Chapter 2: Conducting Research in Psychology

BRIEF CHAPTER OUTLINE

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- Common Sense and Logic
- The Limits of Observation
- What Is Science?
- The Scientific Method
- What Science Is Not: Pseudoscience

Research Methods in Psychology
- Principles of Research Design
- Descriptive Studies
  - Case Study
  - Naturalistic Observation
  - Interview and Survey
- Meta-Analysis
- Correlational Studies
- Experimental Studies

Challenging Assumptions in the Objectivity of Experimental Research Commonly Used Measures of Psychological Research
- Self-Report Measures
- Behavioral Measures
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Making Sense of Data with Statistics
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Psychology in the Real World: **Challenge the Assumptions of Advertiser's Statistics Research Ethics**
- Ethical Research with Humans

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Bringing It All Together: Making Connections in Psychological Research: **Can Experience Change the Brain?**

Chapter Review

EXTENDED CHAPTER OUTLINE

Zimbardo‟s Stanford Prison Experiment is outlined in detail (see

- Zimbardo set out to examine whether normal people might behave in extreme ways when thrust into situations that place certain demands of them.
- Zimbardo screened 21 male student volunteers and assigned them to be either “guards” or “prisoners” in a simulated prison environment for two weeks. All were briefed beforehand about what conditions would be like in the mock prison. All the students signed a form consenting to participate.
- Six days into the simulation, however, Zimbardo ended the study, because the students were playing their roles too well.
  - Prisoners went back and forth between plotting riots and having emotional breakdowns, such as getting sick and crying.
  - Guards became extremely authoritarian, restricting almost all personal freedom of the prisoners.

One of the goals of modern psychological research is to understand human behavior in a sound, objective, and scientific manner while observing guidelines for the physical and emotional well-being of the people or animals being studied.

- Formal ethical guidelines, however, were first proposed in the United States in 1966 and only became law in 1974. This is *after* Zimbardo conducted his study. You may want to ask students if they think that his study would have been approved by IRBs today.

THE NATURE OF SCIENCE

Common Sense and Logic

Common sense is the intuitive ability to understand the world.

Logic tells us how the world *should* work.

CONNECTION: How do psychologists tease apart how much of a trait is due to genetics and how much is due to environment? A common approach is to study twins (both identical and fraternal) who are reared apart or reared together (Chapter 3).

The Limits of Observation

Our knowledge of the world comes through our five senses, but the way in which the brain organizes and interprets sensory experiences may vary from person to person, making observation potentially faulty.

Another problem with observation is that people tend to generalize from their observations and assume that what they witnessed in one situation applies to all similar situations.

What Is Science?

Science can be thought of in three distinct areas: physical, biological, and social.

- As mentioned in Chapter 1, psychology is a *social* science.

There are three attitudes of science:

1. Question authority. Be skeptical and don‟t just accept the words of experts. You must scrutinize and test ideas yourself.
2. Show open skepticism. While you should be skeptical, you should also, ultimately, be open to accepting whatever the evidence reveals.
3. Intellectual honesty. Accept the data, whatever it suggests.

The Scientific Method

The **scientific method** is made up of five basic processes that you can remember by the word OPTIC: Observe, Predict, Test, Interpret, and Communicate.

In the *observation* and *prediction* stages of a study, researchers develop expectations about an observed phenomenon.

- A **theory** is a set of related assumptions from which testable predictions can be made. They organize and explain what we have observed and guide what we will observe.
- A **hypothesis** is a specific, informed, and testable prediction of what kind of outcome should occur under a particular condition.

The third stage is the *testing* of these hypotheses. To do this, researchers select both an appropriate method of testing and the appropriate measurement techniques.

In the fourth stage, researchers use statistical techniques to *interpret* the results and determine whether they are beyond chance and a close fit to their prediction or not. You may want to use this as an opportunity to explain why psychology majors need to take statistics!

The fifth stage of the scientific method is to *communicate* the results. Generally, scientists publish their findings in an established, peer-reviewed, professional journal but they can also give talks and poster presentations. Written communications follow a standardized format (called APA [vs. MLA] style)

whereby the researchers report their hypothesis, describe their research design and the conditions of the study, summarize the results, and share their conclusions.

