CHAPTER OVERVIEW

Chapter 1 explains the limits of intuition and common sense in reasoning about behavior and mental processes. To counteract our human tendency toward faulty reasoning, psychologists adopt a scientific attitude that is based on curiosity, skepticism, humility, and critical thinking. Chapter 1 also explains how psychologists, using the scientific method, employ the research strategies of description, correlation, and experimentation in order to objectively describe, predict, and explain behavior.

The next section discusses how statistical reasoning is used to help psychologists describe data and to generalize from instances. To describe data, psychologists often rely on measures of central tendency such as the mean, median, and mode, as well as variation measures such as the range and standard deviation. Statistical reasoning also helps psychologists determine when it is safe to generalize from a sample to the larger population.

Chapter 1 concludes with a discussion of several questions people often ask about psychology, including why animal research is relevant, whether laboratory experiments are ethical, whether behavior varies with culture and gender, and whether psychology’s principles don’t have the potential for misuse.

Chapter 1 introduces a number of concepts and issues that will play an important role in later chapters. Pay particular attention to the strengths and weaknesses of descriptive and correlational research. In addition, make sure that you understand the method of experimentation, especially the importance of control conditions and the difference between independent and dependent variables. Finally, you should be able to discuss three important principles concerning populations and samples, as well as the concept of significance in testing difference.

NOTE: Answer guidelines for all Chapter 1 questions begin on page 31.

CHAPTER REVIEW

First, skim each section, noting headings and boldface items. After you have read the section, review each objective by answering the fill-in and essay-type questions that follow it. As you proceed, evaluate your performance by consulting the answers beginning on page 31. Do not continue with the next section until you understand each answer. If you need to, review or reread the section in the textbook before continuing.

The Need for Psychological Science (pp. 19–26)

David Myers at times uses idioms that are unfamiliar to some readers. If you do not know the meaning of any of the following words, phrases, or expressions in the context in which they appear in the introduction to this chapter and in this section, refer to pages 38–40 for an explanation: to remedy their own woes; winnow sense from nonsense; dresses it in jargon; bull’s eye; “Out of sight, out of mind”; “Absence makes the heart grow fonder”; familiarity breeds contempt; drop a course; lackluster predictions; hard-headed curiosity; leap of faith; the proof is in the pudding; auras; crazy-sounding ideas; arena of competing ideas; so much the worse for our ideas; “The rat is always right”; the spectacles of our preconceived ideas; gut feelings; debunked; “play the tape”; sift reality from illusion.
Objective 1: Define hindsight bias, and explain how it can make research findings seem like mere common sense.

1. The tendency to perceive an outcome that has occurred as being obvious and predictable is called the ________________ . This phenomenon is ________________ (rare/common) in ________________ (children/adults/both children and adults).

2. Because it is ________________ (after the fact/usually wrong), this tendency makes a research finding seem like mere commonsense.

Objective 2: Describe how overconfidence contaminates our everyday judgments.

3. Our everyday thinking is also limited by ________________, in what we think we know, which occurs because of our ________________ to seek information that confirms our judgments.

4. Most people are ________________ (better/worse/equally wrong) in predicting their social behavior.

Objective 3: Explain how the scientific attitude encourages critical thinking.

5. The scientific approach is characterized by the attitudes of ________________ , ________________ , and ________________ .

6. In scientific inquiry, this encourages reasoning that examines assumptions, discerns hidden values, evaluates evidence, and assesses conclusions, which is called ________________ .

Objective 4: Describe how psychological theories guide scientific research.

7. Psychologists use the ________________ to guide their study of behavior and mental processes. They make ________________ and form ________________ , which are ________________ based on new ________________ .

8. An explanation using an integrated set of principles that organizes and predicts behaviors or events is a ________________ . Testable predictions that allow a scientist to evaluate a theory are called ________________ . These predictions give direction to ________________ .

9. In order to prevent theoretical biases from influencing scientific observations, research must be reported precisely—using clear ________________ ________________ of all concepts—so that others can ________________ the findings.

10. The test of a useful theory is the extent to which it effectively ________________ observations and implies clear ________________ .

11. Psychologists conduct research using ________________ methods ________________ , and ________________ methods.

Objective 5: Identify an advantage and a disadvantage of using case studies to study behavior and mental processes.

1. The research strategy in which one or more individuals is studied in depth in order to reveal universal principles of behavior is the ________________ .

