidelines. Kathy got off to a slow start but was only a few paces behind the leaders. Her fans knew she could soon catch up. However, this time Kathy did not bolt to the lead as she had done before. Instead, she veered away from the other runners. Without breaking her stride, she ran off the track, scaled a 7-foot fence, raced down a side street, and jumped off a 50-foot bridge. Ten minutes later, her coach found her on the concrete flood plain of the White River. She had two broken ribs, a punctured lung, and was paralyzed from the waist down. Not only would she never run again, she might never walk again.

What happened to Kathy? Why did she quit the race and nearly self-destruct? As a star athlete and premedical student on the Dean's list, she had everything going for her. She had been valedictorian of her high school class. Teachers and coaches described her as sweet, sensible, diligent, courteous, and religious. Nobody understood her behavior. It did not make sense. Kathy's father thought the tragedy “had something to do with the pressure that is put on young people to succeed.” Teammates felt the pressure may have come from within Kathy herself. “She was a perfectionist,” said one of them. Determined to excel at everything, Kathy had studied relentlessly, even during team workouts.

How did Kathy explain her actions? She told an interviewer that she was overcome by the terrifying fear of failure as she began falling behind in the race. “All of a sudden . . . I just felt like something snapped inside of me.” She felt angry and persecuted. These negative reactions were new to Kathy and made her feel as if she were someone else. “I just wanted to run away,” she recalled. “I don't see how I climbed that fence. . . . I just don't feel like that person was me. I know that sounds strange, but I was just out of control. . . . I was watching everything that was happening and I couldn't stop.”

The case of Kathy Ormsby raises fascinating questions for psychology. Personality, social, and developmental psychologists might ask how athletic ability, intelligence, parental support, competition, motivation to achieve, and personality traits combined to make Kathy a superstar in the first place. Clinical psychologists would want to know why something snapped in Kathy at this race, why feelings of anger were so foreign to her, and why she felt persecuted. Those who study the nature of consciousness would try to understand Kathy's perception that she was outside of herself, unable to stop her flight toward death. Health

psychologists and those who work in the area of sports psychology might try to identify signs of stress and clues in earlier behaviors that could have signaled an impending breakdown. Psychologists who emphasize the biological basis of behavior might consider the role of brain and hormonal factors in her sudden, abnormal reaction. Are there any circumstances under which you might quit as Kathy Ormsby did?

We may never completely understand what motivated Kathy's behavior, but psychology provides the tools—research methods, scaffolding, and theories about the causes of behavior—for exploring basic questions about who we are and why we think, feel, and act as we do. Psychologists are challenged to make sense of cases such as this one that violate ordinary conceptions about human nature. Their motivation is not only intellectual curiosity, but also a desire to discover how to help people in ways that might prevent such tragedies in the future.

Associated Press (Jun 5, 1996). *Ex-runner finds peace 10 years after bizarre accident.*

<http://www.spokesman.com/stories/1996/jun/05/ex-runner-finds-peace-10-years-after-bizarre/>

Hersh, P. (Nov 20, 1987). A great runner learns how to walk away. *The Chicago Tribune*.

Litsky, F. (Jun 6, 1986). Runner quits race, leaps from bridge. *The New York Times*.

Litsky, F. (Jun 7, 1986). Ormsby is permanently paralyzed. *The New York Times*.

Zimbardo, P. G., Johnson, R. L., Weber, A., & Gruber, C. W. (2007). *Psychology (AP High School Ed.)*. Upper Saddle River, NJ: Pearson Education.

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## Lecture Launcher 1.12 – Clinical, Psychiatric, and Other Types of Psychological Training

"I just love psychology because I want to help people! What's a good school to go to so I can become a therapist?" As instructors, we welcome such wide-eyed enthusiasm in our students. As professionals, however, we recognize that the question is much more complicated. Choosing between MA, PhD, PsyD, MFCC, or other degree programs can be a challenge right from the start. Choosing a training emphasis, let alone some kind of broader ideological stance, is an even bigger challenge. By the time the decision making filters down to "is this the right program for me?" many a student may already be disheartened.

Shed some light on aspects of graduate training by sharing with your students the following lists, compiled from various ranking sources. For example, the website [www.socialpsychology.org](http://www.socialpsychology.org) routinely publishes lists of graduate program rankings. Here are the Top 10 graduate programs in psychology, based on "quality scores" compiled by the National Research Council:

- 1 .....Stanford University
- 2 .....University of Michigan—Ann Arbor
- 3 .....Yale University
- 4 .....University of California, Los Angeles
- 5 .....University of Illinois at Urbana-Champaign
- 6 .....Harvard University
- 7 .....University of Minnesota—Twin Cities
- 8 .....University of Pennsylvania
- 9 .....University of California, Berkeley
- 10 .....University of California, San Diego

The National Research Council also compiled rankings of the top graduate programs in social psychology. Perhaps not surprisingly, many of the same schools are represented:

- 1 .....Stanford University
- 2 .....University of Michigan—Ann Arbor
- 3 .....Yale University
- 4 .....Harvard University

- 5 ..... University of California, Los Angeles
- 6 ..... University of Pennsylvania
- 7 ..... Carnegie-Mellon University
- 8 ..... University of California, Berkeley
- 9 ..... University of Minnesota—Twin Cities
- 10 ..... Cornell University

More of a change is seen when comparing graduate programs in clinical psychology:

- 1 ..... Yale University
- 2 ..... University of Pennsylvania
- 3 ..... University of Michigan—Ann Arbor
- 4 ..... University of Minnesota—Twin Cities
- 5 ..... University of California, Berkeley
- 6 ..... University of California, Los Angeles
- 7 ..... Indiana University, Bloomington
- 8 ..... University of Oregon
- 9 ..... University of Colorado, Boulder
- 10 ..... University of Washington

For historical comparison, Jean M. Kim and Edward C. Chang, of the University of Michigan, compiled rankings of U.S. and Canadian clinical psychology programs based on how well their graduates performed on the Examination for Professional Practice in Psychology (EPPP) between 1997 and 2006. The top 10 programs are listed below:

- 1 ..... University of Victoria
- 2 ..... University of Waterloo
- 3 ..... University of Illinois at Champaign-Urbana
- 4 ..... Rutgers University, New Brunswick
- 5 ..... Concordia University
- 6 ..... University of Wisconsin, Madison
- 7 ..... University of British Columbia
- 8 ..... Marquette University
- 9 ..... Temple University
- 10 ..... Queens University

And here are the Top 10 clinical psychology programs between 1988 and 1995, as reported by the Association for Psychological Science (APS) *Observer*:

- 1 ..... University of Oregon
- 2 ..... University of Waterloo
- 3 ..... University of Pennsylvania
- 4 ..... University of Delaware
- 5 ..... University of California, Los Angeles
- 6 ..... University of Iowa
- 7 ..... University of Minnesota
- 8 ..... University of Connecticut
- 9 ..... Yale University
- 10 ..... University at Albany, SUNY

Finally, here are the rankings of top psychiatry programs, compiled by *U.S. News and World Report*:

- 1 ..... Harvard University
- 2 ..... King's College, London
- 3 ..... University of California, Los Angeles
- 4 ..... Yale University

5 .....	Stanford University
6 .....	Columbia University
7 .....	University of California, San Diego
8 .....	University of Pittsburgh
9 .....	Duke University
10 .....	University College, London

You might share these data with your students for several purposes. First, emphasize that different metrics were used across these ranking systems and that certainly other standards apply. Second, note that a “good” program for one person might not be a good program for another. Differences in interests, future goals, prior experience, and so on can (and should) influence training decisions. Finally, make the point that a “good school” in general is not necessarily a good school for a specific subject matter. Harvey Mudd College is a wonderful school for engineering but not particularly for psychology (no offense, Harve!).

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## Lecture Launcher 1.13 - Case Studies of Vietnam War Experiences

An excellent example of how the case study works in psychological research is the work of Lambricht (2003), who studied the responses of six Vietnamese volunteers (varying in age from 24 to 68) to the disruption in their daily lives and occupations, and the cultural adjustments brought about by the war in Vietnam. She conducted the interviews individually, in different locations throughout Vietnam during June and July of 2002. The six volunteers, from whom she obtained written consent, answered seven questions. Although the standard seven questions might suggest that this face-to-face interview was a highly structured one, Lambricht was in fact free to follow up any interesting answers with more questions as the need arose, making the interview an unstructured one. Here are two brief excerpts from those interviews, answers to the question “What about your culture explains its resilience during sustained disruption (such as war, famine, social and political crises)?”

(Nguyen Ban, 24) “A happy stable family takes care of each other...we all overcome together. We have a solid base to stand on... The Vietnamese are very flexible, adaptable to the situation. They are resilient; in the hard time they are unified and come together in a community to fight against the enemy...”

(Le Minh Viet, 68): Resilience, without the ability to adapt under circumstances, we wouldn't have survived the Chinese domination, the French, and all the wars over the centuries. Circumstances shape the attitudes, the emotions, and the behaviors. All of us are used to war situation and became acclimated so it minimizes trauma.”

Notice that although both interviewees stress the adaptability of the Vietnamese, the younger Nguyen seems focused on how Vietnamese people might react in some future conflict—Nguyen did not live through wartime. The older Minh did experience the war and talks more about how the past affects his culture now. This kind of detailed information is only possible in a case-study style of research. Mere observation would not provide the answers to Lambricht's questions.

Interview Questions:

1. What about your culture explains its resilience during sustained disruption (such as war, famine, social and political crises)?
2. What lessons have been learned as a result?
3. How have these lessons been integrated into the current society?
4. Can you share some examples of adjustment to the turmoil, examples known within your area of expertise or with which you are personally familiar?



5. Can you give examples of maladjustment known within your area of expertise or with which you are personally familiar?
6. In thinking about your answers, what do you see as being particular to the Vietnamese culture that explains your response to the above questions?
7. Is there anything else you would like to add to this interview?

Lambright, L.L. (2003) Paper presented at International Conference, Midwest Institute for International/Intercultural Education, Cleveland, Ohio, April.