Replication is the repetition of a study to confirm the results. The advancement of science hinges on results being replicated. This is how the process of scientific discovery is cumulative. Previous knowledge builds on older knowledge.

What Science Is Not: Pseudoscience

Pseudoscience refers to practices that appear to be and claim to be science, but in fact do not use the scientific method to come to their conclusions.

Pseudoscience practitioners:

1. make no real advances in knowledge,
2. disregard well-known and established facts that contradict their claims,
3. do not challenge or question their own assumptions,
4. tend to offer vague or incomplete explanations of how they came to their conclusions, and
5. tend to use unsound logic in making their arguments.

Examples of pseudoscience include alchemy, creation science, intelligent design, perpetual motion machines, astrology, psychokinesis, and some forms of mental telepathy.

RESEARCH METHODS IN PSYCHOLOGY

Principles of Research Design

Research designs are plans for how to conduct a study.

A general goal of psychological research is to measure change in behavior, thought, or brain activity**.** A **variable** is anything that changes or "varies" within or between people. Psychologists do research by predicting how and when variables influence each other.

- Examples of variables are age, personality traits, gender, and mental disorders.

Researchers must pay attention to how they obtain participants for their studies. ○

The first step in obtaining a sample is for the researchers to decide the makeup of the entire group or **population** in which they are interested (e.g., all college students, all men, all adolescents, all African Americans, etc.).

- Populations are too large to survey or interview directly so researchers draw on small subsets from each population to study, called **samples**.
  - If researchers want to draw valid conclusions or make accurate predictions about the population, it is important that they have

samples that accurately represent the population in terms of age, gender, ethnicity, or any other variables that might be of interest.

Descriptive Studies

Single events and single cases often lead to new ideas and new lines of research (e.g., the Kitty Genovese murder).

In **descriptive designs,** the researcher makes no prediction and does not control or manipulate any variables. The researcher defines a problem and describes the variable of interest.

These types of studies generally occur during the exploratory phase of research.

- Case Studies
- Involves a psychologist observing one person often over a long period of time.
- Offer deep insights that surveys and questionnaires often miss because they are based on a one-on-one relationship lasting over years.
- **Psychobiographies** examine in detail the lives of historically important people.
- They do not test hypotheses but can be a rich source for hypotheses.
- Caution! Not all cases are generalizable to other people. That is why we don‟t stop with case studies, but use them to develop testable and more general predictions.

Naturalistic Observation

- The researcher tries to be as unobtrusive as possible and observes and records behavior in the real world.
- Naturalistic observation is more often the design of choice in comparative psychology by researchers who study non-human behavior (usually primates) to determine what is and is not unique about our species. A good example is Jane Goodall.
- Developmental psychologists occasionally also conduct naturalistic observations (e.g., the Efe tribe and communal childrearing practices).
- The advantage of naturalistic observation is that it gives researchers a look at real behavior in the real world, rather than in a controlled setting where people might not behave naturally.
- Caution! Because conditions cannot be controlled and cause and effect relationships between variables cannot be examined, these studies are rarely done.

Interview and Survey

- Both the interview and the survey involve asking people directly or indirectly what they think, feel, or have done.
- They also both involve specific questions, usually asked precisely the same way, but answers can be open-ended or restricted to a rating (Likert) scale.
- Interviews can be conducted face-to-face, over the phone, or online.
- Pitfalls include sampling problems such as not being representative and biased responses.
    - Ideally, researchers want to have a **representative sample** in which the sample truly represents the population of interest.
- Kinsey"s surveys of male and female sexual behavior provide good examples of the power and weakness of survey research.
    - He didn"t use representative sampling and oversampled people in Indiana (his home state) and prisons.
    - He interviewed people face-to-face about their most personal and private details of their sexual behavior, making it more likely they would not be perfectly honest in their responses.

Meta-Analysis

Meta-analysis is a quantitative method for combining the results of all the published and even unpublished results on one question and drawing a conclusion based on the entire set of studies on the topic.

A researcher converts the findings of each study into a standardized statistic known as effect size. **Effect size** is a measure of the strength of the relationship between two variables or the magnitude of an experimental effect. The average effect size across all studies reflects what the literature overall says on a topic or question.

Correlational Studies

Correlational designs measure two or more variables and their relationship to one another (e.g., how is variable X related to variable Y).