2. Although case studies can suggest ________________ for further study, a potential problem with this method is that any given individual may be ________________ .

Objective 6: Identify the advantages and disadvantages of using surveys to study behavior and mental processes, and explain the importance of wording effects and random sampling.

3. The method in which a group of people is questioned about their attitudes or behavior is the ________________ .
4. An important factor in the validity of survey research is the __________ of questions.

5. The tendency to overestimate others’ agreement with us is the ____________.

6. Surveys try to obtain a ____________ sample, one that will be representative of the ____________ being studied. In such a sample, every person ________________ (does/does not) have a chance of being included.

7. Large, representative samples ________________ (are/are not) better than small ones.

8. We are more likely to overgeneralize from select samples that are especially ________________.

Objective 7: Identify an advantage and a disadvantage of using naturalistic observation to study behavior and mental processes.

9. The research method in which people or animals are directly observed in their natural environments is called ________________.

10. Case studies, surveys, and naturalistic observation do not explain behavior; they simply ________________ it.

11. Using naturalistic observation, researchers have found that people are more likely to laugh in ________________ situations than in ________________ situations. Also, using observations of walking speed and the accuracy of public clocks, researchers have concluded that the pace of life ________________ (varies/does not vary) from one culture to another.

Correlation (pp. 30–36)

If you do not know the meaning of any of the following words, phrases, or expressions in the context in which they appear in the text, refer to page 40 for an explanation: naked eye; flipped a coin; “cold hands”... “hot hands.”

Objective 8: Describe positive and negative correlations, and explain how correlational measures can aid the process of prediction.

1. When changes in one factor are accompanied by changes in another, the two factors are said to be ________________, and one is thus able to ________________ the other. The mathematical expression of this relationship is called a ________________.

2. Graphs called ________________ are often used to depict the relationship between two sets of scores.

3. If two factors increase or decrease together, they are ________________. If, however, one decreases as the other increases, they are ________________. Another way to state the latter is that the two variables relate ________________.

4. A negative correlation between two variables does not indicate the ________________ or ________________ of the relationship. Nor does correlation prove ________________; rather, it merely indicates the possibility of a ________________ relationship.

If your level of test anxiety goes down as your time spent studying for the exam goes up, would you say these events are positively or negatively correlated? Explain your reasoning.

Objective 9: Explain why correlational research fails to provide evidence of cause-effect relationships.

5. A correlation between two events or behaviors means only that one event can be ________________ from the other.
6. Because two events may both be caused by some other __________________, a correlation does not mean that one __________________ the other. For this reason, correlation thus does not enable __________________.

Objective 10: Describe how people form illusory correlations.

7. A perceived correlation that does not really exist is an __________________
   ____________________________.

8. People are more likely to notice and recall events that __________________ their beliefs. This error in thinking helps explain many __________________ beliefs.

Objective 11: Explain the human tendency to perceive order in random sequences.

9. Another common tendency is to perceive order in __________________ _________________.

10. Patterns and streaks in random sequences occur __________________ (more/less) often than people expect, and they __________________ (do/do not) appear random.

Experim entation (pp. 36–39)

If you do not know the meaning of the following word in the context in which it appears in the text, refer to page 40 for an explanation: recap.

Objective 12: Explain how experiments help researchers isolate cause and effect.

1. To isolate __________________ and __________________, researchers __________________ control for other __________________.

2. Research studies have found that breast-fed infants __________________ (do/do not) grow up with higher intelligence scores than those of infants who are bottle-fed with cow’s milk. To study cause-effect relationships, psychologists conduct __________________. Using this method, a researcher __________________ the factor of interest, while __________________ other factors.

3. If a __________________ changes when an __________________ factor is varied, the researcher knows the factor is having an __________________.

Objective 13: Explain why the double-blind procedure and random assignment build confidence in research findings.

4. Researchers sometimes give certain participants a pseudotreatment, called a __________________, and compare their behavior with that of participants who receive the actual treatment. When merely thinking that one is receiving a treatment produces results, a __________________ ________________ is said to occur.

5. When neither the subjects nor the person collecting the data knows which condition a subject is in, the researcher is making use of the __________________ ________________.

6. An experiment must involve at least two conditions: the __________________ condition, in which the experimental treatment is present, and the __________________ condition, in which it is absent.

7. Experimenters rely on the __________________ ________________ of individuals to the experimental conditions.

Objective 14: Explain the difference between an independent and a dependent variable.

8. The factor that is being manipulated in an experiment is called the __________________ variable.
The measurable factor that may change as a result of these manipulations is called the ____________________ variable.

9. The aim of an experiment is to ____________________
a(n) ____________________ variable, ____________________ the ____________________ variable, and ____________________ all other ____________________.

Explain at least one advantage of the experiment as a research method.

Objective 17: Describe the three measures of central tendency, and tell which is most affected by extreme scores.

3. The three measures of central tendency are the ____________________, the ____________________, and the ____________________.

4. The most frequently occurring score in a distribution is called the__________________.

5. The mean is computed as the ____________________

________________________________ of all the scores divided by the ____________________ of scores.

6. The median is the score at the ____________________ percentile.

7. When a distribution is lopsided, or ____________________, the ____________________ (mean/median/mode) can be biased by a few extreme scores.

Objective 18: Describe two measures of variation.

8. Averages derived from scores with ____________________ (high/low) variability are more reliable than those with ____________________ (high/low) variability.

9. The measures of variation include the ____________________ and the ____________________

________________________________.

10. The range is computed as the ____________________

________________________________.

11. The range provides a(n) ____________________ (crude/accurate) estimate of variation because it ____________________ (is/is not) influenced by extreme scores.

12. The standard deviation is a ____________________ (more accurate/less accurate) measure of variation than the range. Unlike the range, the standard deviation ____________________ (takes/does not take) into consideration information from each score in the distribution.

Statistical Reasoning (pp. 39–44)

If you do not know the meaning of any of the following words, phrases, or expressions in the context in which they appear in the text, refer to pages 40–41 for an explanation: Off the top-of-the-head estimates; national income cake; gauges; data are “noisy.”

Objective 15: Explain the importance of statistical principles, and give an example of their use in everyday life.

1. Researchers use ____________________ to help them see and interpret their observations.

Objective 16: Explain how bar graphs can misrepresent data.

2. Once researchers have gathered their ____________________, they must ____________________ them. One simple way of visually representing data is to use a ____________________ ____________________ . It is important to read the ____________________

________________________________ and note the ____________________ to avoid being mislead by misrepresented data.
Objective 19: Identify three principles of making generalizations from samples.

13. It is safer to generalize from a ________________ sample than from a ________________ sample.

14. Averages are more reliable when they are based on scores with ________________ (high/low) variability.

15. Small samples provide a ________________ (more/less) reliable basis for generalizing than large samples.

Objective 20: Explain how psychologists decide whether differences are meaningful.

16. Tests of statistical ________________ are used to estimate whether observed differences are real—that is, to make sure that they are not simply the result of ________________ variation. The differences are probably real if the sample averages are ________________ and the difference between them is ________________ (relatively small/relatively large).

17. Statistical significance does not necessarily indicate the importance or ________________ significance of a difference or result.

Frequently Asked Questions About Psychology (pp. 44–50)

If you do not know the meaning of any of the following words, phrases, or expressions in the context in which they appear in the text, refer to page 41 for an explanation: plunge in; To understand how a combustion engine works . . . ; screen; color “the facts.”

Objective 21: Explain the value of simplified laboratory conditions in discovering general principles of behavior.

1. In laboratory experiments, psychologists’ concern is not with specific behaviors but with the underlying theoretical ________________ . As an example, researchers have found that people who flexibly cope with ________________ stresses also cope flexibly with ________________

2. Psychologists conduct experiments on simplified behaviors in a laboratory environment in order to gain ________________ over the many variables present in the “real world.” In doing so, they are able to test ________________ ________________ of behavior that also operate in the real world.

Objective 22: Discuss whether psychological research can be generalized across cultures and genders.

3. Culture refers to shared ________________, ________________, ________________, and ________________ that one generation passes on to the next.

4. Although specific attitudes and behaviors vary across cultures, the underlying ________________ are the same. For instance, throughout the world people diagnosed with ________________ exhibit the same ________________ malfunction. Likewise, similarities between the ________________ far outweigh differences.

Objective 23: Explain why psychologists study animals, and discuss the ethics of experimentation with both animals and humans.

5. Many psychologists study animals because they are fascinating. More important, they study animals because of the ________________ (similarities/differences) between humans and other animals. These studies have led to treatments for human ________________ and to a better understanding of human functioning.

6. