Science of Psychology An Appreciative View 4th edition King Solutions Manual

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CHAPTER TWO: PSYCHOLOGY'S SCIENTIFIC METHOD

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Chapter Learning Objectives

2.1: Explain the scientific method.
2.2: Describe the three types of research that are used in psychology and common research settings.
2.3: Explain research samples and settings.
2.4: Distinguish between descriptive statistics and inferential statistics.
2.5: Describe some research challenges that involve ethics.
2.6: Explain the need to think critically about psychology research.
2.7: Describe scientific studies on health and wellness and their findings.

Chapter Overview

"Can One Hour Change a Life?"

- The chapter opens with a story about first-generation college students. Can spending an hour in an orientation program listening to seniors share stories about their diverse backgrounds impact student success? How can scientific inquiry be used to investigate this issue?
- A recent study by Stephens et al. (2015) compared students who attended a "difference-education" program during orientation with students who attended a program which did not highlight the impact of diverse backgrounds on college success. The students who attended the "difference-education" program were more likely to highlight their own diverse backgrounds as strengths.
- It is the scientific method that allows researchers to test ideas using objective methods, reach reliable findings, and draw conclusions about what we might consider everyday occurrences.

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I. Psychology's Scientific Method

A. The Scientific Approach and the Five Steps of the Scientific Method

- Science is not defined by *what* it investigates, but by *how* it investigates.
- Using the scientific method is what makes psychology a science.
- Researchers in psychology use the *scientific method* when conducting research. The scientific method follows the following five steps: observing some phenomenon, formulating hypotheses and predictions, testing through empirical research, drawing conclusions, and evaluating conclusions.

1. Observing some phenomenon

c. The first step in conducting scientific research is *observing* some phenomenon—acting like a detective to know why or how something is the way it is.
d. When trying to formulate a research question for your observation, it is important to operationally define how your *variable* (anything that can change) will be measured.
e. The scientific method begins with a *theory,* which is a broad idea of set of closely related ideas that tries to explain certain observations. They tell us about the relationship between variables on a conceptual level. Theories try to explain why certain things occur and make predictions about future observations.

2. Formulating Hypotheses and Prediction

a. The second step in conducting scientific research is stating a hypothesis, an idea that is arrived at logically from a theory.
b. A hypothesis is a prediction, a statement that can be tested.

3. Testing Through Empirical Research

a. The third step in conducting scientific research is to test the hypothesis by collecting and analyzing data (empirical research).
b. The researcher must decide what participants to use in their research (e.g., human or animal? female, male, or both?). By establishing an operational definition, the researchers provide an objective description of how a variable is going to be measured or observed.
c. Importantly, variables do not have only one operational definition; rather, it is the way a researcher interprets the variable.
d. One key aspect of testing a hypothesis is data collection, which applies mathematical procedures to understand what the data mean. Data are the information collected in a study.

4. Drawing Conclusions

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a. Based on what was found after the data analysis, researchers can draw conclusions from their research.
b. After publication, replication is key. Having other researchers repeat the study and get the same/similar results is important in psychology.
  i. *Direct replication* involves doing the study exactly as it was conducted previously
  ii. *Conceptual replication* involves doing the same study but with different methods or different samples.
c. A research finding is considered *reliable* when the study has been replicated again and again and yields similar findings.

5. Evaluating the Theory

a. Evaluation never really ends. Conclusions become part of the research community—which continues to question them.
b. Meta-analysis is a statistical procedure that summarizes a large body of evidence from the research literature on a particular topic. With meta-analysis, researchers combine results across various studies to establish the strength of an effect.
c. A recent meta-analysis of 33 studies of academic performance sought to answer the question of whether procrastination affects academic performance.
d. Psychologists work together in a collaborative effort to increase an overall body of knowledge.
e. Researchers can work together on the same study or share their scientific findings by publishing them in scientific and academic journals. Researchers can also share their conclusions by presenting them at both international and national conferences.

II. Types of Psychological Research

- Three main types of psychological research are: *descriptive research, correlational research, and experimental research.*

A. Descriptive Research

1. Observation
a. Being a good observer requires an important set of skills. Observers are trained and practice their skills regularly.
b. For observers to be effective, they must be systematic. The researchers must know what they are looking for, who they are observing, where and when the observations will take place, and how observations will be made.

2. Surveys and Interviews

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a. One method to get information about people is to interview them directly.
b. When information needs to be taken from a large group of people, a survey can be used. A survey consists of questions about a person's self-reported attitudes or beliefs about a topic.
c. Survey questions can be either unstructured and open-ended or structured and more specific.
d. Surveys and interviews can be problematic because sometimes participants will answer questions in the way they believe is socially acceptable instead of how they really feel.

3. Case Studies

a. A case-study or case history is conducted when a researcher takes an in-depth look at a single individual. Case studies might also provide an in-depth and detailed exploration of particular small groups such as families.
b. The case study is usually conducted by a clinical psychologist when the unique aspects of an individual's life cannot be duplicated in other individuals.
c. Case studies tell us a great deal about an individual person but not very much about people in general.

4. The Value of Descriptive Research

a. Descriptive research allows researchers to get a sense of what "something is," but cannot answer questions about how and why it became that way.
b. The Satisfaction with Life Scale (SWLS) is one example of what researchers use to help operationally define variables, in this case the variable of happiness. If researchers wanted a more in-depth understanding of the predictors of happiness, they would turn to a correlational design.

B. Correlational Research

- Correlational research is conducted when studies are concerned with identifying the relationships between two or more variables so it can be understood how the variables change together.
- In a correlational study the variables are measured by the researcher to see how they relate.
- The strength of the relationship between two variables is expressed as a *correlation coefficient*, or letter *r*.
- The numeric value of the correlation coefficient falls between –1.00 and +1.00, where the number determines the *strength* of the relationship between the variables and the – or + sign determines the *direction* of the relationship between the variables.

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- A *positive correlation* occurs when the variables move in the same direction so that if one variable increases, the other variable increases also, and if one variable decreases, the other variable decreases as well.
- A *negative correlation* occurs when the variables move in opposite directions so that if one variable increases, the other variable decreases, and vice versa.
- Correlational studies can take place anywhere, whether it is in the classroom, out in the real world, or in the laboratory.

1. Correlation Is Not Causation

a. Words like **link, associated with, relationship between** are synonymous with correlations and do not mean causation.
b. Correlation does not equal causation. A correlation between two variables only states that there is a relationship between the two variables and not that one of the variables causes the other variable.
c. The *third-variable problem* occurs when an extraneous variable that has not been measured accounts for the relationship between two other variables.
d. The third variable is also called a *confound*.
e. Even though there is a risk of a third variable, correlational studies are important because they allow us to research variables that cannot be manipulated. Correlational studies can also be conducted on variables that would be considered unethical to be carried out in an experiment.
f. A cross-sectional design measures variables at a single point in time.

2. The Value of Correlational Research

a. Though correlations do not allow us to show causal relationships, they do allow researchers to make predictions among variables.
b. It is also valuable in cases where it might be unethical to do research in any other way.
c. Correlations are helpful for researchers studying everyday experiences, such as natural disasters like the earthquake that caused a tsunami in Japan or the earthquake that struck Guatemala.
d. Correlations can also measure multiple variables in their studies. In some cases, a researcher can assess whether a relationship between two variables is explained by a third, fourth, or even fifth variable.
e. When studying everyday experiences, the experience sampling method (ESM) may be used, which tracks daily experiences of individuals in their natural setting.
f. Alternatively, the event-contingent responding asks participants to complete a report each time they engage in a particular behavior.

3. Longitudinal Designs

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a. Longitudinal designs are a special type of systematic observation that measures variables of interest over time.
b. One example of a longitudinal design is the study between happiness and longevity using the Nun Study data set conducted by David Snowdon and his colleagues.
c. Even though longitudinal studies attempt to demonstrate causality, the most well conducted, excellent longitudinal studies cannot prove causation.

C. Experimental Research

- Researchers cannot demonstrate causation without experimental research.
- In an experiment, the researcher manipulates one of the variables to see if it influences the behavior in question. If the behavior changes when one of the variables is manipulated, then the manipulated variable caused the behavior to change.
- Researchers use *random assignment* by dividing the participants randomly into two different groups

1. Independent and Dependent Variables

a. The *independent variable* is the variable that is manipulated in an experiment.
b. Sometimes the independent variable is the social context in which a person finds himself. The social psychologists might manipulate the context with the help of a *confederate*.
c. A confederate is a person who is given a role to play in a study so that the social context can be manipulated.
d. The *dependent variable* is the result of the manipulation of the independent variable. Researchers measure changes in the dependent variable.
e. The independent and dependent variables are the most important concepts in psychological research. The independent variable is the *cause* while the dependent variable is the *effect.*
f. An experiment by Cwir & others (2011) explores whether being socially connected to someone causes a person to experience someone else's experience as their own.

2. Experimental and Control Groups

a. The *experimental group* is the group whose variable is manipulated.
b. The *control group* is exactly like the experimental group except there is no manipulation of the variable. The control group is used as a comparison group.

3. Quasi-Experimental Designs

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a. These types of designs are similar to experiments, but do not include random assignment.
b. Quasi-experimental designs may be useful for studying the differences between groups of people who have different experiences.
c. Though common, these designs do not lend themselves to strong causal conclusions that can otherwise be drawn from experiments.

4. Some Cautions About Experimental Research

a. *Validity* refers to whether the experiment studied what it was supposed to study.
b. ***External validity*** refers to whether the experimental design is representative of real-world issues.
c. ***Internal validity*** refers to whether changes in the dependent variable are actually due to the manipulation of the independent variable.
d. Experimenter Bias
  i. ***Experimenter bias*** occurs when the experimenter's expectations influence the results of the study.
  ii. **Demand characteristics** are any aspect of a study that communicates to participants how the experimenter wants them to behave.
e. Research Participant Bias and the Placebo Effect
  i. **Research participant bias** occurs when the participant's behavior during the experiment is influenced by how they believe they are supposed to be behaving.
  ii. A placebo is an innocuous, inert substance that has no effect on the behavior of the participants. However, the participants are unaware of this; they believe they actually received the manipulation.
  iii. A **placebo effect** occurs when the participant's expectations produce an experimental outcome, even though they did not receive any manipulation.
  iv. One method to control for both experimenter and participant bias is to conduct a **double-blind experiment.** In this type of experiment, neither the experimenter nor the participant is aware of which participants are in the experimental group and which are in the control group.

D. Applications of the Three Types of Research

- All three types of research can be used to address the same topic.
- Consider the role of positive experiences in human functioning: Maslow used the descriptive case study approach, McAdams used correlational research, and experimental researchers have randomly assigned

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individuals to writing tasks about positive experiences as a means of evaluating overall functioning.

III. Research Samples and Settings

A. The Research Sample

1. The researcher also wants to be able to draw conclusions from the results that will apply to a larger group of people or animals. This larger group is known as the population. The group that the study is using is called the sample. The sample is a subset of the population.
2. As a way to more closely resemble the population, the researcher uses a sample. Choosing a random sample means that each member of the population has an equal chance of being selected.
3. A random sample is not the same thing as random assignment!
4. A random sample aims to minimize bias, including gender bias and ethnic bias.

B. The Research Setting

1. All three types of research discussed can take place in different physical settings. The setting of the research does not determine what type of research design it is. Common settings include the laboratory and natural settings.
2. Laboratory research takes place in a controlled environment where the complex factors of the real world are removed. There are many drawbacks to conducting laboratory research. These drawbacks include: the participants know that they are being studied; the laboratory setting is unnatural; the participants who go to a university setting to take part in laboratory research may not be representative of the general population; and some aspects of the mind and behavior are difficult to examine in a laboratory.
3. When research is conducted in a natural setting, it is naturalistic observation. People's behaviors are being observed in real-world situations.

IV. Analyzing and Interpreting Data

- Psychologists use *statistics* as mathematical methods to report their data.

A. Descriptive Statistics

- *Descriptive statistics* are used to describe and summarize data in a meaningful way. They show us the big picture.

1. Measures of Central Tendency

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a. A *measure of central tendency* shows the overall characteristics of the data.
b. The *mean* is the average of the data. It is calculated by adding all the scores together and then dividing by the total numbers of scores in the data set.
c. The *median* is the score that falls directly in the center of the data set after the data have been arranged from highest to lowest, or vice versa. The median is the middle score.
d. The *mode* is the score that occurs most frequently in the data set.
e. The most common measure of central tendency in psychological research is the **mean**, which is also a key component to calculating other statistical measures.

2. Measures of Dispersion

a. *Measures of dispersion* determine how much the scores vary from each other, or the differences among those scores.
b. The *range* is the distance between the highest and lowest score. It is found by subtracting the lowest score from the highest score.
c. The *standard deviation* measures how much the scores vary, on average, around the mean. The smaller the standard deviation, the less variability there is from the mean.

B. Inferential Statistics

1. Inferential statistics are the mathematical methods used to determine if the data sufficiently support the hypothesis.
2. In order words, to test predictions psychologists must use inferential statistics.
3. Inferential statistics determine a statement of probability that tells what the odds are that the difference was due to chance.
4. In psychology, statistical significance refers to a statement of probability that the results occurred simply by chance alone.
5. Confidence level refers to the .05, or 5%, of significance that is the minimum level of probability that scientists will accept for concluding that the differences observed are real.

V. Conducting Ethical Research

- Researchers must ensure that the experiment will be carried out in an ethical way.
- Researchers must also try to overcome their personal biases.

A. Conducting Ethical Research

1. The consideration of ethical standards came about after Nazi doctors in concentration camps were using prisoners as guinea pigs in their experiments.

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2. Researchers have an obligation to the research participant to anticipate issues their study might cause and to inform participants of possible side effects or consequences.
3. Ethics Guidelines

    a. The American Psychological Association (APA) developed guidelines for researchers to follow when conducting research involving human participants.
    b. Researchers must obtain *informed consent* from the participants prior to the start of the experiment. The participants must know in advance what will be involved in the experiment and what, if any, risks there might be.
    c. Researchers are responsible for the *confidentiality* of all the data collected from the participants in the experiment.
    d. After the experiment has been conducted the researcher is responsible for *debriefing* the participants. This means that the participants are informed of the experiment's purpose and the methods that were used in the experiment.
    e. *Deception* is allowed in an experiment if telling the participants in advance about the expected outcome of the study could potentially alter the participants' behavior and therefore invalidate the results of the experiment.
        i. When deception is used in research, the principle of informed consent is violated. This is why participants should have the option of withdrawing consent after they find out what the study is really about.

4. The Ethics of Research with Animals

    a. Experiments using animals as the research subjects have provided a better understanding of and solutions for many human problems.
    b. APA has set housing, feeding, and maintaining psychological and physiological well-being guidelines for researchers that use animal subjects.

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VI. Thinking Critically About Psychological Research

A. Not all psychological information that is presented to the public comes from professionals with appropriate credentials. The media can present to the public information that may have been misinterpreted or taken out of context.
B. It is important for individuals to avoid overgeneralizing conclusions that are based on little information.
C. Just as we cannot generalize from a small group of people to all people, consumers of psychological research must resist the temptation to apply all conclusions about groups to an individual. There is a distinguished difference between group needs and individual needs that must be accounted for in our understanding of psychological research.
D. This unclear distinction is not entirely the media's fault. Researchers often fail to examine the overlap in the data on the groups they are comparing, and they look for only the differences.
E. Consumers must look for other evidence of research conclusions in different studies or experiments.
F. Drawing conclusions from correlations is a common mistake that consumers of psychological research make.
G. Consider the source of the information. Seek out respected journals, newspapers, and publications that have reputable, qualified researchers producing the material. Ultimately, the consumer is responsible for finding the details behind the reported findings and for analyzing the study's credibility.

VII. The Scientific Method and Health and Wellness

A. The Power of Expressive Writing to Enhance Health and Wellness

1. James Pennebaker has conducted several studies that all converge on a similar finding: writing about one's deepest thoughts and feelings related to traumatic events one may have experienced leads to various health and well-being benefits.
2. Not all participants in the trauma group were writing about traumatic events. Some were even detailing simple personal experiences.
3. The conclusions that can be drawn from Pennebaker's research can be applied to our own lives by following a simple set of guidelines: find a quiet place to write, pick one topic to write about, dedicate a few minutes each day to writing, and don't worry about proper grammar/spelling.

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Chapter Features

- *Psychological Inquiry:* Miserable but Helpful?
- *Intersection:* Motivation and Social Psychology: Can a Sense of Purpose Buffer Distress in the Face of Diversity?
- *Psychological Inquiry:* Experimentation in a Natural Setting
- *Critical Controversy:* Is It Ethical to Use Deception in Research?

Connections

	Assignable Through Connect	**Assignable Within the Chapter**	**Instructor Resources**
Psychology's Scientific Method LO 2.1: Explain the scientific method.	Reading Assignment: Psychology's Scientific Method Concept Clip: Scientific Method Interactivity: The Scientific Method	Apply Your Knowledge: #5, #6	Lecture/Discussion Suggestions: • Skepticism • Operational Definitions PowerPoints Critical Thinking Question: #1 Handout: 2.1
Types of Psychological Research LO 2.2: Describe the three types of research that are used in psychology and common research settings.	Reading Assignment: Types of Psychological Research Concept Clip: Correlation Interactivity: Correlations NewsFlash: Are Antidepressants Safe During Pregnancy? Concept Clip: Independent and Dependent Variables Interactivity: Designing an Experiment: Dependent and Independent Variables Learning Exercise: Types of Research	Psychological Inquiry: Miserable But Helpful? Intersection: Personality and Social Psychology: Does Sociability Lead to Happiness or Is It the Other Way Around? Apply Your Knowledge: #3	Lecture/Discussion Suggestions: • Correlations • Words That Are Alike? • WebQuest—Understand Experiments in Psychology • Types of Variables and Types of Groups PowerPoints Critical Thinking Questions: #3, #4 Polling Question: 2.3 Handout: 2.2

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	Learning Exercise: Research Designs NewsFlash: Rethinking One of Psychology's Most Infamous Experiments		
Research Samples and Settings LO 2.3: Explain research samples and settings.	Reading Assignment: Research Samples and Settings Interactivity: Naturalistic Observation NewsFlash: Are Researchers Missing Signs of Autism in Girls? Reading Assignment: Analyzing and Interpreting Data		Lecture/Discussion Suggestions: • Populations and Samples • Naturalistic Observation PowerPoints Critical Thinking Question: #2 Handout: 2.3
Analyzing and Interpreting Data LO 2.4: Distinguish between descriptive statistics and inferential statistics.	Learning Exercise: Statistics NewsFlash: Can Big Data Help Psychiatry Unravel the Complexity of Mental Illness?	Psychological Inquiry: Experimentation in a Natural Setting	Lecture/Discussion Suggestions: • Measures of Central Tendency • Significantly Significant! PowerPoints Handout: 2.4
Conducting Psychological Research LO 2.5: Describe some research challenges that involve ethics.	Reading Assignment: Conducting Ethical Research Interactivity: Ethics	Critical Controversy: Is It Ethical to Use Deception in Research?	Lecture/Discussion Suggestions: • Ethics • Ethics on the Web PowerPoints Critical Thinking Question: #2 Polling Questions: 2.1, 2.2 Handout: 2.5

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Thinking Critically About Psychological Research LO 2.6: Explain the need to think critically about psychological research.	Reading Assignment: Thinking Critically About Psychological Research	Apply Your Knowledge: #4	Lecture/Discussion Suggestion: • Media and Research PowerPoints Critical Thinking Question: #2
The Scientific Method and Health and Wellness LO 2.7: Describe scientific studies on health and wellness and their findings.	Reading Assignment: The Scientific Method and Health and Wellness	Apply Your Knowledge: #1, #2	Lecture/Discussion Suggestion: • The Power of the Written Word PowerPoints Critical Thinking Question: #1

Teaching the Chapter

LO 2.1: Explain the scientific method.

Lecture Outline

Can One Hour Change a Life?

- Orientation programs for first-generation college students
- Scientific inquiry can be used to investigate issue and solve problems
- Scientific method

I. Psychology's Scientific Method

A. A Scientific Approach & The Five Steps in the Scientific Method

1. Science is defined by *how* it investigates, not *what* it investigates.
2. Using the scientific methods makes psychology a science.

B. Steps in the Scientific Method

1. Observation—Act Like a Detective

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a. Variable
b. Theory

2. Formulating Hypotheses and Predictions

a. Hypothesis
b. Predictions that can be tested, driven from theories

3. Testing through Empirical Research

a. Operational definition
b. Empirical research
c. Data

4. Drawing Conclusions

a. Replication
i. Direct replication
ii. Conceptual replication
b. Reliability

5. Evaluating the Theory

a. Meta-Analysis
b. Collaboration between researchers
c. Meta-analysis is used to investigate whether procrastination negatively influences academic performance.

Suggested Activities

Skepticism: Bring in a couple of self-help books that you checked out from the library. Break the class into groups and have them look through one of the self-help books and choose one of the treatments or suggestions the author gives for a problem. Ask the groups to discuss whether or not the treatment or advice sounds factual. Ask them to write down what credentials the author has. Discuss with the class how self-help books may seem helpful, but should be read and followed carefully. Discuss with them how using the scientific method when conducting research results in more factual conclusions.

Operational Definitions: Use *Activity Handout: 2.1: Find the Variable and Operationally Define It!* to have the students find operational definitions in an experiment. In the activity the students are given various segments from actual journal articles and they are asked to identify the operational definition(s) in each of the articles.

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LO 2.2: Describe the three types of research that are used in psychology and common research settings.

Lecture Outline

II. Types of Psychological Research

A. Descriptive Research

1. Observation
2. Surveys and Interviews
3. Case Studies
4. The Value of Descriptive Research

B. Correlational Research

1. The degree of relationship between two variables is represented by a correlation *coefficient*.
2. Positive and Negative Correlations
3. Correlation Is Not Causation

    a. Third-variable problem
    b. Confounds
    c. Cross-sectional design

4. The Value of Correlational Research

    a. Experience sampling method (ESM)
    b. Event-contingent responding

5. ***Psychological Inquiry: Miserable but Helpful?***
6. Longitudinal design

C. Experimental Research

1. When one or more of the variables is manipulated while the other is held constant, the research is called an *experiment*.
2. *Random assignment* occurs when the researcher assigns the participants to groups by chance.
3. Independent and Dependent Variables
4. Roles of Confederates
5. Experimental and Control Groups
6. Quasi-Experimental Designs
7. ***Intersection: Motivation and Social Psychology: Can a Sense of Purpose Buffer Distress in the Face of Diversity?***
8. Some Cautions about Experimental Research

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a. Validity
b. External Validity
c. Internal Validity
d. Experimenter Bias
e. Demand characteristics
f. Research Participant Bias and the Placebo Effect
g. Double-Blind Experiment

D. Applications of the Three Types of Research

Suggested Activities

Correlations: Draw various graphs on the board representing both positive and negative correlations. Also put various correlation coefficients on the board under the graphs. Break the class into groups and ask them to identify each graph as either a positive or a negative correlation and also whether it is representing a strong or a weak correlation. After the groups have finished, ask one member of each group to come to the board and write down what their group decided on. This activity will give the students experience in identifying different types of correlations.

Words that are alike?: On the board or electronically, write the word *correlation* in one column and the word *causation* in another column. Either in groups or individually, ask students to identify as many words as possible that are synonyms to these column labels. Afterwards, discuss recent media illustrations using or even misusing these terms. Lastly, was there a discrepancy in the number of synonyms in each column? Have student speculate as to why that may or may not be.

Types of Variables and Types of Groups: Use *Activity Handout: 2.2: What Type of Variable Is It? What Type of Group Is It?* This activity has different examples of hypotheses for research ideas. The students have to identify both the independent and dependent variables in the hypotheses. They also have to identify who makes up the experimental group and who makes up the control group.

LO 2.3: Explain research samples and settings.

Lecture Outline

III. Research Samples and Settings

A. Research Samples

1. Population
2. Sample
3. Random sample

B. Research Settings

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1. Common settings of research
2. Laboratory
3. Naturalistic observations

Suggested Activities

Populations and Samples: Use *Activity Handout: 2.3: Populations and Samples* to give the students experience in identifying the population and samples in various examples. The students should be able to differentiate between who the population is and who makes up the sample.

Naturalistic Observation: Have students write down five places where naturalistic observation research could take place. Next break the students into groups and have them discuss among their group what five places they wrote down. Have the groups decide on three of the places and describe what type of research variables a researcher would possibly be looking at in these settings and why laboratory research could not be conducted there. The students will get an idea of the differences between laboratory research and naturalistic observation and why certain variables cannot be conducted in both settings.

LO 2.4: Distinguish between descriptive statistics and inferential statistics.

Lecture Outline

IV. Analyzing and Interpreting Data

A. Descriptive Statistics

1. Measures of Central Tendency
    - **a.** Mean
    - **b.** Median
    - **c.** Mode
    - **d.** Most common measure of central tendency is mean
2. ***Psychological Inquiry: Experimentation in a Natural Setting***
3. Measures of Dispersion
    - **a.** Measures of dispersion determine how scores vary from each other
    - **b.** Range
    - **c.** Standard deviation

B. Inferential Statistics

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1. Statistical significance
2. Confidence level

Suggested Activities

Measures of Central Tendency: Use *Activity Handout: 2.4: The Mean, the Median, and the Mode* as a way for students to practice working through the various measures of central tendency.

Significantly Significant!: Before class, find a few current articles and parse out the results sections. In groups, give students an example of research results and ask them to discuss whether or not the results were statistically significant and what that means to them. *(Since this is often a difficult concept for students to understand, having them put this in their own words may help clarify the misunderstandings.*)

LO 2.5: Describe some research challenges that involve ethics.

Lecture Outline

V. Conducting Psychological Research

A. Conducting Ethical Research

1. APA Ethics Guidelines

   a. Informed Consent
   b. Confidentiality
   c. Debriefing
   d. Deception

2. ***Critical Controversy: Is It Ethical to Use Deception in Research?***
3. The Ethics of Research with Animals

Suggested Activities

Ethics: Use *Activity Handout: 2.5: Ethics* as a way for students to think about ethical considerations when conducting research. This activity gives students research scenarios that deal with ethical concerns. Questions regarding their own ethical considerations follow each scenario.

Ethics on the Web: In class, use the APA website and review some of the ethical guidelines that are listed. Explore the guidelines and discuss why ethical conduct is so important in psychology and in research in general.

LO 2.6: Explain the need to think critically about psychological research.

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Lecture Outline

VI. Thinking Critically About Psychological Research

- **A.** Overgeneralizing from small sample
- **B.** Distinguish between group results and individual needs
- **C.** Look for answers beyond a single study
- **D.** Avoid causes where none have been found
- **E.** Consider the course of psychological information

Suggested Activities

Media and Research: Have students find a media outlet (i.e., TV news, online news source, or radio station) and report to the class what the essence of the research report entailed and how the conclusions should be evaluated. Ask students what is missing or what more information they would need before determining the credibility and validity of the research being commented about in their media selection.

LO 2.7: Describe scientific studies on health and wellness and their findings.

Lecture Outline

VII. The Scientific Method and Health and Wellness

- **A. The Power of Expressive Writing to Enhance Health and Wellness**
  1. Writing and Being Healthy

Suggested Activities

The Power of the Written Word: Have students keep a journal for at least one week that details their daily events and their feelings related to the day. At the end of this time period, have students complete a reflection paper on how their writing influenced their perceptions of a "bad day" or a "good day." How could writing about very serious events help themselves or someone they know get through the tough times? Can writing really improve their quality of life?

Critical Thinking Questions

1. Evaluate the type of research or factual information presented in self-help books. What purpose do you think self-help books serve? What are the intentions of the authors?

2. How do you think psychological research is controlled for ethical bias and overcoming the problems of ethnicity in research?

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3. What are the possibilities of psychological researchers controlling for the third variable problem? How do you conduct research knowing you cannot think of every possible variable that could confound your results?

4. What types of situations can occur where correlation equals causation?

Polling Questions

- **Polling 2.1: Clients as Friends, We'll See?**
  While many digital immigrants (i.e., older therapists) recoil at the thought of having clients as Facebook friends and too readily call it "unethical," is the answer really that simple? Knowing that the digital age is moving so fast and that access to therapy may have a technological counterpart, what do you think? How many would accept a former client as a *Friend* on a social media site once therapy ended? How many think it would be acceptable for a therapist to have a professional social media site and accept friend requests there? Who has had a personal experience (either themselves or knowing someone else) who crossed the boundary lines of ethical behavior with someone in a professional role? Lastly, how many people think it is alright for the therapist to text their clients? Let's discuss the implications of ethical behavior and its effects on others.

- **Polling Question 2.2: Since I Can Use It, It Must Be Ok!**
  Take a few minutes to review the critical controversy on deception in research. Let's share our own thoughts and ideas about this. How many think that using deception in research is acceptable under any condition? Who thinks that it is not alright to trade one's ethical responsibility such as informed consent for advancement in research through deception? How many people in the class have been deceived by someone they trusted?

- **Polling Question 2.3: It's All Over the News… Video Games Cause Children to Be Violent!**
  There is much controversy surrounding the culture of video gaming with our current youth. Over the past several years, video games have become increasingly more graphic, dramatic, and some would say violent. As a result, how many of you have heard that video games cause children to be more violent or act aggressively? How many of you agree with the statement, "The companies which make violent video games should be held responsible if children imitate and ultimately hurt others as a result of playing their games"? Who thinks people are misunderstanding what the word causation means when they are talking about explaining childhood aggression and video game playing? In this discussion, illustrating very clear points, students will have a more applicable understanding of the uses and misuses of causation and correlation terminology.

Apply Your Knowledge

(Also found at the end of the chapter.)

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1. It's time to get out those old photos from the prom, wedding, or family reunion and see just how happy people were (or were not). Look at some pictures from your own life and see who was genuinely smiling and who was faking it. Just cover the mouths with your finger—you can see who is happy from their eyes.

2. Is an old diary of yours hanging around somewhere? Pull it out and take a look at what you wrote. Count up your positive emotion words or negative emotion words. Are there themes in your diary from years ago that are still relevant to your life today? Does looking at your own diary change the way you might think about the results of the Nun Study? Explain.

3. What are some positive and negative correlations that you have observed in your own experience? What are some third variables that might explain these relationships? Do you think these relationships may be causal? How would you design an experiment to test that possibility?

4. In the next few days, look through several newspapers and magazines for reports about psychological research. Also notice what you see and hear on television about psychology. Apply the guidelines for being a wise consumer of information about psychology to these media reports.

5. Pick a topic of interest to you and define the variables. Then list as many ways to operationalize the variables as you can. Come up with at least one behavioral measure of the variable. Would your topic be best studied using a correlational or an experimental method? How would you conduct the study?

Suggested Readings and Media

Suggested Articles from *Annual Editions, Psychology, 2013/2014* Publications

Annual Edition: Psychology from McGraw Hill Education contains articles representative of current research and thinking in psychology. Individual articles can be selected to enhance your course, or the entire volume can be accessed for an easy, pre-built teaching resource. The *Annual Edition* articles are updated on a regular basis through a continuous monitoring of over 300 periodical sources. The articles selected are authored by prominent scholars, researchers, and commentators writing for a general audience. Each article includes a brief overview and learning outcomes, critical thinking questions, and Internet references. The **McGraw-Hill Create™ Annual Editions Article Collection** can be accessed at http://www.mcgrawhillcreate.com/annualeditions

Suggested Readings

American Psychological Association. (2002). Ethical principles of psychologists and code of conduct. *American Psychologist, 57*(12).

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Chastain, G., & Landrum, R. E. (1999). *Protecting Human Subjects: Departmental Subject Pools and Institutional Review Boards*. Washington, DC: American Psychological Association.

Martin, D.W. (2000). *Doing Psychology Experiments* (5th ed.). Belmont, CA: Wadsworth/Thomson Learning.

Stanovich, Keith E. (2013). *How to Think Straight about Psychology* (10th edition). Boston, MA: Pearson Publishing.

Suggested Media

Do Scientists Cheat? (Annenberg/CPB Collection, 60 minutes).

Research Methods: From Question to Conclusion, Annenberg Learning Series Videos Discovering Psychology: Updated Edition.
http://www.learner.org/series/discoveringpsychology/methods/index.html (2013)

http://www.psychology.org/resources/

This website has a plethora of links for various topics on psychological research, such as doing research, ethical issues, statistics, and research technology.

http://www.apa.org/research/index.aspx

This is the official website of the APA. This website discusses the ethical regulations and codes of conduct that must be followed when conducting psychological research.

https://www.merlot.org/merlot/index.htm

THIS IS A USEFUL WEBSITE FOR RESOURCES IN LEARNING AND ONLINE TEACHING THAT HOUSES LEARNING EXPERIENCES, PEER-REVIEWED ACTIVITIES, AND PERSONAL COLLECTIONS OF PSYCHOLOGICAL MATERIALS.

HTTP://WWW.THEPSYCHFILES.COM

THIS IS A GOOD WEBSITE HOUSING SEVERAL FREE PODCASTS AND VIDEOS ON VARIOUS TOPICS RELATED TO PSYCHOLOGY, INCLUDING RESEARCH METHODS AND STATISTICS.

http://kspope.com/

The site covers a broad range of subjects, including licensing laws, regulation, ethics, medication, military-related issues, suicide and sexual issues, etc. A unique feature that deserves mention is that the website is designed for people with disabilities in accordance with W3C Accessibility Guidelines.

http://psychology.arrive2.net/

This page has links to: professional psychology associations, sources of online data that could be used for student research, sites where you can participate in experiments, humor, scholarly journals & magazines, even more journals, large psychology sites (mega sites),

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information to help you perform research, self-help sites, sites especially designed for students (such as tutorials), and sites especially designed for teachers.

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Activity Handouts

ACTIVITY HANDOUT: 2.1

FIND THE VARIABLE AND OPERATIONALLY DEFINE IT!

Read the below abstracts from various journal articles and then state in the space provided what the operational definition is.

1. The present study examined the relationships of masculinity and femininity with concession in an experimental collaborative eyewitness testimony task, using the MORI technique. Participants formed same-sex or mixed-sex pairs and watched a videotaped event. Their eyewitness memories were assessed three times: immediately after watching, after discussing the event together, and individually one week later. The participants' self-confidence in their recalled memories and percentages of concessions were also examined. The Masculinity-Humanity-Femininity Scale was administered to the participants at the end of the experiment. The results showed that masculinity negatively correlated with concession, and that both masculinity and femininity were associated with inaccuracy in collaborative memory recall.

2. The present study examined the extent to which the achievement strategies deployed by adolescents and those used by their peers would predict adolescents' school adjustment, academic achievement, and problem behavior. The participants were 287 fourteen- to fifteen-year-old comprehensive school students (121 boys and 165 girls) from a middle-sized town in central Sweden. The results showed that not only the maladaptive strategies used by adolescents, but also those reported by their peers, predicted adolescents' norm-breaking behavior, low school adjustment, and low level of achievement; high levels of failure expectations and task-avoidance among adolescents' peers were positively associated with adolescents' own norm-breaking behavior, and indirectly via this, also with their maladjustment at school and low grades. These associations were found after controlling for the impact of adolescents' own achievement strategies.

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3. The ability to match faces with corresponding names was studied under various conditions involving encoding and retrieval. Twenty photographs of undergraduates were randomly paired with 20 common names. Experiment 1 presented the photographs for 10 each, followed by either presentation of the names alone with the instruction to write facial characteristics from memory or presentation of the photographs again with instructions to write from memory the names and anything unusual about the names themselves. Later retrieval was best for the former condition and was interpreted as showing that names could prime image representations of faces. Experiment 2 was a partial replication of Experiment 1 with retrieval measured over seven weeks. These results showed that memories for face-name matches lasted several weeks. Also, consistent with Experiment 1, the number of reported initial face characteristics was highly predictive of matches between faces and names. These studies show the importance for later retrieval of forming and maintaining vivid images of faces even when the faces have no outstanding characteristics.

4. This study examined whether certain personality characteristics are associated with susceptibility to false memories. Participants first answered questions from the Myers-Briggs Type Indicator in order to measure various personality characteristics. They then watched a video excerpt, the simulated eyewitness event. They were next encouraged to lie about the videotaped event during an interview. A week later, some participants recognized confabulated events as being from the video. Two personality characteristics in particular—the introversion/extroversion and thinking/feeling dimensions—were associated with susceptibility to false memories.

5. In the present study, three alternative causal models concerning the relationships between implicit theories of intelligence, perceived academic competence, and school achievement were tested. The direction of changes in implicit theories and perceived competence during early adolescence was also examined. A total of 187 fifth and sixth graders were tested and retested a year later, when they were sixth and seventh graders, respectively. Cross-lagged regression analyses indicated that school achievement determined the adoption of a particular implicit theory through the mediation of perceived competence. Implicit theories were found to change toward the adoption of more incremental beliefs and perceived academic competence declined; however, high achievers, as compared with their low- and middle-level classmates, adopted more incremental beliefs, and had significantly higher perceived competence.

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ACTIVITY HANDOUT: 2.2

WHAT TYPE OF VARIABLE IS IT? WHAT TYPE OF GROUP IS IT?

Read the statements below and then identify the independent and dependent variables and the experimental and control groups.

1. Participants taking part in a sleep study to determine whether the number of hours of sleep a person gets determines how well they will do on an exam were randomly assigned to either the group that was woken up at various times throughout the night or the group that was allowed to sleep throughout the night.

   Independent Variable:
   Dependent Variable:
   Experimental Group:
   Control Group:

2. Participants took part in a study to determine the number of consumed beers it would take to affect their ability to walk in a straight line. Subjects were randomly assigned to either a group that drank alcoholic beer or a group that drank non-alcoholic beer.

   Independent Variable:
   Dependent Variable:
   Experimental Group:
   Control Group:

3. Pharmaceutical Company X conducted an experiment to determine if the new migraine headache pill would alleviate migraine headaches. Subjects were randomly assigned to a group that was given the medication with the active ingredient or a group that was given a placebo pill.

   Independent Variable:
   Dependent Variable:
   Experimental Group:
   Control Group:

4. College X conducted an experiment to determine if freshmen who had their schedules made for them achieved higher grades in their freshman year than freshmen who made their own schedules.

   Independent Variable:
   Dependent Variable:
   Experimental Group:
   Control Group:

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ACTIVITY HANDOUT: 2.3

POPULATION AND SAMPLES

Read the statements below. In the space provided, identify who the population is and who the sample could be. (None of the examples are factual.)

1. It is hypothesized that there is a higher rate of teenage pregnancy in single-parent households than in two-parent households.

   Population:
   Sample:

2. It is hypothesized that there is more school violence in inner-city schools than in suburban schools.

   Population:
   Sample:

3. It is hypothesized that infants born prematurely get better grades in high school than those infants not born prematurely.

   Population:
   Sample:

4. It is hypothesized that college freshman drink more alcoholic beverages than college seniors.

   Population:
   Sample:

5. It is hypothesized that students who started their education at a community college are more likely to graduate than students who started their education at a four-year college.

   Population:
   Sample:

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ACTIVITY HANDOUT: 2.4

THE MEAN, THE MEDIAN, AND THE MODE

Determine what the mean, the median, and the mode are in the following examples.

1. 21 17 5 6 10 16 10 21 8 10 19 25
   12 5 15 22

   Mean:

   Median:

   Mode:

2. 2 3 4 5 6 7 8 9 10 1 2 3
   4 5 6 7 8 9 1 3 6 9 1 10
   1 2 5

   Mean:

   Median:

   Mode:

3. 20 40 60 80 100 30 60 90 40 80 20 21
   22 30 20 25 80 20 33 47 30 45 65 81
   100

   Mean:

   Median:

   Mode:

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ACTIVITY HANDOUT: 2.5

ETHICS

Read the following scenarios and answer the reflection questions that follow.

1. Jennifer and Bethany have both recently declared psychology as their majors. One evening as they are looking over their required courses, they start talking.
   Jennifer: "I don't see why we have to learn statistics and research methods! I am never going to use them anyway. I want to be a counselor and I am just going to deal with each person as an individual. Science treats everyone as if they are interchangeable and totally predictable. In fact, I think people would be better counselors and teachers and social workers if they didn't take research classes at all, because then they would treat everyone as individuals, not clones."
   Bethany: "People are a lot more predictable than you think. Psychologists have learned so much about human behavior in the last hundred years or so using the scientific method. I really believe that if you can figure out all of the factors that are affecting someone's behavior, you can be pretty accurate in figuring out what they are going to do. I've decided that I want to be a researcher because I think I can help more people in the long run than you will as a therapist. As a researcher, I can develop programs that will help a lot of people who suffer from the same problem. A therapist can only help one person at a time, and sometimes it takes years for a person to get better."

   Reflection Questions:

   a. How do Jennifer and Bethany differ in their understanding of what people are like? Who do you agree with more and why?

   b. What is ethically troubling about taking Jennifer's position to the extreme? What would happen if therapists received no training in the scientific study of human behavior?

   c. What is ethically troubling about taking Bethany's position to the extreme? What is the problem with assuming that if you can figure out all the variables (genes, environment, etc.) that you can perfectly predict people's behavior?

2. Dr. Franklin designed a treatment for panic attacks, tried it with all of her clients who suffered from panic attacks, and had great success. Over a 10-year period, Dr. Franklin treated over 100 clients, and the technique significantly reduced panic in all of her clients. The treatment consisted of the therapist (Dr. Franklin) leading the patient through a series of relaxation exercises in her office. Dr. Franklin was so excited about the success of this treatment that she decided to market it to therapists nationwide. For $33 (which is pretty

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reasonable for a psychological measure or technique), she sent the therapist a script of everything she said to the patient during the relaxation exercises. A lot of therapists purchased the treatment because they were very impressed with the success rate that Dr. Franklin reported. However, six months later, Dr. Franklin started to receive calls, letters, and emails from therapists all over the country who complained that the treatment was completely useless for their clients.

Reflection Questions:

a. How would you explain the fact that Dr. Franklin had so much success and the other therapists experienced such failure? How would reliability analyses have helped this problem?

b. From an ethical point of view, why should Dr. Franklin have done reliability analyses before marketing her treatment program?

c. Keeping in mind that she never gave any false information to anyone who purchased her treatment program, do you think Dr. Franklin should give them a refund of their money? Why or why not?

3. Karen has been working with Dr. Tarner on a research study for the past two years. They have collected data on flavor preferences in rats and found some very impressive results. They presented their research at a conference and submitted a paper about the project to an academic journal. When the reviews of their manuscript come back from the journal, the reviewers have several questions about the data. Dr. Tarner asks Karen to look over the data and the SPSS output from the study and double-check that they did everything correctly. When Karen reviews the data, she realizes that she made a mistake in entering the data. Inadvertently, she had repeated some of the same data values twice in the data file, so it appeared there were 270 observations when there were actually 240.

   Reflection Questions:

   a. Why might Karen decide not to tell Dr. Tarner about the error?

   b. What are some possible negative consequences that might result if Karen tells Dr. Tarner and they both report it to the journal editors?

   c. What are some possible negative consequences that might result if Karen tells Dr. Tarner but they agree not to report the mistake to the journal editor?

4. Beverly really wants to go to graduate school in psychology, and she has the grades to get in, but she knows that she needs to get some research experience. She begins working with Dr. Miserendino on a project in which she is observing white rats and measuring the amount

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of time it takes them to learn to navigate through a maze depending on whether the animal has been given a drug or a placebo. Beverly is supposed to collect data every day for six days in a row (Monday through Saturday) to see what happens as the drug gradually wears off. She collects the data Monday through Friday, but on Saturday she isn't able to get to campus because of a family emergency. She knows from talking to Dr. Miserendino about the study that it is too expensive to repeat because both the rats themselves and the drugs are very costly. She also knows that if she tells Dr. Miserendino that she missed a day of data collection, Dr. Miserendino will be really upset. She considers making up the data just for Saturday based on the data she collected the rest of the week. She knows that Dr. Miserendino would never have to find out what happened.

Reflection Questions:

a. Assuming Dr. Miserendino never does find out about the made-up data, what are some possible negative ethical consequences of Beverly's decision to falsify the data?

b. Why is it risky for Beverly to make up the data?

c. What would you choose to do if you were in Beverly's place? Explain.

5. As part of their class requirements, the students in Dr. Taylor's Research Design and Analysis class are sent over to Trumbull Mall to observe interactions between mothers and their toddler-aged children. They are told not to interact with the moms at all, but just record certain behaviors, like the number of times they speak harshly to their child and the number of times the child whines or cries.

One of the mothers notices that the students are watching people and she complains to mall security. The manager of the mall asks the students where they are from, then writes a letter of complaint to Dr. Taylor. Here is an excerpt:

> "I am requesting that you do not engage in any more observational research at Trumbull Mall. I don't think it is right to allow students to observe people's behavior without getting their permission first. It is a violation of privacy and it's wrong even if they don't realize they are being watched. People come to the mall to shop, not to be watched."

Reflection Questions:

a. What are some good reasons for the manager's concerns? Explain.

b. What are some good reasons why the students should be able to do this type of research? Explain.

c. If you were in Dr. Taylor's position, how would you handle the situation?

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Answer Key to Activity Handouts

ACTIVITY HANDOUT: 2.1 ANSWER KEY

FIND THE VARIABLE AND OPERATIONALLY DEFINE IT!

Read the below abstracts from various journal articles and then state in the space provided what the operational definition is.

1. The present study examined the relationships of masculinity and femininity with concession in an experimental collaborative eyewitness testimony task, using the MORI technique. Participants formed same-sex or mixed-sex pairs and watched a videotaped event. Their eyewitness memories were assessed three times: immediately after watching, after discussing the event together, and individually one week later. The participants' self-confidence in their recalled memories and percentages of concessions were also examined. The Masculinity-Humanity-Femininity Scale was administered to the participants at the end of the experiment. The results showed that masculinity negatively correlated with concession, and that both masculinity and femininity were associated with inaccuracy in collaborative memory recall.

OPERATIONAL DEFINITION: score on the Masculinity-Humanity-Femininity scale

2. The present study examined the extent to which the achievement strategies deployed by adolescents and those used by their peers would predict adolescents' school adjustment, academic achievement, and problem behavior. The participants were 287 fourteen- to fifteen-year-old comprehensive school students (121 boys and 165 girls) from a middle-sized town in central Sweden. The results showed that not only the maladaptive strategies used by adolescents, but also those reported by their peers, predicted adolescents' norm-breaking behavior, low school adjustment, and low level of achievement; high levels of failure expectations and task-avoidance among adolescents' peers were positively associated with adolescents' own norm-breaking behavior, and indirectly via this, also with their maladjustment at school and low grades. These associations were found after controlling for the impact of adolescents' own achievement strategies.

OPERATIONAL DEFINITION: grades in school

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3. The ability to match faces with corresponding names was studied under various conditions involving encoding and retrieval. Twenty photographs of undergraduates were randomly paired with 20 common names. Experiment 1 presented the photographs for 10 each, followed by either presentation of the names alone with the instruction to write facial characteristics from memory or presentation of the photographs again with instructions to write from memory the names and anything unusual about the names themselves. Later retrieval was best for the former condition and was interpreted as showing that names could prime image representations of faces. Experiment 2 was a partial replication of Experiment 1 with retrieval measured over seven weeks. These results showed that memories for face-name matches lasted several weeks. Also, consistent with Experiment 1, the number of reported initial face characteristics was highly predictive of matches between faces and names. These studies show the importance for later retrieval of forming and maintaining vivid images of faces even when the faces have no outstanding characteristics.

OPERATIONAL DEFINITION: name retrieval

4. This study examined whether certain personality characteristics are associated with susceptibility to false memories. Participants first answered questions from the Myers-Briggs Type Indicator in order to measure various personality characteristics. They then watched a video excerpt, the simulated eyewitness event. They were next encouraged to lie about the videotaped event during an interview. A week later, some participants recognized confabulated events as being from the video. Two personality characteristics in particular—the introversion/extroversion and thinking/feeling dimensions—were associated with susceptibility to false memories.

OPERATIONAL DEFINITION: MBTI scores

5. In the present study, three alternative causal models concerning the relationships between implicit theories of intelligence, perceived academic competence, and school achievement were tested. The direction of changes in implicit theories and perceived competence during early adolescence was also examined. A total of 187 fifth and sixth graders were tested and retested a year later, when they were sixth and seventh graders, respectively. Cross-lagged regression analyses indicated that school achievement determined the adoption of a particular implicit theory through the mediation of perceived competence. Implicit theories were found to change toward the adoption of more incremental beliefs and perceived academic competence declined; however, high achievers, as compared with their low- and middle-level classmates, adopted more incremental beliefs, and had significantly higher perceived competence.

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OPERATIONAL DEFINITION: implicit theories of intelligence operationalized as incremental beliefs; other operationalizations not clear but presumably academic achievement was operationalized as grades or GPA.

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ACTIVITY HANDOUT: 2.2 ANSWER KEY

WHAT TYPE OF VARIABLE IS IT? WHAT TYPE OF GROUP IS IT?

Read the statements below and then identify the independent and dependent variables and the experimental and control groups.

1. Participants taking part in a sleep study to determine whether the number of hours of sleep a person gets determines how well they will do on an exam were randomly assigned to either the group that was woken up at various times throughout the night or the group that was allowed to sleep throughout the night.

Independent Variable: hours of sleep
Dependent Variable: exam performance
Experimental Group: group that was woken up
Control Group: group that was allowed to sleep through the night

2. Participants took part in a study to determine the number of consumed beers it would take to affect their ability to walk in a straight line. Subjects were randomly assigned to either a group that drank alcoholic beer or a group that drank non-alcoholic beer.

Independent Variable: number of alcoholic beers
Dependent Variable: walking in a straight line
Experimental Group: group given beers
Control Group: group given non-alcoholic beer

3. Pharmaceutical Company X conducted an experiment to determine if the new migraine headache pill would alleviate the number of migraine headaches. Subjects were randomly assigned to a group that was given the medication with the active ingredient or a group that was given a placebo pill.

Independent Variable: migraine medication
Dependent Variable: number of migraine headaches
Experimental Group: group given the new migraine pill
Control Group: group given placebo pill

4. College X conducted an experiment to determine if freshmen who had their schedules made for them achieved higher grades in their freshman year than freshmen who made their own schedules.

Independent Variable: type of schedule
Dependent Variable: school performance as measured by higher grades
Experimental Group: group that had schedules made for them
Control Group: group that made their own schedules

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ACTIVITY HANDOUT: 2.3 ANSWER KEY

POPULATION AND SAMPLES

Read the statements below. In the space provided, identify who the population is and who the sample could be. (None of the examples are factual.)

1. It is hypothesized that there is a higher rate of teenage pregnancy in single-parent households than in two-parent households.

Population: all female teenagers
Sample: random sample of female teenagers

2. It is hypothesized that there is more school violence in inner-city schools than in suburban schools.

Population: all inner-city and suburban schools
Sample: random sample of inner-city and suburban schools

3. It is hypothesized that infants born prematurely get better grades in high school than those infants not born prematurely.

Population: all children
Sample: random sample of high school students

4. It is hypothesized that college freshman drink more alcoholic beverages than college seniors.

Population: all college students
Sample: random sample of freshmen and seniors

5. It is hypothesized that students who started their education at a community college are more likely to graduate than students who started their education at a four-year college.

Population: all college students
Sample: Random sample of community college and four year college students

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ACTIVITY HANDOUT: 2.4 ANSWER KEY

THE MEAN, THE MEDIAN, AND THE MODE

Determine what the mean, the median, and the mode are in the following examples.

1. 21 17 5 6 10 16 10 21 8 10 19 25
   12 5 15 22

   Mean: 13.875

   Median: 13.5

   Mode: 10

2. 2 3 4 5 6 7 8 9 10 1 2 3
   4 5 6 7 8 9 1 3 6 9 1 10
   1 2 5

   Mean: 5.07

   Median: 5

   Mode: 1

3. 20 40 60 80 100 30 60 90 40 80 20 21
   22 30 20 25 80 20 33 47 30 45 65 81
   100

   Mean: 57.78

   Median: 60

   Mode: 40

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ACTIVITY HANDOUT: 2.5 ANSWER KEY

ETHICS

Read the following scenarios and answer the reflection questions that follow.

1. Jennifer and Bethany have both recently declared psychology as their majors. One evening as they are looking over their required courses, they start talking.

Jennifer: "I don't see why we have to learn statistics and research methods! I am never going to use them anyway. I want to be a counselor and I am just going to deal with each person as an individual. Science treats everyone as if they are interchangeable and totally predictable. In fact, I think people would be better counselors and teachers and social workers if they didn't take research classes at all, because then they would treat everyone as individuals, not clones."

Bethany: "People are a lot more predictable than you think. Psychologists have learned so much about human behavior in the last hundred years or so using the scientific method. I really believe that if you can figure out all of the factors that are affecting someone's behavior, you can be pretty accurate in figuring out what they are going to do. I've decided that I want to be a researcher because I think I can help more people in the long run than you will as a therapist. As a researcher, I can develop programs that will help a lot of people who suffer from the same problem. A therapist can only help one person at a time, and sometimes it takes years for a person to get better."

Reflection Questions:

d. How do Jennifer and Bethany differ in their understanding of what people are like? Who do you agree with more and why?

Jennifer does not understand that psychology is a science and requires the application of the scientific method.

e. What is ethically troubling about taking Jennifer's position to the extreme? What would happen if therapists received no training in the scientific study of human behavior?

By not understanding the research on the treatment methods that are most effective, Jennifer could use the wrong treatments.

f. What is ethically troubling about taking Bethany's position to the extreme? What is the problem with assuming that if you can figure out all the variables (genes, environment, etc.) that you can perfectly predict people's behavior?

Psychological research must eventually be taken back to the individual to ensure that it makes sense and is feasible. A researcher has control over many variables whereas a counselor does not.

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2. Dr. Franklin designed a treatment for panic attacks, tried it with all of her clients who suffered from panic attacks, and had great success. Over a 10-year period, Dr. Franklin treated over 100 clients, and the technique significantly reduced panic in all of her clients. The treatment consisted of the therapist (Dr. Franklin) leading the patient through a series of relaxation exercises in her office. Dr. Franklin was so excited about the success of this treatment that she decided to market it to therapists nationwide. For $33 (which is pretty reasonable for a psychological measure or technique), she sent the therapist a script of everything she said to the patient during the relaxation exercises. A lot of therapists purchased the treatment because they were very impressed with the success rate that Dr. Franklin reported. However, six months later, Dr. Franklin started to receive calls, letters, and emails from therapists all over the country who complained that the treatment was completely useless for their clients.

Reflection Questions:

a. How would you explain the fact that Dr. Franklin had so much success and the other therapists experienced such failure? How would reliability analyses have helped this problem?

Multiple therapists should administer the treatment before drawing conclusions.

b. From an ethical point of view, why should Dr. Franklin have done reliability analyses before marketing her treatment program?

Conclusions were potentially misleading.

c. Keeping in mind that she never gave any false information to anyone who purchased her treatment program, do you think Dr. Franklin should give them a refund of their money? Why or why not?

Answers vary.

3. Karen has been working with Dr. Tarner on a research study for the past two years. They have collected data on flavor preferences in rats and found some very impressive results. They presented their research at a conference and submitted a paper about the project to an academic journal. When the reviews of their manuscript come back from the journal, the reviewers have several questions about the data. Dr. Tarner asks Karen to look over the data and the SPSS output from the study and double-check that they did everything correctly. When Karen reviews the data, she realizes that she made a mistake in entering the data. Inadvertently, she had repeated some of the same data values twice in the data file, so it appeared there were 270 observations when there were actually 240.

Reflection Questions:

d. Why might Karen decide not to tell Dr. Tarner about the error?

Karen is afraid, or the results don't change.

e. What are some possible negative consequences that might result if Karen tells Dr. Tarner and they both report it to the journal editors?

The paper might not be published.

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f. What are some possible negative consequences that might result if Karen tells Dr. Tarner but they agree not to report the mistake to the journal editor?

The conclusions drawn from the data could be misleading and even false.

4. Beverly really wants to go to graduate school in psychology, and she has the grades to get in, but she knows that she needs to get some research experience. She begins working with Dr. Miserendino on a project in which she is observing white rats and measuring the amount of time it takes them to learn to navigate through a maze depending on whether the animal has been given a drug or a placebo. Beverly is supposed to collect data every day for six days in a row (Monday through Saturday) to see what happens as the drug gradually wears off. She collects the data Monday through Friday, but on Saturday she isn't able to get to campus because of a family emergency. She knows from talking to Dr. Miserendino about the study that it is too expensive to repeat because both the rats themselves and the drugs are very costly. She also knows that if she tells Dr. Miserendino that she missed a day of data collection, Dr. Miserendino will be really upset. She considers making up the data just for Saturday based on the data she collected the rest of the week. She knows that Dr. Miserendino would never have to find out what happened.

Reflection Questions:

a. Assuming Dr. Miserendino never does find out about the made-up data, what are some possible negative ethical consequences of Beverly's decision to falsify the data?

Incorrect conclusions will be drawn from the data thereby compromising the scientific process.

b. Why is it risky for Beverly to make up the data?

Incorrect conclusions will be drawn from the data thereby compromising the scientific process.

c. What would you choose to do if you were in Beverly's place? Explain.

The only correct answer is to admit to the researcher your error.

5. As part of their class requirements, the students in Dr. Taylor's Research Design and Analysis class are sent over to Trumbull Mall to observe interactions between mothers and their toddler-aged children. They are told not to interact with the moms at all, but just record certain behaviors, like the number of times they speak harshly to their child and the number of times the child whines or cries.

One of the mothers notices that the students are watching people and she complains to mall security. The manager of the mall asks the students where they are from, then writes a letter of complaint to Dr. Taylor. Here is an excerpt:

"I am requesting that you do not engage in any more observational research at Trumbull Mall. I don't think it is right to allow students to observe people's behavior without

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getting their permission first. It is a violation of privacy and it's wrong even if they don't realize they are being watched. People come to the mall to shop, not to be watched."

Reflection Questions:

d. What are some good reasons for the manager's concerns? Explain.
Participants did not give informed consent.

e. What are some good reasons why the students should be able to do this type of research? Explain.
Participants were in public; participants' routine was not altered by the students; there were no risks.

f. If you were in Dr. Taylor's position, how would you handle the situation?
Researchers should seek permission from an owner/manager when they wish to collect data in public.

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