Correlational studies are useful when the variables cannot be manipulated. For example, you can"t randomly assign a child to live with his or her mother or his or her father. You also can't manipulate whether someone has schizophrenia or not.

The major limitation of the correlational approach is that it does not establish whether one variable actually causes the other or vice versa. Correlation is not causation!

A **correlation coefficient** is a statistic that tells us whether two variables relate to each other and the direction of the relationship.

- Correlations range between–1.0 and +1.0, with coefficients near 0.00 telling us there is no relationship between the two variables. As a correlation approaches ±1.00, the strength of the relationship increases.
- Correlation coefficients can be positive or negative. If the relationship is positive, then as a group‟s score on X goes up, their score on Y also goes up. With a negative correlation, as a group‟s score on X goes up, their score on Y goes down.

Experimental Studies

A true **experiment** has two crucial characteristics.

1. First, experimental manipulation of a predicted cause, **the independent variable,** and measurement of the response, or **dependent variable**.
2. Second, r**andom assignment** of participants to control and experimental groups or conditions.

The **independent variable** in an experiment is an attribute that is manipulated by the experimenter while other aspects of the study are held constant.

The **dependent variable** is the outcome, or response to the experimental manipulation.

Random assignment is the method used to assign participants to different research conditions so that each person has the same chance of being in one group as another. Random assignment is critical because it assures that *on average* the groups will be similar with respect to certain variables.

- Why is this important? Because if the groups are the same on these qualities at the beginning of the study, then any differences between the groups at the end of the experiment are likely to be the result of the experiment.
- The **experimental group** consists of those participants who will receive the treatment or the independent variable.
- The **control group** consists of participants who are treated exactly in the same manner as the experimental group but who do not receive the independent variable or treatment.
    - They may instead be given a **placebo,** a substance or treatment that appears identical to the actual treatment but lacks the active substance.

Confounding variables are additional variables whose influence cannot be separated from the independent variable being examined.

Experimental design allows us to determine causality if the independent variable caused changes in the dependent variable and everything else is held constant.

- Researchers must also be careful to treat the two groups alike and make sure that all environmental conditions (e.g., noise level and room size) are equivalent.

How much participants and experimenters know about the experimental conditions to which participants have been assigned can also affect outcome.

- **Single-blind studies** are designs in which participants do not know the experimental condition to which they have been assigned. This must be the case in all studies to avoid the possibility that participants will behave in a biased way. For example, if participants know they have been assigned to a group that receives a new training technique on memory, then they might try harder to perform well. This would confound the results.
- In **double-blind studies** neither the participants nor the researchers know who has been assigned to which condition.
  - These designs prevent **experimenter expectancy effects,** which occur when the behavior of the participants is influenced by the experimenter‟s knowledge.

CHALLENGING ASSUMPTIONS IN THE OBJECTIVITY OF EXPERIMENTAL RESEARCH

Robert Rosenthal hypothesized that people who believed they were successful would be more likely to see success in others.

To test this idea, he conducted an experiment in which he told one group of participants that they had done well on an intelligence test and another group that they had done poorly on an intelligence test. Rosenthal randomly assigned participants to be in one of these conditions (there was also a neutral control condition where participants were not given any feedback after the intelligence test). Then he asked both groups to examine photographs of people doing various tasks and rate how successful they thought the people in the photos were.

He compared the average scores of the participants assigned to different conditions *before* doing anything to them. Unfortunately, the groups were not only different at the outset, but they were different in exactly the way that favored his hypothesis.

Because he used random assignment, the only difference in the groups at the outset was Rosenthal‟s knowledge of who was in which group. Somehow, by knowing who was in which group, he unintentionally created behaviors that favored his hypothesis.

Rosenthal had discovered experimenter expectancy effects. He also found that if the study involves direct interaction between an experimenter and

participants, the experimenter‟s age, ethnicity, personality, and gender can have an effect on the participants‟ behavior.

Rosenthal stumbled upon a more general phenomenon known as **self-fulfilling prophecy,** a statement that changes events to cause a belief or prediction to become true.

Within 10 years, more than 300 other studies confirmed Rosenthal‟s results in both human and animal experiments.

Their research led to the development of double-blind procedures.

Expectancy effects have also been found in classrooms. Lenore Jacobson collaborated with Rosenthal in a study to determine whether teachers create "smart" behavior in classrooms. They found that when a teacher thinks that a certain student is "smart" and "special," he/she may unwittingly treat the student differently, give more detailed feedback, and give the student more challenging material. These actions, in turn, could create a higher-performing, "smarter" student.

COMMONLY USED MEASURES OF PSYCHOLOGICAL RESEARCH

The tools and techniques used to assess thought or behavior are called *measures*.

Self-Report Measures

Self-reports are people‟s written or oral accounts of their thoughts, feelings, or actions.

Two kinds of self-report measures are commonly used in psychology: **interviews** and **questionnaires.**

- In an interview, a researcher asks a set of questions and the respondent usually answers in any way he or she feels is appropriate. Answers are either coded into broad categories or simply summarized. The answers are often open-ended and not constrained by the researcher.
- In a questionnaire, responses are limited to the choices given in the questionnaire.

Pros of Self-Report Questionnaires

- Self-report questionnaires are easy to use, especially in the context of collecting data from a large number of people at once or in a short period of time.
- They are also relatively inexpensive.
- If designed carefully, they can also provide important information on key psychological variables.

Cons of Self-Report Questionnaires

- People are not always the best sources of information about themselves because of **social desirability bias.** This is the tendency toward favorable self-presentation.
- We have to assume that people are accurate witnesses to their own experiences.

Behavioral Measures

Behavioral measures are based on systematic observation of people‟s actions, either in their normal environment (that is, naturalistic observation) or in a laboratory setting. Afterward, trained coders observe the videotapes and, using a prescribed method, code the level of aggressive behavior exhibited by each person.

Pros

- They are less susceptible to social desirability bias than are self-report measures.
- They provide more objective, direct measurements, because they come from a trained outside observer, rather than from the participants themselves.

Cons

- If people know they are being observed, watched, and/or measured, they may modify their behavior.
- These studies are time-intensive.

Physiological Measures

Physiological measures are used to collect data on bodily responses such as heart rate, sweating, respiration, and brain activity. Chapter 3 will discuss brain imaging techniques.

Clearly, the big **con** here is that these technologies require specialized training in the use of equipment, collection of measurements, and data interpretation. They can therefore be quite costly.

MAKING SENSE OF DATA WITH STATISTICS

Once researchers collect data, they must make sense of them using **statistics**, the mathematical procedures for collecting, analyzing, interpreting, and presenting numerical data.

Statistics are used to describe and simplify data and to understand how variables are related.

Descriptive Statistics

The first statistics researchers calculate are called **descriptive statistics**. These tests provide a way of summarizing and organizing data.

- These statistics can be represented in graphs.
- Another way to describe data is to compute the **mean** of the data or the arithmetic average.
- The **median** is the middle score, which separates the lower half of scores from the upper half.
- The **mode** is the most frequently occurring score.
- The mean, however, does not reveal anything about how spread out, or how varied, scores are. The most common way to represent that information is to calculate the **standard deviation,** which tells you how much the scores in a sample vary around the mean.
- **Frequency** is the number of times a particular score occurs in a set of data**.** A graph of frequency scores is known as a distribution. To graph a distribution we place the scores on the horizontal or X-axis and their frequencies on the vertical or Y-axis.
    - For example, the standard bell curve, or normal distribution, if we gave 1,000 children an IQ test and plot all 1,000 scores, we would end up with something very close to a symmetrical bell-shaped distribution. That is, very few children would score 70 or below and very few children would score 130 and above. The majority of children would be right around the average or mean of 100. In fact, right at two-thirds (68% to be exact) would be within 1 standard deviation (15 points) of the mean. Moreover, about 95% would be within 2 standard deviations, or between 70 and 130.

Inferential Statistics

Inferential statistics allow us to test hypotheses and make an inference as to how likely a sample score is to occur in a population.

Probability and the normal distribution are used to rule out chance as an explanation for why the group scores are different.

Five in one hundred (5%) is the most frequent choice made by psychological researchers and is referred to as the *probability-level*. If we obtain two means and our statistical analysis tells us there is only a 5% or less chance that these means come from the same population, we conclude that the numbers are not just different but statistically different and not likely by chance.

To compare just two means, we use a statistic known as the **t-test**. The basic logic of the t-tests is to determine whether the means for your two groups are so different they are not likely to come from the same population.

In short, t-tests allow us to test our hypotheses and rule out chance as an explanation.

As useful and helpful as statistics are to help us understand our results, be aware however that they also can be and are used to mislead people.

PSYCHOLOGY IN THE REAL WORLD: CHALLENGE THE ASSUMPTIONS OF ADVERTISER'S STATISTICS

Scenario #1: A billboard advertising a popular hybrid vehicle: *"The car more people would buy again."*

- What did the ad actually say? The car more people would buy again. Ask yourself, "*More* than what?" The meaning of this claim depends entirely on what this vehicle is being compared to (other hybrids, all cars, a moped?).
- Advertisers regularly leave information out and hope you will fill in the blank with what helps them most. In this case, they hope and assume you fill in the blank with "all other cars."

Scenario #2: In an ad in the morning paper, Company B reports on research that should really make you want to buy their product. *A recent lab study shows that just a ½ ounce of their new drug—let's call it "No-Cold"—killed 37,202 germs in a test tube in less than 15 seconds!*

- The implication is that it is a great cold medicine—perhaps better than others—on the basis of these hard scientific data. Here are a few things to consider:
  - The fact that a substance works well in a test tube (a controlled environment) does not mean it will work in the human throat or respiratory tract.
  - The ad doesn‟t say what kinds of germs "No-Cold" killed.

Scenario #3: Graphic displays of data can be misleading. Consider Figures 2.14A and 2.14B, both of which depict the billions of dollars spent on education over a one-year period.

- One seems to show a much bigger increase in spending on education than the other but if you look closely, both depict the same dollar increase in spending.
- This visual difference stems from how the illustrations‟ vertical axis is segmented. Companies, journalists, and politicians mislead people all the time by tweaking the graphic depiction of data.

RESEARCH ETHICS

Some of the most important studies in psychology could not be performed today, including the Stanford Prison Experiment.

Ethics are the rules governing the conduct of a person or group in general or in a specific situation, or more simply, standards of right and wrong.

Every single psychological study conducted with humans and animals must pass through a rigorous review of its methods by a panel of experts. If the proposed study does not meet the standards, it cannot be approved.

Another notable example of research that would violate current ethics guidelines is Milgram‟s research on obedience, which will be discussed in more detail in Chapter 14.

- Milgram designed an experiment to test systematically the question of whether decent people could be made to inflict harm on other people.
- His studies involved a simulation in which participants were misled to think they were participating in a study on punishment and learning. They administered what they thought were electrical shocks to punish the "learner," who was in another room, for making errors.
- In spite of protest from the "learner" when increasingly intense shocks occurred, the experimenter pressured the "teachers" to continue administering shocks. Despite his screams, most of the participants continued to shock the learner.
- After the study, Milgram fully explained to his participants that, in fact, the "learner" was never shocked or in pain at all.

<u>Ethical Research with Humans</u>

Today, all psychological and medical researchers must adhere to the following guidelines listed below.

1. **Informed consent:** Participants must be told, in general terms, what the study is about, what they will do and how long it will take, what the known risks and benefits are, that they have the right to withdraw at any time without penalty, and whom to contact with questions.
2. **Respect for persons:** The dignity and autonomy of the individual must be protected.
3. **Beneficence:** Participants should be told the costs and benefits of participation. The costs should be minimized and the benefits maximized.
4. **Privacy and confidentiality:** Protect the privacy of the participant, generally by keeping all responses confidential.
5. **Justice:** The benefits and costs of participation must be distributed equally among participants.

The APA believes that participant deception should be avoided whenever possible but recognizes that sometimes it is justified. If deception is used then, when the study is over, participants must be **debriefed** or informed of the exact purposes of the study (including the hypotheses) and all deceptive practices must be revealed and explained.

Today, to ensure adherence to ethical guidelines, **institutional review boards (IRBs)** evaluate proposed research before it is conducted to make sure research involving humans does not cause undue harm or distress.

Ethical Research with Animals

Biological psychology and learning are the areas of psychology that most often use animals for research.

Animals cannot consent to research but since animal research has led to many treatments for disease, as well as advances in understanding basic neuroscientific processes, the medical and scientific communities, along with the general public, have deemed such research acceptable as long as the general conditions and treatment of the animals is humane.

Laws generally require housing the animals in clean, sanitary, and adequately sized structures.

Specific IRBs evaluate proposals for animal research and require researchers to ensure the animals¨ comfort, health, and humane treatment, which also means keeping discomfort, infection, illness, and pain to an absolute minimum at all times.

If a study requires euthanizing the animal, it must be done as painlessly as possible.

BRINGING IT ALL TOGETHER: MAKING CONNECTIONS IN PSYCHOLOGICAL REACH: CAN EXPERIENCE CHANGE THE BRAIN?

The research question is can enriching experiences actually improve brain function and/or make the brain grow faster?

Some methods of research are chosen over others in an attempt to answer this question.

In the early 1960s research was conducted to study the effects of different environments on the brain of rats. In many experimental studies genetically similar rats were assigned to enriched or impoverished environments. The researchers found rats raised in enriched environments showed evidence of growth in brain tissue.

One of the major reasons we study these phenomena in animals is that ethical limitations prevent human research. Animals serve as a model.

Rat and human brains, however, are not identical. Rat brains are not a perfect model for human brains.

It would be, however, unethical to assign children to enriched or impoverished environments.

The most rigorous design that e could be applied in this research is a **quasi-experimental design.** This type of design makes use of naturally occurring groups rather than randomly assigned ones.

Several quasi-experimental designs have focused on people who had received intensive musical training.

People who have received this musical training, especially before age 7 have a thicker corpus callosum or a band of nerve fibers connecting the two hemispheres of brain.

This means musicians have more communication between the two sides of the brain compared to people who have not had musical training.

The results, however, are correlational and not causal because researchers relied on naturally occurring groups.

KEY TERMS

behavioral measures: measures based on systematic observation of people‟s actions, either in their normal environment or in a laboratory setting.
case study: a study design in which a psychologist, often a therapist, observes one person over a long period of time.
confounding variable: variable whose influence on the dependent variable cannot be separated from the independent variable being examined.
control group: a group of research participants who are treated in exactly the same manner as the experimental group, except that they do not receive the independent variable or treatment.
correlation coefficient: a statistic that ranges from −1.0 to +1.0 and assesses the strength and direction of association between two variables.
correlational designs: studies that measure two or more variables and their relationship to one another; not designed to show causation.
debriefing: the explanation of the purposes of a study following data collection.
dependent variable: in an experiment, the outcome or response to the experimental manipulation.
descriptive designs: study designs in which the researcher defines a problem and variable of interest but makes no prediction and does not control or manipulate anything. **descriptive statistics:** techniques that show what observations collected in research actually look like, by summarizing and describing data.

double-blind studies: studies in which neither the participants nor the researchers administering the treatment know who has been assigned to the experimental or control group.
effect size: a measure of the strength of the relationship between two variables or the extent of an experimental effect.
ethics: the rules governing the conduct of a person or group in general or in a specific situation; or, more simply, standards of right and wrong.
experiment: a research design that includes independent and dependent variables and random assignments of participants to control and experimental groups or conditions. **experimental group:** a group consisting of those participants who will receive the treatment or whatever is predicated to change behavior.
experimenter expectancy effects: result that occurs when the behavior of the participants is influenced by the experimenter‟s knowledge of who is in the control group and who is in the experimental group.
frequency: is the number of times a particular score occurs in a set of data**.**
hypothesis: a specific, informed, and testable prediction of the outcome of a particular set of conditions in a research design.
independent variable: a property that is manipulated by the experimenter under controlled conditions to determine whether it causes the predicted outcome of an experiment.
inferential statistics: allow us to test hypotheses and make an inference as to how likely a sample score is to occur in a population.
institutional review boards (IRBs): organizations that evaluate proposed research before it is conducted to make sure research involving humans does not cause undue harm or distress.
mean: the arithmetic average of a series of numbers.
measures: tools and techniques used to assess thought or behavior are called measures.
median: the score that separates the lower half of scores from the upper half. **meta-analysis:** research technique for combining all research results on one question and drawing a conclusion.
mode: a statistic that represents the most commonly occurring score or value.
naturalistic observation: a study in which the researcher unobtrusively observes and records behavior in the real world.
normal distribution: a normal distribution has a precise shape; we know exactly what percentage of scores is within one standard deviation from the mean (68%) and how many are within two standard deviations of the mean (95%).
physiological measures: measures of bodily responses, such as blood pressure or heart rate, used to determine changes in psychological state.
placebo: a substance or treatment that appears identical to the actual treatment but lacks the active substance.

population: the entire group a researcher is interested in; for example, all humans, all adolescents, all boys, all girls, all college students.
pseudoscience: claims presented as scientific that are not supported by evidence obtained by the scientific method.
quasi-experimental design: research method similar to an experimental design except that it makes use of naturally occurring groups rather than randomly assigning subjects to groups.
random assignment: the method used to assign participants to different research conditions so that all participants have the same chance of being in any specific group.
replication: the repetition of a study to confirm the results; essential to the scientific process.
representative sample: a research sample that accurately reflects the population of people one is studying.
research design: plans of action for how to conduct a scientific study.
samples: subsets of the population studied in a research project.
scientific method: the procedures by which scientists conduct research, consisting of five basic processes: observation, prediction, testing, interpretation, and communication.
scientific thinking: scientific thinking involves the cognitive skills required to generate, test, and revise theories.
self-fulfilling prophecy: a statement that affects events to cause the prediction to become true.
self-reports: written or oral accounts of a person‟s thoughts, feelings, or actions.
single-blind studies: studies in which participants do not know the experimental condition (group) to which they have been assigned.
social desirability bias: the tendency toward favorable self-presentation that could lead to inaccurate self-reports.
standard deviation: a statistical measure of how much the scores in a sample vary around the mean.
statistics: collection, analysis, interpretation, and presentation of numerical data.
theory: a set of related assumptions from which scientists can make testable predictions.
t-test: a statistical test that compares two means.
variable: a characteristic that changes or “varies,” such as age, gender, weight, intelligence, anxiety, and extraversion.

MAKING THE CONNECTIONS (Some of the connections are found in the text. Other connections may be useful for lecture or discussion.)

Common Sense and Logic

CONNECTION: How do psychologists tease apart how much of a trait is due to genetics and how much is due to environment? A common approach is to study twins (both identical and fraternal) who are reared apart or reared together (Chapter 3).

Discussion: A brief overview of behavioral genetics and personality can be found at: It reviews twin and adoptee research on personality and how behavioral genetics has influenced methodology.

What Is Science?

CONNECTION: Think about one assumption or idea or belief you once had that you no longer believe. What made you change your mind? Did you observe certain things that contradicted your belief, or did someone convince you with the logic of an argument?

Discussion: Ask students to stand up, if they believe research on animals is unethical have them move to stand on the L side of the room. If they believe that it is ethical, have them stand to the R. If they are unsure they can stay in the middle. Have the L and R sides discuss their perspective and then ask people to move to the part of the room that now represents their stance. Generally, many students will shift views after discussion and this will illustrate attitude change (Chapter 14).

CONNECTION: As a neuroscientist working on Parkinson‟s disease, Helen Mayberg found something unexpected about brain circuitry. Initially she was skeptical. Because she was also curious and open to the evidence, she decided to pursue it further. Her curiosity and openness led to her discovery how placing an electrical stimulator deep inside the brain could turn off depression like a switch (Chapter 16).

Suggested Website: The Mayo Clinic‟s website has a thorough discussion of ECT: **Suggested Video:** The following link is a case study of a woman who underwent ECT:

Descriptive Studies

CONNECTION: The “bystander effect” explains why, when so many people are around, individuals do not get involved and help others in need. When in a group, individual responsibility is diffused among people and everyone thinks that helping is someone else‟s responsibility (Chapter 14).

Suggested Video: Reenactment of Darley and Latane‟s research:

Suggested Video (warning, this is violent): A June 5, 2008, hit-and-run in Hartford, CT

Research Ethics

CONNECTIONS: Social psychologists have demonstrated both in the lab and in the real world that otherwise normal folks can be pressured to do cruel things, such as give people shocks to the point of knocking them unconscious (or so they believe; Chapter 14).

Discussion: Have students discuss how Zimbardo and Milgram‟s studies might be related to current events (e.g., World War II, Abu Ghraib, cults, hazing, etc.).

Discussion: A recent 2009 replication of Milgram's study can be found at:

INNOVATIVE INSTRUCTION

1. Ask the psychology majors in the room what courses they are most and least looking forward to. Generally, they will say they are looking the least forward to Research Methods and Statistics. Then ask them why those classes are required for their major. Use this as a jumping-off point for a discussion about the importance of research in psychology.

2. Ask students what the most famous examples of psychological research they know are. Have them identify the methodology of the studies.

3. Ask students if they believe in UFOs. ESP?

4. Ask students if they think it is ethical to use deception in psychological research. Why or why not? If not, how can you test issues about cruelty, obedience, stealing, lying, etc.?

5. Ask students if they believe that animal research is ethical. Encourage them to discuss their opinions and challenge each other.

6. Students may have difficulty differentiating theories from hypotheses. Tell them of some different theories you have and ask them to pull out testable hypotheses. For example, you can tell them that a researcher believed that frozen foods do not have calories. Calories are measures of heat. Frozen food, by definition, can‟t have calories. Therefore, frozen foods are calorie-free. Explain what events this theory might lead to: diets of frozen candy bars, ice cream, Starbucks Frappacinos, frozen cookie dough, etc., that lead to weight loss. What is the theory? Hypotheses? How can they be tested?

7. Have students get into groups and give them the following theory: media violence and adolescent aggression are related. Assign each group to a different research design (correlation, experiment, survey, case study, and naturalistic observation) and ask them to come up with a testable hypothesis and method of testing.

8. Ask students what are the most famous examples of psychological research they are aware of. Have them identify the methodology of the studies.

9. Have students visit the IRB website for your college or university and read over its mission statement. If there is a training certificate researchers must obtain to conduct research on your campus, you may want to have students do so, and report on their experiences.

10. Have students read a great article that expands Rosenthal‟s research into teacher bias. This can be found in: Rosenthal, R., S. L., and Jacobson, L. (1966). Teachers‟ expectancies: Determinates of pupils‟ IQ gains. *Psychological Reports, 19*, 115–118. Have them write two paragraphs that summarize the article and then one paragraph that illustrates a personal experience where they have experienced the bias themselves.

11. Ask students when they may have experienced the self-fulfilling prophecy. Examples include telling themselves they are going to fail a test and then not studying, or telling themselves that their significant other‟s parents won‟t like them and then acting cold and aloof when they meet.

12. Ask students about their experiences in middle school or high school when they were assigned to "Basic," "Regular," "Advanced," or "AP" classes. How did those assignments change their behaviors? Did the teachers act differently toward them? Why?

Suggested Media

1. *Zimbardo prison study part 1 (careful, there is swearing)*:
2. *Sybil* (1976) is a great example of a case study.
3. [illegible] techniques. The [illegible] can be shown by going
4. A great video from Annenberg with Phil Zimbardo, former president of the APA discussing research methods in psychology can be found at: Part 1:

5. *Discovering Psychology: Understanding Research* (Annenberg)

Concept Clips (McGraw-Hill Connect for Feist and Rosenberg, 3rd ed.)

1. Scientific Method
2. Correlation

Suggested Websites

Suggested Readings

American Psychological Association (1992). Ethical principles of psychologists and code of conduct. *American Psychologist, 47,* 1597–1611.

Baumrind, D. (1964). Some thoughts on ethics of research: After reading Milgram"s „Behavioral study of obedience." *American Psychologist, 19,* 421–423.

Burkley, E., & Burkley, M. (2009). Mythbusters: A tool for teaching research methods in psychology. *Teaching of Psychology, 36,* 179–184.

Guthrie, R. V. (2003). *Even the rat was white* (2nd ed.). Allyn-Bacon.

Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review, 84,* 231–259.

Rosenthal, R. (1976). *Experimenter effects in behavioral research.* New York: Irvington Publishers.

Rosnow, R. L., & Rosenthal, R. (1989). Statistical procedures and the justification of knowledge in psychological science. *American Psychologist, 44,* 1276–1284.

Rosenzweig, S. (1933). The experimental situation as a psychological problem. *Psychological Review, 40,* 337–354.

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

Zimbardo, P. G. (2007). *The Lucifer effect: Understanding how good people turn evil.* New York: Random House.