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## Lecture Launcher 1.14 - Online Polls

News websites such as *cnn.com* and *foxnews.com* frequently poll their visitors on current event topics. A good example of this is when websites ask visitors whom they plan to vote for in an upcoming presidential election. The results of these surveys are then posted online. Sometimes, the results of online polls are also publicized in newspapers, on television, or on the radio. After discussing online polls with your students, ask them to respond to the following questions in a class discussion or as a short writing assignment. What are the advantages and disadvantages of collecting survey and opinion poll data online? Why do you think that some critics claim they are misleading?

*Sample answer: Using online surveys is probably a very cost-effective way to collect large amounts of data. However, because only certain people might visit a website, the survey may have a biased sample. For example, people without a lot of money and older adults may not have access to a computer. Also, online polls only survey people who want to visit the website. If the website represents a conservative news organization, then the poll sample won't contain many liberals (and vice versa). If the survey sample is biased, then the results will not reflect the opinions of the general population.*

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## Lecture Launcher 1.15 - Correlation and Causality

There seems to be a general human tendency to attribute causality to correlated events. Laypeople, like psychologists, often impose patterns of (apparently) lawful regularity on observed events. Given what is perceived as an “effect,” we search for causes. Events are more likely to be singled out for attention and analysis when they are unusual, anomalous, and discontinuous with our prior experience. When such events are natural phenomena, they are typically relegated to the status of “cause” and then the search is directed toward their aftereffects.

One of the most persistent instances in which pseudo-correlations of behavioral consequences are reported to flow from salient natural and human events is the “baby boom” syndrome. For example, the allegation of increased birthrate nine months after a major power blackout in New York is well known, as is the baby boom in Israel nine months after their war with Egypt.

Invariably, when base rate data are used to compare the assumed “increase in births,” the effect vanishes. That is, when seasonal fluctuations in births are taken into account, there is no unusual effect left to relate to the nine-months-earlier unusual event. But that does not deter the correlation seekers. Three University of North Carolina sociologists attributed a 1955 drop in Southern birth rates to the Supreme Court's 1954 school desegregation decision (Rindfuss, Reed, & St. John, 1978). They theorized that uncertain prospects for the future “demoralize” prospective parents (both whites and, to a lesser extent, blacks), causing them to postpone any children they might otherwise have conceived in the three- or four-month period immediately

following the decision. The subsequent recovery in the birth rate is attributed to the realization that desegregation would in fact proceed slowly.

Rindfuss, R. R., Reed, J. S., & St. John, C. A. (1978). A fertility reaction to a historical event: Southern white birth rates and the 1954 desegregation ruling. *Science*, 201, 178-180.

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## Lecture Launcher 1.16 - Damned Lies, Damned Statisticians

Joel Best has written an excellent book examining the misuse and abuse of statistics, especially those asserted in the public forum and used for social and political decision making. The book is a great source of lecture ideas and demonstrations; an anecdote from the introduction will illustrate the kind of material you might draw from.

Best served on the dissertation committee of a student who asserted the following claim in the first sentence of her or his dissertation prospectus: "Every year since 1950, the number of American children gunned down has doubled." This dramatic statistic certainly attracts attention and would seem to call for strong, unambiguous, immediate legislation of all sorts. But as Best points out, there's a certain stink hanging over this claim. Let's say, for example, that in 1950 only one child was gunned down in America. That would mean that in 1951 two children were gunned down, in 1952 four children were gunned down, in 1953 eight children were gunned down, and so on. If this statistic were accurate, by 1965 there would have been 32,768 children gunned down (Best notes that FBI statistics for 1965 revealed 9,960 criminal homicides of *any* kind in the entire country). By 1970, the number of deaths would have passed 1 million, and by 1980 it would have passed 1 billion. By 1983, there would have been 8.6 billion gunned down children (more than twice the population of the planet at that time), and by 1995, when this student made this assertion, the number of American children gunned down would have been *35 trillion*—a staggering statistic indeed, but for a very different reason!

A little digging by Best revealed the error of the student's ways. The statement was harvested verbatim from a published article in a journal in the student's field, but the original statement was made by the Children's Defense Fund. However, the original statement read, "The number of American children killed each year by guns has doubled since 1950." Notice that this is a very different statement with a very different meaning: In 1994 the number of children "gunned down" was twice what it was in 1950. Some creative license on the part of the article's authors (and the student's lifting of it) led to the combinatorial confusion revealed by Best.

But there's more to the story. As Best points out, the population of the United States also rose between 1950 and 1994, by about 73%. We might therefore expect all kinds of events to increase, including the number of childhood fatalities. Because the population had nearly doubled, the number of childhood shootings (and number of cars purchased, and children born, and television sets bought, and books written, and any number of things) might indeed have seemed to increase just because there were more people. Moreover, there's some fuzziness about the claim itself. "Child" is a little sticky, given that some Children's Defense Fund statistics include anyone under the age of 25. Also, "died by gunshot" could include suicides and accidents as well as homicides. Finally, it's not clear who has compiled the information on these childhood deaths or how the counting was done.

Unfortunately, there are more than enough of these types of statistical missteps that you can share with your students. Use these examples to stress the importance of critical thinking and a keen evaluation of dubious claims.

Best, J. (2012). *Damned lies and statistics* (updated ed.). Berkeley, CA: University of California Press.

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## **Lecture Launcher 1.17 - Basic Research vs. Applied Research**

For fiscal year 2017, about 1.5 billion dollars were requested by the president of the United States for The National Institute of Mental Health (NIMH). The money budgeted to the NIMH is used to fund psychology research around the country. In broad terms, these research projects can be divided into two categories: basic and applied. The goal of basic research is simply to expand our understanding and increase our knowledge. For example, a basic research project sponsored by the NIMH may study the function of a single protein in the brain to figure out what it does. The goal of applied research, on the other hand, is to solve a particular problem, such as developing pharmaceutical agents to treat depression. How much taxpayer money should go to basic versus applied research can be a contentious issue. Some feel that basic research wastes money pursuing “knowledge for knowledge’s sake,” and that this money would be put to better use developing treatments for psychological and neurological problems. Supporters of basic research argue that practical treatments often arise from the knowledge gained from basic research, and that applied researchers wouldn’t know where to begin if not for basic research.

After introducing students to the debate over funding for basic versus applied research, ask for volunteers to share their opinions with the class. How would they distribute the NIMH budget? As students discuss the issue, you may want to pose the following questions: When Congress appropriates funds to the NIMH, should they be allowed to specify what percentage goes to basic or applied research? Can the United States afford to fund research that may have no clear benefit to society? What role does serendipity play in scientific discovery? Make sure students come away from the lesson with an understanding of the importance of both types of research.

<https://www.nimh.nih.gov/about/budget/fy-2017-budget-congressional-justification.shtml>

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## **Lecture Launcher 1.18 - Size Matters**

It doesn’t take much instruction in statistical reasoning or research methods to learn that larger samples are usually better than smaller ones, for all kinds of reasons. But this maxim is sometimes ignored, even in professional publications.

Judy Langlois, of the University of Texas at Austin, and her students investigated a case in which sample size makes an important difference in interpreting research outcomes. Research on facial attractiveness has often revealed that masculine male faces are more attractive than feminine male faces (Cunningham, Barbee, & Pike, 1990; O’Toole et al., 1998). Other researchers, however, have shown that feminine male faces are more attractive than masculine male faces (Perrett et al., 1998). Both sets of investigators have offered cogent explanations for their findings, but Langlois and her colleagues suspected that sample size may account for the contradictory results.

The researchers gathered attractiveness ratings and masculinity/femininity ratings for 150 men’s faces and 147 women’s faces. They then bootstrapped (i.e., resampled with replacement) the correlation between attractiveness and masculinity/femininity for every possible sample size from  $N=3$  to  $N=150$ . This produced a sampling distribution of correlation coefficients, or, in other words, a large comparison distribution against which to evaluate other results.

The researchers then examined the literature on the issue of facial attractiveness and converted appropriate findings to effect sizes. This allowed them to compare the effect sizes reported in previous findings with the effect sizes generated by their sampling distribution. In cases in which the probability of a published study’s effect size was less than .025 of coming from the generated sampling distribution, it could be concluded that

the published study's results were significantly different. Among the findings revealed by these procedures was this: At large sample sizes (50 faces and above), the variance among the possible correlations is fairly stable, but at smaller sample sizes (fewer than 30 faces), there is a bias to obtain inaccurately high correlations. In short, sample size can account for much of the variation seen in studies of the relationship between masculinity and attractiveness in men.

Bronstad, P. M., Ramsey, J. L., & Langlois, J. H. (2002). Sample size explains discrepancies in facial attractiveness research: Masculine male faces are more attractive. Poster presented at the 12<sup>th</sup> Annual Convention of the American Psychological Society, New Orleans, June 2002.

Hoss, R. A., Ramsey, J. L., Griffin, A. M., & Langlois, J. H. (2005). The role of facial attractiveness and facial masculinity/femininity in sex classification of faces. *Perception*, 34(12), 1459-1474.

Cunningham, M. R., Barbee, A. P., & Pike, C. L. (1990). What do women want? Facialmetric assessment of multiple motives in the perception of male facial physical attractiveness. *Journal of Personality and Social Psychology*, 59, 61-72.

O'Toole, A. J., Deffenbacher, K. A., Valentin, D., McKee, K., Huff, D., & Abdi, H. (1998). The perception of face gender: The role of stimulus structure in recognition and classification. *Memory and Cognition*, 26, 146-160.

Perrett, D. I., Lee, K. J., Penton-Voak, I. S., Rowland, D., Yoshikawa, S., Burt, D. M., Henzi, S. P., Castles, D. L., & Akamatsu, S. (1998). Effects of sexual dimorphism on facial attractiveness. *Nature*, 394, 884-887.

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## Lecture Launcher 1.19 – The (Tobacco) Road from Hypothesis to Conclusion

Here's what might seem like an unusual question to your current students: How do we know that cigarette smoking is dangerous to one's health? What's (hopefully) taken for granted these days was not always the case. In fact, like most testable questions, hypotheses needed to be developed, evidence needed to be gathered, and conclusions needed to be derived. Here's a short version of how that happened in the case of smoking and illness.

Cigarette smoking became common in Europe after French and British soldiers picked up the habit from Turkish soldiers during the Crimean War of 1854 to 1856. The habit was adopted by a few Americans in the next 30 or 40 years. In those days, the tobacco was strong and smokers rolled their own cigarettes. More American males began to smoke after the automatic cigarette-making machine was perfected in North Carolina in the 1880s. Very few women smoked, at least in public, until after World War I, when U.S. tobacco companies began to target women with their advertising.

People must have suspected that cigarettes were dangerous to health long before any research was done. The slang term for cigarettes, "coffin nails," was used during the first half of the 20th century. The conjecture became a hypothesis when doctors noticed that many people who died of lung cancer had been heavy smokers, and it was also suspected that nicotine affects the circulatory system. Early studies produced strong negative correlations between cigarette smoking and age at death: The more people smoked, the younger they were when they died.

These correlational data resulted in the first warning labels on cigarettes in the 1960s: "Caution: The Surgeon General has determined that cigarette smoking may be hazardous to your health." Notice that the warning reads "may be hazardous," rather than "is hazardous." The conservative warning is all that was justified by correlational data: The earlier death of smokers could be for reasons other than cigarette smoking. Perhaps smokers live more stressful lives, and both the smoking and their illness are the result of stress. Also, it is possible that smokers are not as mindful of their health in other ways as nonsmokers; maybe they don't exercise or have nutritious diets. Or perhaps both the smoking and the mortality have a genetic basis.

To do a definitive experiment on the effects of smoking, one would need to get a sizeable sample of young people who have never smoked and use matched random assignment to place them in either a smoking

group or a nonsmoking group. The smokers would smoke at least one package of cigarettes a day for life, beginning at age 14, and the nonsmokers would not smoke at all. The dependent variable is age at death, and the successors of the original researchers could not analyze the data until all the participants had died. If the nonsmokers lived significantly longer, the researchers would be justified in concluding that cigarette smoking *is* hazardous to health.

Although an experiment like this has not been done, and probably never will be done, in the 1970s the label on cigarette packages nonetheless was changed to read, "Cigarette smoking is dangerous to your health." The evidence that prompted this change came from several sources. One source was studies that tried to match smokers and nonsmokers on various alternative causes, such as stress, and thus to control for its effects on health. Another source of evidence came from animal studies. The conclusion that cigarettes are truly "coffin nails" is based on large amounts of data and a multitude of studies.

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## Lecture Launcher 1.20 - Using Animals in Psychological Research

A controversial issue in psychology, and in many other fields of study, involves the use of animals in research. Is it ethical to subject animals to unnatural and/or painful situations in the pursuit of knowledge about the human condition? You might present students with some additional information about the use of animals in psychological research and the nature of the debate.

Psychologists who study animals are sometimes interested in comparing different species or hope to learn more about a particular species. Their work generally falls into the area of basic science, but often it produces practical benefits. For example, using behavioral principles, farmers have been able to reduce crop destruction by birds and deer without resorting to their traditional method—shooting the animals. Other psychologists are primarily interested in principles that apply to both animals and people. Because many animals have biological systems or behavioral patterns similar to those of human beings, using animals often allows more control over variables than would otherwise be possible. In some cases, practical or ethical considerations prevent the use of human beings as subjects. By studying animals, we can also clarify important theoretical issues. For example, we might not attribute the greater life expectancy of women solely to "lifestyle" factors and health practices if we find that a male-female difference exists in other mammals as well.

As the text points out, those who support the use of animals in research argue that animal studies have led to many improvements in human health and well-being. In recent years, however, animal research has provoked angry disputes over the welfare of animals and even over whether to do any animal research at all. Much of the criticism has centered on the medical and commercial use of animals, but psychologists have also come under fire. Critics of animal research have pointed to studies that produce no benefits for human beings but involve substantial harm to the animals being studied. A few years ago, for instance, a Maryland psychologist studying the nervous system was convicted of cruelty to animals after he cut the nerve fibers controlling limb sensation in 17 monkeys. The purpose of his research was to find ways to restore the use of crippled limbs in stroke victims. The charges alleged abusive treatment of the animals. The psychologist's conviction was eventually reversed on appeal, but by then the government had withdrawn its funding of the project.

People have staked out extreme positions on both sides of this debate. The controversy has often degenerated into vicious name-calling by extremists on both sides. Some animal rights activists have vandalized laboratories and threatened and harassed researchers and their families; some scientists have unfairly branded all animal welfare activists as terrorists (Blum, 1994). A more positive result of the debate has been the close examination of the APA's ethical code for the humane treatment of animals and the

passage of stricter federal animal welfare regulations governing the housing and care of research animals. Most psychological organizations, however, oppose proposals to ban or greatly reduce animal research. The APA and other organizations feel that protective legislation for animals is desirable but must not jeopardize productive research that increases scientific understanding and improves human welfare.

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## Lecture Launcher 1.21 - An Historical Perspective on Research Ethics

When discussing the ethical treatment of human research participants several “classic” studies, which would be ethically questionable by today’s standards, serve as examples. For instance, many instructors discuss Stanley Milgram’s studies of obedience, Philip Zimbardo’s prison simulation, or Stanley Schachter’s studies of autonomic arousal and attribution. Students often have mixed reactions to these examples. Some find them relatively innocuous, whereas others have strong reactions to the treatments participants were asked to endure. The fact that such studies took place within relatively recent times compounds the issue. Some students see these 1960s’ experiments as long ago and of a different time, whereas others see them as examples of the unethical treatment psychologists still foist on people to this day.

To provide a context for these types of issues, your students might be interested in hearing about older examples of ethically questionable research. For example, Carney Landis, a noted psychologist of the 1920s and 1930s, conducted a series of studies dealing with the experience and expression of emotion. In one set of studies he was particularly interested in capturing facial expressions of emotion and used strong elicitors of emotion to produce them. For example, one situation involved dropping a lit firecracker underneath an unsuspecting subject’s chair, whereas another involved showing participants pornographic (for their day) photographs and photos of horribly disfiguring skin diseases.

Although these manipulations may seem harsh, Landis used stronger ones as well. For example, participants were instructed in one situation to plunge their hand into a pail of shallow water that, unbeknownst to them, contained three live frogs. (This manipulation was presumably used to evoke disgust.) To quote Landis, “After the subject had reacted to the frogs the experimenter said, ‘Yes, but you have not felt everything yet, feel around again.’ While the subject was doing so he received a strong...shock from an induction coil, attached to the pail by concealed wiring.”

And for the *coup de grâce*:

“The table in front of the subject was covered with a cloth. A flat tray and a butcher’s knife were placed on the cloth. A live white rat was given to the subject. He (sic) was instructed, ‘Hold this rat with your left hand and then cut off its head with the knife.’...In five cases where the subjects could not be persuaded to follow directions the experimenter cut off the head while the subject looked on.”

Mention is also made of a final experiment involving shock that “...varied from a just noticeable intensity to a strength which caused the subject to jump from the chair,” as well as other studies. Landis’s participants, in passing, included graduate students, a stenographer, a school teacher, and a 13-year-old boy with high blood pressure.

Although Landis has been singled out for examination here, there are certainly no lack of experiments from the 1920s through the 1960s that can provide examples of ethically dubious research. Discussing such studies, especially in light of current APA standards, should produce spirited discussion among your students.

Landis, C. (1924). Studies of emotional reactions II: General behavior and facial expression. *Comparative Psychology*, 4, 447-509.

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**▲ Return to Chapter 1: Table of Contents****Lecture Launcher 1.22 - The Characteristics of Good Reasoners**

Reasoning skills are a central component of critical thinking (along with the other skills and dispositions described in Chapter 1 of the text). The following characteristics of good and bad reasoners are from the late Richard W. Paul of the Critical Thinking Community:

***Characteristics of Good Reasoners***

1. ***Reasoning has a purpose. Good reasoners:***
  - state their purpose clearly
  - distinguish it from related purposes
  - adopt realistic and significant purposes and goals
  - monitor their thinking for consistent goals
2. ***Reasoning is an attempt to figure something out, to settle some question, to solve some problem. Good reasoners:***
  - are clear about the question they are trying to settle and can express it clearly
  - can break a question into sub-questions
  - distinguish significant from trivial and relevant from irrelevant questions
  - distinguish questions they can answer from questions they can't
  - are sensitive to the assumptions built into the questions they ask
3. ***Reasoning is done from some point of view. Good reasoners:***
  - keep in mind that people have different points of view, especially on issues that are controversial
  - consistently articulate other points of view and reason from within those points of view
  - seek other viewpoints, especially when the issue is one they believe in passionately
  - have insight into areas and problems where they are most likely to be prejudiced
4. ***All reasoning is based on data, information, evidence. Good reasoners:***
  - assert a claim only when they have sufficient evidence to back it up
  - can articulate and therefore evaluate the evidence behind their claims
  - actively search for information *against* (not just *for*) their own position
  - key in on relevant information and disregard information or data that are irrelevant to the question at issue
  - draw conclusions only to the extent that they are supported by the data
  - state their evidence clearly and fairly
5. ***Reasoning is expressed through, and shaped by, concepts and ideas. Good reasoners:***
  - are aware of the key concepts and ideas they use
  - are able to explain the basic implications of the key words and phrases they use
  - are able to distinguish their special, nonstandard uses of words from standard uses
  - are aware of irrelevant concepts and ideas
  - use concepts and ideas in ways relevant to their functions
  - can distinguish superficial from deep concepts
6. ***Reasoning is based on assumptions. Good reasoners:***
  - make assumptions that are clear
  - make assumptions that are reasonable
  - make assumptions that are consistent with each other
7. ***Reasoning leads somewhere, has implications and consequences. Good reasoners:***
  - clearly articulate significant implications and consequences of their reasoning

- search for negative as well as for positive consequences
- anticipate the likelihood of unexpected negative and positive implications

**8. Reasoning contains inferences by which we give meaning to data and come to conclusions.**  
**Good reasoners:**

- make inferences that are clear and precise
- usually make inferences that follow from the evidence or reasons presented
- often make inferences that are deep rather than superficial
- often make inferences or come to conclusions that are reasonable
- make inferences or come to conclusions that are consistent with each other

Wilson, J., & Binker, A.J.A. (2012). *Critical thinking: What every person needs to survive in a rapidly changing world* (2<sup>nd</sup> ed.), Rohnert Park, CA: Foundation for Critical Thinking.  
<http://www.criticalthinking.org>

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## ▼ CLASSROOM ACTIVITIES, DEMONSTRATIONS, AND EXERCISES

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- 1.2 - Psychology's Goals Applied to Matchmaking
- 1.3 - Pseudopsychology and the Mozart Effect
- 1.4 - A Jigsaw Approach to Learning the Early History of Psychology
- 1.5 - Which Famous Psychologist Am I?
- 1.6 - Perspectives in Psychology
- 1.7 - What Psychologists Know
- 1.8 - Thinking About Your Interests in Psychology
- 1.9 - Inference or Observation?
- 1.10 - Contradictory Beliefs
- 1.11 - Name That Research Method
- 1.12 - Making Statistics Relevant
- 1.13 - Observational Research in the Dining Hall
- 1.14 - Understanding Correlations
- 1.15 - Correlating Shoe Size and Height
- 1.16 - Wonder Horse Dials 911 to Save Boy's Life
- 1.17 - Softens Hands While You Do Dishes
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### Activity 1.1 - Misconceptions about Psychology

This activity expands on the idea behind the *Think about It* feature that opens Chapter 1 (text p. 2). You can use it to initiate a discussion of the scientific method and how it might be used to examine each of the misconceptions included in the “Knowledge of Psychology Test” (**Handout Master 1.1**).

One of the most popular and venerable activities for the introductory course is the administration and subsequent discussion of misconceptions about psychology. Although a new 65-item multiple-choice test was developed by McCutcheon (1991), the most popular test is the Test of Common Beliefs developed by Vaughan (1977). Vaughan's test, however, has been criticized for the ambiguity of some of the items (Brown, 1984; Gardner & Dalsing, 1986; Ruble, 1986), the fact that all items have “false” as the correct response, which may lead to a response set tendency (Vaughan, 1977), and the finding that many of the items are not really misconceptions since they are often correctly answered (Gardner & Dalsing, 1986; Lamal, 1979). Griggs and Ransdell (1987) compared responses to Vaughan's Test of Common Beliefs from students that had taken an introductory psychology course in high school to those of several other studies (Lamal, 1979; Gardner & Dalsing, 1986; Vaughan, 1977). Using a criterion of at least a 50% error rate for an item (that is, they were answered as “true”), they identified 15 questions that met the criterion in at least two studies and had not been subject to earlier criticisms of ambiguity. These items are reproduced in **Handout Master 1.1** and are ordered from highest to lowest with respect to their average error rate. You can administer these items to your class and use the responses as a starting point for a discussion on common sense notions and misconceptions about psychology. You may want to note to your students that many of these items are also answered incorrectly by psychologists and other social scientists (see Gardner & Hund, 1983). You can also tell your students that the correct answers to many of these items are discussed in their textbook.

Brown, L. T. (1983). Some more misconceptions about psychology among introductory psychology students. *Teaching of Psychology*, 10, 207–210.

- Brown, L. T. (1984). Misconceptions about psychology aren't always what they seem. *Teaching of Psychology*, 11, 75–78.
- Gardner, R. M., & Dalsing, S. (1986). Misconceptions about psychology among college students. *Teaching of Psychology*, 13, 32–34.
- Gardner, R. M., & Hund, R. M. (1983). Misconceptions of psychology among academicians. *Teaching of Psychology*, 10, 20–22.
- Griggs, R. A., & Ransdell, S. E. (1987). Misconceptions tests or misconceived tests? *Teaching of Psychology*, 14, 210–214.
- Lamal, P. A. (1979). College students' common beliefs about psychology. *Teaching of Psychology*, 6, 155–158.
- McCutcheon, L. E. (1991). A new test of misconceptions about psychology. *Psychological Reports*, 68, 647–653.
- Ruble, R. (1986). Ambiguous psychological misconceptions. *Teaching of Psychology*, 13, 34–36.
- Vaughan, E. D. (1977). Misconceptions about psychology among introductory psychology students. *Teaching of Psychology*, 4, 138–141.

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## Activity 1.2 - Psychology's Goals Applied to Matchmaking

Based only on the descriptions provided in the grid below, ask your class to guess which pairs of the people listed belong together. There is no right or wrong answer. Tell your students to follow their instincts.

Now lead your class in a discussion of their matchmaking decisions with respect to the goals of psychology:

- How would they describe the behaviors they engaged in while trying to settle on appropriate matches?
- Did they read all the descriptions before they began?
- Did they find the decisions easy to make?
- Did they change their minds several times?
- How would they explain their behavior?
- What rules do they believe they used to match up the couples? Were they most concerned about age? About occupations? About leisure activities? Did they use some combination of all three descriptions? What inferences did they make in their decisions, such as perceived gender? What does the factor(s) that they used most say about them personally and their selection of a partner?
- How might their explanation allow them to predict which real-world relationships would succeed?
- Suppose that based on their day-to-day observations of relationships, they focused on occupations while doing their matchmaking. Are they willing to generalize from the predictions they made on this task to predictions in the real world? Can they begin to imagine the types of research they might carry out to test those predictions?
- Does their explanation allow them to control or improve their own relationship-seeking behavior or to give better advice to others?
- Have they learned from this exercise what matters most to them in a relationship? What more would they like to learn from research?
- Could they learn something that would allow them to improve the quality of their own or other people's lives?
- If their research reveals the factors that help determine which relationships, in general, will endure, they should be able to improve the quality of people's lives.

David Age: 21 Job: Car mechanic Enjoys: Gourmet food	Dana Age: 23 Job: Advertising executive Enjoys: Movies
Chris Age: 29 Job: Dog groomer Enjoys: Gardening	Janet Age: 35 Job: Lawyer Enjoys: Roller coasters

Sandy Age: 54 Job: Flight attendant Enjoys: Hang gliding	Karen Age: 18 Job: Sales clerk Enjoys: Art museums
Jamie Age: 20 Job: Secretary Enjoys: Football	Pat Age: 56 Job: Pediatrician Enjoys: Opera
Jerry Age: 37 Job: College professor Enjoys: Comic books	Rahul Age: 22 Job: Store manager Enjoys: Scuba diving

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## Activity 1.3 - Pseudopsychology and the Mozart Effect

When discussing pseudoscience and critical thinking, ask students about their impression of the so-called *Mozart effect*. Most students will have heard of the general phenomenon and have seen videos or CDs “designed to increase your children’s IQ.” (Zell Miller, the former governor of Georgia, was so impressed by this information that he authorized the development of a program to purchase thousands of classical music CDs, so that every newborn baby in Georgia could be sent home from the hospital with a head start on the Mozart effect.) Bring in a magazine advertisement and read from it, touting the merits of the product. (You can find images of and information about such products with a quick Internet search.) Ask students if they believe the claims, and if they would buy the product. Probe them by asking what proof they would need that the product actually works. Usually, students will begin to question the merits of the product, at which point you can discuss the actual psychological findings of this moneymaking gimmick by summarizing the work of Steele, Bass, and Crook (1999).

Pseudoscience quite literally means “false science.” Its “claims [are] presented so that they appear scientific even though they lack the supporting evidence and plausibility” (Shermer, 1997, p. 33). Furthermore, pseudoscience appears to use scientific methods and tries to give that “science-y” impression. Some characteristics of pseudoscience include the following:

- associates itself with true science
- relies on and accepts anecdotal evidence
- sidesteps disproof: any possible outcome is explained away, and fails to make specific predictions
- dangerously reduces complexity to simplicity

Ask students why the Mozart effect would be considered pseudoscience based on these types of characteristics. Invite your students to share other examples of possible pseudoscience, such as graphology, palmistry, aromatherapy, and quite arguably Eye-Movement Desensitization and Reprocessing (EMDR). Finally, encourage them to visit sites such as [www.skepticblog.org/](http://www.skepticblog.org/), [www.skeptic.com](http://www.skeptic.com/), or [MichaelShermer.com](http://MichaelShermer.com).

Steele, K.M., & Bass, K. E., & Crook, M. D. (1999). The mystery of the Mozart effect: Failure to replicate. *Psychological Science*, 10, 366–369.

Shermer, M. (1997). *Why people believe weird things: Pseudoscience, superstition, and other confusions of our time*. New York: W. H. Freeman & Co.

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## Activity 1.4 –

### A Jigsaw Puzzle Approach to Learning the Early History of Psychology

For this activity, you will need one or more colorful children's jigsaw puzzles, depending on class size. Each puzzle should measure approximately 9 inches by 12 inches and contain 12 to 15 pieces. There should be at least one puzzle piece per student. Thus, four puzzles would be needed for a class of 50.

Break the puzzles apart and distribute the pieces randomly throughout the class, being sure not to give adjacent puzzle pieces to adjacent students. After all students receive a piece, invite them to tell you everything they can about their piece. Ask them to consider you “an alien who has just landed from the mother ship,” someone for whom everything must be reduced to a basic level and explained in terms that cannot be reduced further. Their descriptions of the puzzle pieces should not assume prior knowledge on your part (e.g., “it has a Ninja turtle on it” would assume prior knowledge). Eventually, accept descriptions such as “it is round,” “it has color on it,” and “it has no odor” because these answers are more fundamental than the previous ones. This exercise helps students understand the difficulty of reducing anything to its most fundamental level. When they have nothing more to say, introduce the word *structuralism* as a way of knowing an object or behavior by reducing it to its most basic parts. Then, have students tell you how much they know about their piece and how much they still need to know about it. This helps students to realize the limits of structuralism.

Next, students should figure out what their piece does. Encourage them to mill about the room to find adjoining pieces. (This mingling also serves as an excellent icebreaker.) After the students see how their pieces work in conjunction with other pieces, introduce the word *functionalism* as a way of knowing an object or behavior by seeking to understand its function or purpose. In short, discuss what the piece can do and what it cannot do. Then, ask students if their knowledge of their piece is complete. Although they know what its parts are (structure) and what it does (function), is there more to know? As isolated groups of students hold their two-piece objects, they realize the limitations of this approach as well. Unless everyone continues to explore, they will not obtain larger meaning and additional knowledge.

Finally, have students continue to work with their pieces to assemble all relevant parts into a whole. Again, with multiple puzzles and random piece distribution, students must cooperate and communicate to create meaningful whole puzzles. After puzzle assembly, introduce the term *Gestalt psychology* as a way of knowing an object or behavior by creating a whole from parts, such that the whole derives its meaning only when the parts relate and work together. Ask if anyone has heard the maxim “The whole is greater than the sum of its parts” and explain its meaning in relation to what they have just learned.

Krauss, J. (1999). A jigsaw puzzle approach to learning history in introductory psychology. *Teaching of Psychology*, 26(4), 279–280.

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## Activity 1.5 - Which Famous Psychologist Am I?

The purpose of this activity is to familiarize students with the names and contributions of notable psychologists. For this activity, you will need to prepare a sign for each student to wear on her or his back. As students enter the class, pin or tape a sign to their backs with the name of a psychologist discussed in the introductory chapter. Make sure that the student doesn't see the assigned name. If you have a large class, you may need to give several people the same historical name. After discussing the history of psychology, tell the students that they are going to have a chance to guess the name of the psychologist on their back. Allow a 10- to 15-minute “mingling” period in which students can move about the room interacting with each

other. Students are only allowed to ask questions of others which can be answered *yes* or *no*. For example, the students might ask, "Am I a woman?" After hearing the answer, they must move on to a new student to ask their next questions, such as "Am I associated with functionalism?" or "Was I the first woman to receive a doctoral degree in psychology?"

This activity can be modified for large classes. If your room lacks space for "mingling," or you simply have too many students to complete the activity comfortably, you may want to modify this activity by asking for several volunteers. The volunteers can stand in front of the class and take turns asking questions of the entire class until they are able to figure out their assigned name.

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## Activity 1.6 - Perspectives in Psychology

This activity will help students summarize the various perspectives, distinguish among them, and appreciate the value of eclecticism. For this exercise, students should work in small groups. Each group should take one of the major psychological perspectives discussed in Chapter 1 (psychodynamic, behavioral, humanistic, cognitive, sociocultural, biopsychological and evolutionary). In the first step, using their books and their minds, they are to outline the key figures as well as key terms and concepts on a PowerPoint slide or poster, in preparation for presenting their perspective to the class. In the second step of this exercise, students are to read a brief case history and analyze the case according to their chosen perspective. The third step is to present their perspective and their analysis to the class.

If you have a small class, you can have each group present its perspective and analysis orally, using PowerPoint or posters as visual prompts. If you have a large class, you may want to have groups do posters, then group posters on similar perspectives together around the edges of the room. You could then tour around the room and ask a few key questions of students from each group while other students look and listen.

Detailed instructions for this activity are contained in [Handout Master 1.2](#). You should follow up the presentations with a discussion of the difference between a perspective and a theory. Finally, you should conclude with a discussion of eclecticism, the notion that all of the perspectives are needed to construct comprehensive explanations of behavior and mental processes.

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## Activity 1.7 - What Psychologists Know

The topic of "what psychologists do" is closely related to "what psychologists know." Breakthroughs in knowledge both central and tangential to psychology occur daily, and there's an easy way to find out about them. Encourage your students to subscribe to one of the many services that provide information about psychology headlines. These feeds are typically free, and although some topics may be of more or less interest to your students, all the information gets delivered quickly and efficiently.

Psychology Headlines Around the World - <http://psyresearch.org/news/headlines>

PsychWidget - <http://www.socialpsychology.org/widget.htm>

Twitter - <http://www.twitter.com/PsychNews>

Science Daily - [https://www.sciencedaily.com/news/mind\\_brain/psychology/](https://www.sciencedaily.com/news/mind_brain/psychology/)

PsycPort - <http://www.apa.org/news/psycport/>

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## Activity 1.8 - Thinking About Your Interests in Psychology

Ask students to think about the various subfields in psychology, encouraging them to look ahead in their textbook for more information. Ask students to then rank their interests in psychology's specialty areas from 1 (*most interesting*) to 11 (*least interesting*).

Clinical psychology  
Cognitive psychology  
Comparative psychology  
Counseling psychology  
Developmental psychology  
Educational and school psychology  
General experimental psychology  
Industrial/organizational psychology  
Personality psychology  
Neuroscience and physiological psychology  
Quantitative psychology  
Social psychology

You may want to tabulate the class's interests and compare the results to the descriptive data described in the textbook. Also, it may be of interest to keep the students' rankings, then ask them to repeat the ranking at the end of the course; return their original rankings and ask students to discuss any changes that occurred (and why) from the beginning to the end of the course.

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## Activity 1.9 - Inference or Observation?

Copy and distribute **Handout Master 1.3** to students. This review exercise asks students to decide whether each of 14 statements is strictly objective or whether it includes an inference made by the observer.

Answers:

1. *observation*, 2. *inference*, 3. *inference*, 4. *observation*, 5. *inference*, 6. *inference*, 7. *inference*, 8. *observation*, 9. *inference*, 10. *observation*, 11. *inference*, 12. *inference*, 13. *observation*, 14. *observation*.

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## Activity 1.10 - Contradictory Beliefs

Consider these contradictory beliefs:

*Birds of a feather flock together* ..... *Opposites attract*  
*Absence makes the heart grow fonder* ..... *Out of sight, out of mind*  
*You can't teach an old dog new tricks* ..... *Never too old to learn*  
*The squeaky wheel gets the grease* ..... *The nail that sticks up gets hammered down*  
*You can't judge a book by its cover* ..... *Where there's smoke, there's fire*

*Better safe than sorry.....Nothing ventured, nothing gained*  
*Two heads are better than one ..... Too many cooks spoil the broth*  
*Never look a gift horse in the mouth ..... Beware of Greeks bearing gifts*

Often students will have anecdotal stories about each belief. Ask students to think about their beliefs from an empirical point of view. You may want to facilitate discussion by providing students with the following questions:

*Can you rely on a single person's account to believe in a phenomenon?*  
*How might each set of beliefs be tested empirically?*  
*When will you "believe" in a certain phenomenon?*

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## Activity 1.11 - Name That Research Method

In this exercise, students are asked to match brief descriptions of research with the name of the method being used. Copy **Handout Master 1.4** and distribute to students as a basis for this exercise.

Answers: 1-c, 2-a, 3-e, 4-f, 5-d, 6-b.

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## Activity 1.12 - Making Statistics Relevant

Statistics can be demystified if you use data gathered from your own students in your presentation of statistical concepts. This requires a little advance planning on your part, so you can have data analyzed by the time you are discussing statistics, but the results are generally worth it.

Several class meetings before you plan to discuss statistics, have students complete the Student Data Sheet, which is included as **Handout Master 1.5**. Emphasize that it is important that students furnish all of the information requested. Students should not put their names on the data sheets. Collect the data sheets and enter the data into a spreadsheet or statistical program. If you are using a spreadsheet program such as Excel, each row represents data for one student; each column contains one type of data.

Sex	Height	Shoe Size	Exercise	Stress	Depression	Anxiety
m	73	11	10	2	2	1
f	65	8	10	3	1	3

After the data are entered, you can compute various types of analyses and construct graphs from the data. (Correlations and t-tests may be computed in Excel using the *Data Analysis* tools, which are available as add-ins under *Tools* on the menu bar.) Using a spreadsheet or statistical program, it is easy to calculate many correlation coefficients. Construct graphs of the relationships that are most interesting, surprising, or absurd. Before presenting the data, ask students to predict the nature and strength of various correlations (e.g., height versus shoe size, exercise versus depression, shoe size versus stress). As you present the data to the students, remind them of how the data were generated; this will help them to focus on the *meaning* of the correlational relationships you are discussing.

Students are also typically interested in statistics relevant to gender differences. Calculate averages for

males versus females in all categories of data (e.g., mean height for males versus females; mean shoe size; mean depression levels). Present means for males and females for various categories. Ask students to predict whether the differences are *statistically significant*. If possible, run t-tests on the data to determine *p* values and present these to the class to confirm or disconfirm their predictions. Male-female differences in height and shoe size are typically statistically significant. Gender differences in other variables are less consistent. Again, choose comparisons that are especially interesting or surprising to present to the class.

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## Activity 1.13 - Observational Research in the Dining Hall

Koschmann and Wesp (2001) provide several research activities for observational research, correlational research, and experimental research. One way to introduce students to research methods is to allow them to become more cognizant of their everyday surroundings and fellow classmates' behaviors. Koschmann and Wesp suggest that the college or university dining hall is an excellent "laboratory" to observe human behavior. Merely ask students to observe others during meals in the cafeteria, such as seat selection or food choices. You might encourage student research teams to decide which behaviors they wish to observe. Ask students to record their observations, maintain confidentiality, and "debrief" anyone who asked them what they were doing. During the next scheduled class, ask students to share their findings and to generate discussion about potential hypotheses that may provide a better understanding of the behaviors they observed.

Koschmann, N. & Wesp, R. (2001). Using a dining facility as an introductory psychology research laboratory. *Teaching of Psychology*, 28, 105–108.

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## Activity 1.14 - Understanding Correlations

This exercise on correlations can be used as a classroom demonstration or as a take-home assignment following a lecture on the nature and uses of correlations. The student handout for this exercise is included as **Handout Master 1.6**. Suggested answers are provided below; however, there are other reasonable explanations.

1. *Positive*. Mutual influence. Similar life experiences.
2. *Negative*. Orphanage environment has an adverse effect on cognitive development. Intelligent children are more likely to be adopted.
3. *Positive*. Violent pornography stimulates violent behavior. Both the violent crime and the number of stores are related to the size of cities. Violent criminals are attracted to violent pornography.
4. *Negative*. Absent students miss pearls of wisdom from the mouth of the instructor. Students with jobs or other responsibilities find it difficult both to get to class and to find time to study.
5. *Positive*. The money appropriated to control crime was poorly spent. The city grew during the eight years, resulting in more crime and more tax revenues.
6. *Positive*. Both variables are related to socioeconomic factors; children from affluent homes have both intellectual and physical advantages over children from substandard home environments. Age is the



third variable that accounts for scores on both variables; older children have bigger vocabularies and are also stronger and better coordinated.

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## Activity 1.15 - Correlating Shoe Size and Height

*Objective:* To provide students with an opportunity to collect, graph, and analyze data and explore the concept of correlation.

*Materials:* tape measure; graph paper; a computer running Microsoft Excel or statistical software (optional)

*Procedure:* Preparation: Begin by reviewing correlations, correlation coefficients, and scatter plots with students. Then ask each student to write a hypothesis about the relationship between shoe size and height for the class. Remind students that their hypothesis should describe both the *direction* and *strength* of the relationship. Data Collection: Before beginning the data collection, explain to students that all height data should be recorded in inches. Also explain that, because men's and women's shoe sizes are measured differently in the United States and Canada, they should add 1½ to all of the men's shoe sizes to convert them to the equivalent women's shoe size. Next, have students collect shoe size and height data from the class. For larger classes, you may want to divide the class into smaller groups, with each group collecting and graphing their own set of data. Alternatively, demonstrate the process of random sampling by choosing the names of approximately 20–30 students “out of a hat” and then record their heights and shoe size on the board. A tape measure should be available for students in case some students do not know their own height. Importantly, remind the class that each student's height must remain paired with that same student's shoe size, otherwise it will not be possible to assess the relationship between the two variables. Analysis: After the data have been collected, students should work together as a class or in groups to create a scatter plot. Remind students to consider the range of the data values when choosing appropriate scales and ranges for the plot's axes. After the data have been plotted, have students discuss the relationship between the two variables. Ask students to estimate the correlation coefficient based upon the scatter plot and compare it to their original hypothesis. Depending on the data set, reasonable estimates will probably range from +0.3 to +0.8. If a computer is available, the actual correlation coefficient can be easily calculated by entering the data into a Microsoft Excel spreadsheet and then using the CORREL function.

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## Activity 1.16 - Wonder Horse Dials 911 to Save Boy's Life

Jane Halonen suggests a fun class exercise that tests students' understanding of experimental methodology principles. After you have covered the basics of correlation, experimentation, and causal inference, challenge your students to apply these principles by examining the outrageous claims made in tabloid headlines, many of which imply a causal relationship (e.g., dreaming in black-and-white improves your sex life; garlic diet improves memory...but not breath; large gopher presence precedes volcano eruptions). For this exercise, bring in a variety of headlines from supermarket tabloids that are psychology-related and causal-sounding (or ask students to bring in examples). Challenge students to design simple studies that will accurately test whether the relationship claimed in the headline is a valid one. Halonen reports that students enjoy the opportunity to “think like scientists” in response to humorous and outrageous claims and that this exercise helps stimulate them to scrutinize causal claims from all sources and to design experiments more carefully and creatively (and, if that isn't enough, they can practice their newfound skills in line at the grocery store)!

Halonen, J. S. (1986). *Teaching critical thinking in psychology*. Milwaukee: Alverno Productions.

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## Activity 1.17 - Softens Hands While You Do Dishes

A variation of the tabloid exercise suggested above encourages students to apply experimental principles to claims they are bombarded with on a daily basis—television and magazine advertising. For this exercise, bring in (or have your students bring in) samples of advertising and have students critique the product claims of success according to principles of experimental methodology. Ads can be critiqued on several grounds, including the problem of personal testimony being unreliable, the absence of a control or comparison group, the presence of extraneous variables, the presence of plausible alternative explanations, unclear or undefined variables, or a lack of supporting statistics. Jane Halonen reports that students become enthusiastic about the usually dreaded topic of experimental methodology when they realize it has the potential to make them smarter consumers.

Halonen, J. S. (1986). *Teaching critical thinking in psychology*. Milwaukee: Alverno Productions.

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## Activity 1.18 - Testing Random Assignment

Students are sometimes leery of random assignment, thinking that the people with the best memory or the worst sense of smell will all end up in the same group and make the results of research un dependable. This demonstration is designed to show that random assignment does produce equivalent groups.

Provide students with small cards and have them record their height in inches. If the class is small, ask them to record the height of their best friend on a second card. Collect the cards and then randomly assign them to several groups of 20. Have students calculate means for the groups.

The means should be quite close, illustrating that random assignment has produced equivalent groups. You might also explain that random assignment is not infallible and can be a source of experimental error.

This activity can be extended by using groups of different sizes, such as 2, 5, 10, 20, and 50, to show that the probability of getting groups that are not equivalent decreases as group size increases.

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## Activity 1.19 - Crossword Puzzle

Copy and distribute **Handout Master 1.7** to students as a homework or in-class review assignment.

Answers for the Crossword puzzle:

### Across

4. the phenomenon in which the expectations of the participants in a study can influence their behavior.

**placebo**

5. the theory and therapy based on the work of Sigmund Freud. **psychoanalysis**

7. tendency of observers to see what they expect to see. **bias**

10. process of assigning subjects to the experimental or control groups randomly, so that each subject has an equal chance of being in either group. **random**

11. the scientific study of behavior and mental processes. **psychology**
12. tentative explanation of a phenomenon based on observations. **hypothesis**
14. a professional with an academic degree and specialized training in one or more areas of psychology. **psychologist**
15. early perspective in psychology associated with Wilhelm Wundt and Edward Titchener, in which the focus of study is the structure or basic elements of the mind. **structuralism**
16. in research, repeating a study or experiment to see if the same results will be obtained in an effort to demonstrate reliability of results. **replicate**
17. the entire group of people or animals in which the researcher is interested. **population**
18. a deliberate manipulation of a variable to see if corresponding changes in behavior result, allowing the determination of cause and effect relationships. **experiment**

#### Down

1. a measure of the relationship between two variables. **correlation**
2. thinking and making reasoned judgments about claims. **critical**
3. early perspective in psychology associated with William James, in which the focus of study is how the mind allows people to adapt, live, work, and play. **functionalism**
6. the process of examining and measuring one's own thoughts and mental activities. **introspection**
8. method system of gathering data so that bias and error in measurement are reduced. **scientific**
9. a medical doctor who has specialized in the diagnosis and treatment of psychological disorders. **psychiatrist**
13. perspective that focuses on the relationship between social behavior and culture. **sociocultural**

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## Activity 1.20 - Fill-in-the-Blanks

Copy and distribute [Handout Master 1.8](#) to students as a homework or in-class review assignment.

### Answers for Fill-in-the-Blanks—Chapter 1

1. behaviorism
2. functionalism
3. structuralism
4. psychology
5. description, explanation, control, prediction
6. theory
7. gestalt
8. psychoanalysis
9. humanism
10. cognitive
11. scientific method
12. hypothesis
13. naturalistic observation
14. surveys
15. ethics
16. experimenter
17. correlation
18. evolutionary
19. psychologist
20. biopsychological
21. experiment

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## ▼ HANDOUT MASTERS

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Handout Master 1.1  
**Knowledge of Psychology Test**

*Instructions:* Read each item carefully and then circle whether you believe the statement to be true or false.

- T F 1. To change people's behavior toward members of ethnic minority groups, we must first change their attitudes.
- T F 2. By feeling people's faces, blind people can visualize how they look in their minds.
- T F 3. Children memorize much more easily than adults.
- T F 4. Unlike humans, the lower animals are motivated only by their bodily needs—hunger, thirst, sex, etc.
- T F 5. "The study of the mind" is the *best* brief definition of psychology today.
- T F 6. The more you memorize by rote (e.g., poems), the better you will become at memorizing.
- T F 7. The best way to ensure that a desired behavior will persist after training is completed is to reward the behavior every single time it occurs throughout training (rather than intermittently).
- T F 8. Fortunately for babies, human beings have a strong maternal instinct.
- T F 9. The ability of blind people to avoid obstacles is due to a special sense that develops in compensation for their absence of vision.
- T F 10. By giving a young baby lots of extra stimulation (e.g., mobiles and musical toys), we can markedly increase its intelligence.
- T F 11. Psychiatrists are defined as medical people who use psychoanalysis.
- T F 12. Boys and girls exhibit no behavioral differences until environmental influences begin to produce such differences.
- T F 13. The high correlation between cigarette smoking and lung cancer proves that smoking causes lung cancer.
- T F 14. Genius is akin to insanity.
- T F 15. In love and friendship, more often than not, opposites attract to one another.

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**► Return to Activity: Misconceptions About Psychology**  
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Handout Master 1.2  
**Perspectives in Psychology**

**Step 1.**

Pick one of the perspectives listed below. Each group, working together, is responsible for teaching the class about its viewpoint. Prepare a PowerPoint presentation or poster that summarizes the important points about your theory. Be sure to include the **names** of people who were most important in developing your theory and **key terms** and **concepts** associated with your theory. Be prepared to present your theory to the class.

**Biological**

**Learning**

**Cognitive**

**Sociocultural**

**Psychodynamic**

**Step 2.**

Read the following case history. Working with your group, decide how a psychologist using your perspective would explain the CAUSE of Andrea's problem. *Do not rely on common sense and intuition in discussing this case. Imagine that you are a dyed-in-the-wool advocate of this particular viewpoint and make your arguments from that point of view.* Write your ideas on your PowerPoint slide or poster and be prepared to present them to the whole class.

Andrea is a 19-year-old college student. She has requested counseling from her college counseling center at the urging of her friends. Andrea's friends believe that she may have an eating disorder. Andrea sees herself as fat, but to her friends she is startlingly thin. In fact, she is so thin that they are afraid that she will become seriously ill. Andrea maintains this low weight mainly by eating practically nothing and drinking two quarts of water a day. She says that she thinks about food "all the time" when she is restricting her food intake, but that she does not want to eat because she is afraid of getting fat. At other times, however, her hunger is so intense that she feels like she has to give in to the cravings. At those times she "binges" and eats huge amounts of food. For example, she once ate a half gallon of ice cream in a little over one hour. After her "binges" she works to get rid of the excess calories she has consumed by vomiting. She says she is starting to agree that she may have an eating problem. After interviewing Andrea, you are convinced that she meets criteria for diagnoses of both anorexia and bulimia.

You are also interested in obtaining some background information about Andrea, to aid in understanding her. You find out that Andrea is 19 years old and a freshman at your college. She says that she started really worrying about her weight two years ago, when she was a junior in high school. At that time her parents were quarreling a lot and had even talked about divorce. She says that managing her eating made her feel more in control. She also noticed that, even though she still felt fat, people seemed to pay more attention to her and to respond to her better as she got thinner. She indicates that she likes having a more "boyish," more athletic figure.

**Step 3.**

Present your perspective and your analysis of the case history to the class.

► **Return to Activity: Perspectives in Psychology**

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Handout Master 1.3  
**Inference or Observation?**

Decide whether each statement is objective (O) or whether it includes an inference or interpretation (I) made by the observer.

- \_\_\_\_\_ 1. Marvin coughed three times before resuming his monologue on the feats he performed on the football team when he was in high school.
- \_\_\_\_\_ 2. The noise from outside caught the rat's attention and it hesitated before deciding which alley to take in the maze.
- \_\_\_\_\_ 3. As she began to talk about her mother's death, her grief manifested itself in tears.
- \_\_\_\_\_ 4. He had his notebook open on the desk in front of him but he took no notes and during the lecture he looked at his watch 23 times.
- \_\_\_\_\_ 5. After Sandra left to go to class, he continued to sit under the tree daydreaming.
- \_\_\_\_\_ 6. Sammy indicated his preference for his father by approaching him whenever he wanted to be reassured.
- \_\_\_\_\_ 7. When the group therapy session was over, she was so anxious to get away from the others that she forgot her purse and umbrella.
- \_\_\_\_\_ 8. Sue ate her hamburger and salad rapidly, and entered the conversation at the table only once during the meal.
- \_\_\_\_\_ 9. Billy became more frightened of Prissy every time she tried to hug and kiss him.
- \_\_\_\_\_ 10. While Allison told the therapist about her affair with Ted, she looked at her feet and held the arms of the chair tightly.
- \_\_\_\_\_ 11. He knocked, then he rang the doorbell and waited for 87 seconds before he finally decided that there was no one home.
- \_\_\_\_\_ 12. Kenny was too shy to join the other children in the sand pile, but I could tell that just watching them was a pleasant experience for him.
- \_\_\_\_\_ 13. The man on the other side of the street fell after the third shot was fired by the woman standing in front of the bakery.
- \_\_\_\_\_ 14. The child looked from the stick to the bread several times before she picked up the stick and used it to bring the bread within her reach.

**► Return to Activity: Inference or Observation?**

**◄ Return to complete list of Handout Masters for Chapter 1**

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Handout Master 1.4  
**Name That Research Method**

Here are the major research methods used by psychologists. Match each with one of the following examples of research.

- a. case history
- b. naturalistic observation
- c. laboratory observation
- d. survey
- e. psychological tests
- f. experiment

1. Jerry is a psychology professor who is interested in the factors that affect the performance of rats who are learning to find their way through a complex maze. Every afternoon he gives each of his 50 rats ten trials in the maze, counting the number of wrong turns each rat makes on its way through the maze.
2. Ben is counseling with Ingo Larsen in a small room in the neuropsychiatric hospital. Ben is a graduate student in clinical psychology and Ingo is his client. Ingo was admitted to the neuropsychiatric hospital when he came to the student health clinic complaining that he heard voices shouting obscenities at him, and confiding that he thinks he is going through a spontaneous sex change. After each session with Ingo, Ben writes a report describing Ingo's verbal and nonverbal behavior and his interpretations of the behavior.
3. Carlos is a graduate student who plans to become a psychometrician. He, like Ben, is working at the neuropsychiatric hospital. His job is to administer a battery of tests to new patients. He will send the test results, along with his summary and interpretation of them, to the patient's clinical psychologist or psychiatrist.
4. Ada is testing the hypothesis that color preference can be influenced by associating a color with a pleasant experience, such as eating. This afternoon she is delivering a supply of red, yellow, blue, green, and white nursing bottles to the mothers of newborns who have consented to let their infants be subjects in her research.
5. Dee is an assistant professor who will teach introductory psychology for the first time next term. She has chosen some films to show to her class of more than 200 students, and is now preparing a questionnaire to administer to her students after each film. She thinks getting student reactions to the films will be helpful next time she teaches the class.
6. Francesca is an undergraduate psychology major. For her senior thesis, she is investigating the nature of the audience for pornography. This afternoon she is sitting in her car across the street from one of the pornographic bookstores in the area. She is taking notes on the sex, approximate age, and ethnicity of the patrons as they enter and leave the store.

► **Return to Activity: Name That Research Method**

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Handout Master 1.5  
**Student Data Sheet**

Please furnish **ALL** of the information requested.

Circle one to indicate whether you are:      **male**                      **female**

State your height in inches (e.g., a person who is 5'5" is 65 inches tall) \_\_\_\_\_ inches

State your shoe size \_\_\_\_\_

How many hours per week do you exercise *on average*? \_\_\_\_\_

Think of how "stressed out" you have felt *on average* over the past two weeks and circle the answer that best represents your stress level.

1	2	3	4	5	6	7	8	9
no stress				medium stress				extreme stress

Think of what your mood has been like *on average* over the past two weeks and circle the answer that best represents your mood.

1	2	3	4	5	6	7	8	9
very happy				neutral				very depressed

Think of what your anxiety levels have been like *on average* over the past two weeks and circle the answer that best represents your anxiety levels.

1	2	3	4	5	6	7	8	9
very calm				medium				extreme anxiety

► **Return to Activity: Making Statistics Relevant**

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Handout Master 1.6  
**Understanding Correlations**

Correlational studies show relationships between variables. If high scores on one variable predict high scores on the other variable, the correlation is *positive*. If high scores on one variable predict low scores on the other variable, the correlation is *negative*.

Showing that two variables are related does not justify claiming that a causal relationship exists. There may be a causal relationship, but other explanations usually exist. For example, the variables may be related because both have a causal relationship with a third variable.

For each of the correlational studies described below, decide whether the correlation is positive or negative and give two alternative explanations for each finding.

1. A study of married couples showed that the longer they had been married, the more similar their opinions on social and political issues were.  
Positive or negative?

Explanation 1:

Explanation 2:

2. An intelligence test was given to all the children in an orphanage. The results showed that the longer children had lived in the orphanage, the lower their IQ scores.  
Positive or negative?

Explanation 1:

Explanation 2:

3. In a study of American cities, a relationship was found between the number of violent crimes and the number of stores selling violence-depicting pornography.  
Positive or negative?

Explanation 1:

Explanation 2:

4. A college professor found that the more class absences students have, the lower their grade in the course tends to be.  
Positive or negative?

Explanation 1:

Explanation 2:

5. A politician running against a candidate who had been in office for eight years pointed out that violent crime had increased steadily during those eight years even though the administration appropriated more and more money to fight crime.  
Positive or negative?

Explanation 1:

Explanation 2:

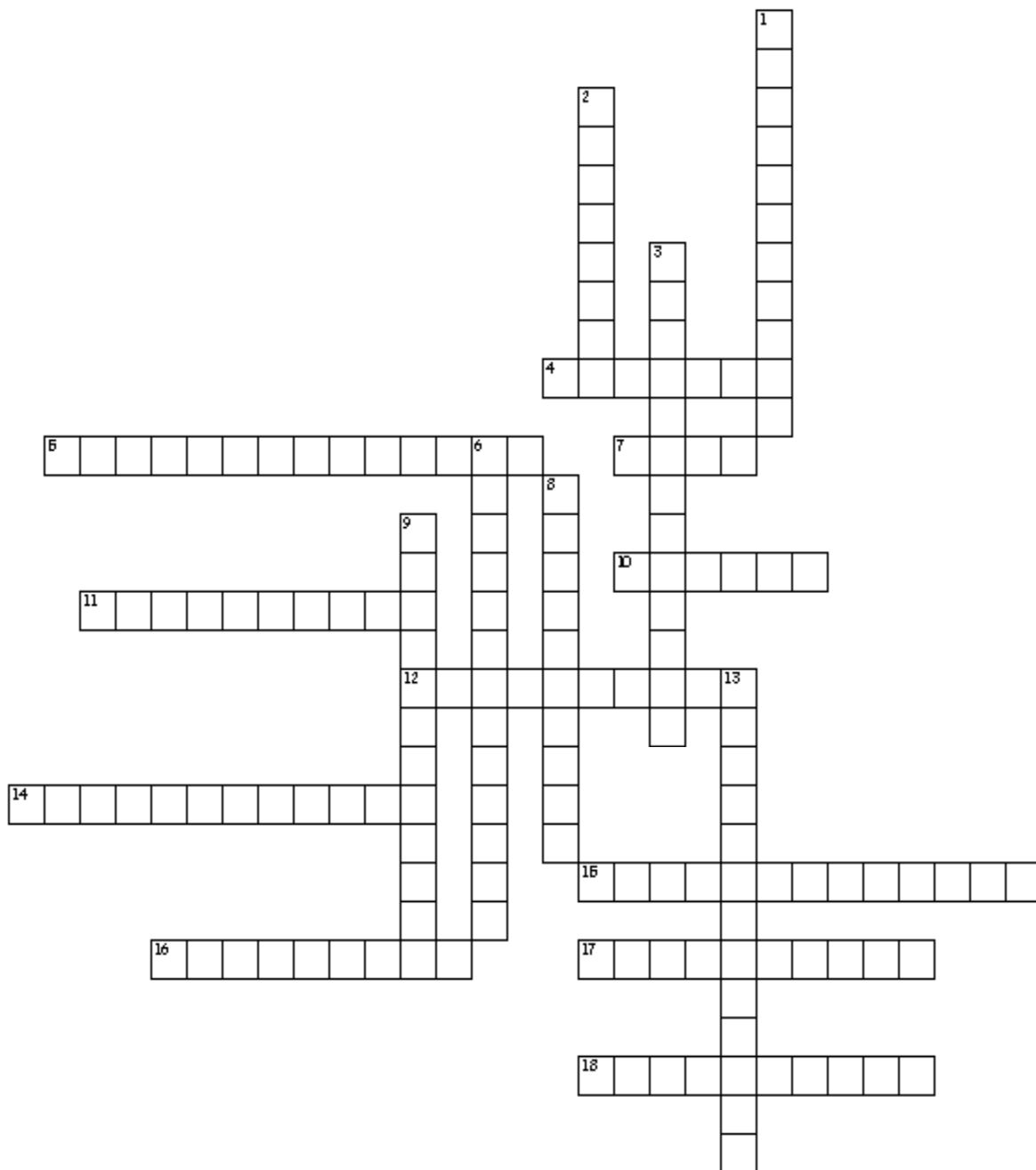
6. It was found that elementary-school children who scored high on a vocabulary test also tended to score high on a test of physical strength and muscular coordination.  
Positive or negative?

Explanation 1:

Explanation 2:

**► Return to Activity: Understanding Correlations**  
**◄ Return to complete list of Handout Masters for Chapter 1**  
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# Handout Master 1.7 Crossword Puzzle



**Across**

4. the phenomenon in which the expectations of the participants in a study can influence their behavior
5. the theory and therapy based on the work of Sigmund Freud
7. tendency of observers to see what they expect to see
10. process of assigning subjects to the experimental or control groups randomly, so that each subject has an equal chance of being in either group
11. the scientific study of behavior and mental processes
12. tentative explanation of a phenomenon based on observations
14. a professional with an academic degree and specialized training in one or more areas of psychology
15. early perspective in psychology associated with Wilhelm Wundt and Edward Titchener, in which the focus of study is the structure or basic elements of the mind
16. in research, repeating a study or experiment to see if the same results will be obtained in an effort to demonstrate reliability of results
17. the entire group of people or animals in which the researcher is interested
18. a deliberate manipulation of a variable to see if corresponding changes in behavior result, allowing the determination of cause and effect relationships

**Down**

1. a measure of the relationship between two variables
2. thinking and making reasoned judgments about claims
3. early perspective in psychology associated with William James, in which the focus of study is how the mind allows people to adapt, live, work, and play
6. the process of examining and measuring one's own thoughts and mental activities
8. method system of gathering data so that bias and error in measurement are reduced
9. a medical doctor who has specialized in the diagnosis and treatment of psychological disorders
13. perspective that focuses on the relationship between social behavior and culture

**► Return to Activity: Crossword Puzzle**

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Handout Master 1.8

**Fill-in-the-Blanks**

1. The science of \_\_\_\_\_ that focuses on observable \_\_\_\_\_ only. It must be directly seen and able to be measured.
2. Defined as to how the mind allows people to adapt, live, work, and play, it is called \_\_\_\_\_.
3. This type of psychology focused on structure or basic elements of the mind and is called \_\_\_\_\_.
4. The definition of \_\_\_\_\_ is the scientific study of behavior and mental processes
5. The four goals of psychology are \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
6. The general explanation of a set of observations or facts is called \_\_\_\_\_.
7. \_\_\_\_\_ ideas are now part of the study of *cognitive psychology*, a field focusing not only on perception but also on learning, memory, thought processes, and problem solving.
8. \_\_\_\_\_ was the theory and therapy based on the work of Sigmund Freud.
9. \_\_\_\_\_ held the view that people have free will, the freedom to choose their own destiny.
10. The \_\_\_\_\_ perspective focuses on memory, intelligence, perception, problem solving, and learning.
11. A system of gathering data so that bias and error in measurement are reduced is called the \_\_\_\_\_.
12. A tentative explanation of a phenomenon based on observations is called a \_\_\_\_\_.
13. Watching animals or humans behave in their normal environment without interacting with them in any way is called \_\_\_\_\_.
14. A researcher will ask a series of questions about the topic under study in a method called \_\_\_\_\_.
15. When groups of psychologists or other professionals who look over each proposed research study and judge it according to its safety and consideration for the participants in the study they are interested in the \_\_\_\_\_ of the study.
16. The tendency of the experimenter's expectations for a study to unintentionally influence the results of the study is called the \_\_\_\_\_ effect.
17. A measure of the relationship between two variables is called a \_\_\_\_\_.
18. The \_\_\_\_\_ perspective focuses on the biological bases of universal mental characteristics that all humans share.
19. A \_\_\_\_\_ is a professional with an academic degree and specialized training in one or more areas of psychology.
20. The \_\_\_\_\_ perspective attributes human and animal behavior to biological events occurring in the body, such as genetic influences, hormones, and the activity of the nervous system.
21. A deliberate manipulation of a variable to see if corresponding changes in behavior result, allowing the determination of cause-and-effect relationships is called an \_\_\_\_\_.

### **Words for Fill-in-the-Blanks**

behaviorism  
biopsychological  
cognitive  
control  
correlation  
description  
ethics  
evolutionary  
experiment  
experimenter  
explanation  
functionalism  
gestalt  
humanism  
hypothesis  
naturalistic observation  
prediction  
psychoanalysis  
psychologist  
psychology  
scientific method  
structuralism  
surveys  
theory

**► Return to Activity: Fill-in-the-Blanks**

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## ▼ REVEL Multimedia Resources

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### Chapter 1 REVEL Multimedia Content available:

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**Video:** Diverse Perspectives

**Video:** Careers in Psychology

**Video:** Research Methods

**Video:** Experiments – Independent vs. Dependent Variables

**Video:** Experiments – Experimental Group vs. Control Group

**Video:** The Ethics of Psychological Research with People

**Video:** Critical Thinking

**Survey:** What Do You Know About Psychology?

**Survey:** Participating in a Research Survey

**Interactive:** Timeline of the History of Psychology

**Interactive:** Work Settings and Subfields of Psychology

**Interactive:** Scatterplots

**Interactive:** A Sample Experiment

**Thinking Critically Journal Prompt 1.1:** How would you define psychology? What do you hope to learn about psychology, yourself, and others after taking this course?

**Thinking Critically Journal Prompt 1.2:** Do you believe that violence is a part of human nature? Is violent behavior something that can someday be removed from human behavior or, at the very least, be controlled? Think about this question from each of the perspectives discussed in this chapter.

**Thinking Critically Journal Prompt 1.3:** You are testing a new drug to treat a serious, often fatal medical condition. Before your experiment is over, it becomes obvious that the drug is working so well that the people in the experimental group are going to recover completely. Should you stop the experiment to give the drug to the people in the control group?

**Shared Writing Prompt:** Researchers try to use a truly representative sample of the population of people in whom they are interested—one of the main reasons for using random selection. Even so, the sample is usually selected from within a particular segment of the social world in which the researchers themselves live and work. For example, in the United States, there are some fairly distinct differences between people from the northeast and people from the southeast, and the same can be true in many other countries. There are also differences between urban and rural areas. If a psychologist is conducting a study in a particular geographical area of a country, how might regional differences impact the study's results? What measures could or should the psychologist take to minimize the impact?

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## ▼ MyPsychLab Multimedia Resources

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### Chapter 1 Videos

Video: The Big Picture: Asking the Tough Questions (5:19)

Learn why the study of psychology is so valuable to society and improving daily life. Take a look at the broad spectrum of professions and specializations in the field.

Video: Basics: Diverse Perspectives (5:46)

See how research psychologists help us better understand the brain, behavior, and the mind using different perspectives and treatments.

Video: Thinking Like a Psychologist: Debunking Myths (5:26)

Discover how scientific research and myths in popular culture influence our opinions and beliefs as information consumers.

Video: The Big Picture: How to Answer Psychological Questions (2:57)

See how psychology is based on scientific inquiry and look at the basic scientific methods used to study the brain, the mind, and behavior.

Video: Basics: Scientific Research Methods (6:43)

Learn how experiments are designed and conducted, and understand the importance of independent and dependent variables, and control and experimental groups.

Video: Special Topics: Ethics and Psychological Research (5:27)

Learn about ethical concerns related to scientific research, and the regulations that researchers follow to keep their subjects healthy.

Video: Thinking Like a Psychologist: Thinking Critically (5:29)

Watch how psychologists use critical thinking to sharpen the focus and results of their experiments and make better decisions.

### Chapter 1 Simulations

Simulation: Implicit Association Test: Cats and Dogs

Sort images and words in a series of categories and find out if you have implicit preferences and prejudices towards cats or dogs.

Survey: Participating in a Research Survey

Participate in a survey to learn about your attitudes towards and experiences with participating in psychological research.

### Writing Space

Writing Practice prompts within Writing Space offer immediate automated feedback. Each student submission receives feedback based on the following characteristics: Development of Ideas, Organization, Conventions, Voice, Focus, and Coherence. Instructors can provide additional feedback and can adjust the auto-generated grade.

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## ▼ Practice Quizzes and *Test Yourself* Answer Keys

### Chapter 1

#### Practice Quiz page 10–11

1. a; 2. b; 3. d; 4. a; 5. c

#### Practice Quiz page 17

1. b; 2. a; 3. a; 4. d; 5. c; 6. a

#### Practice Quiz page 32

1. a; 2. b; 3. c; 4. a; 5. c; 6. c

#### Practice Quiz page 36

1. a; 2. a; 3. b; 4. b

#### Test Yourself page 36

1. d; 2. a; 3. a; 4. c; 5. b; 6. a; 7. a;  
8. a; 9. a; 10. b; 11. c; 12. a; 13. d; 14. b;  
15. a; 16. a; 17. a; 18. d; 19. b; 20. a

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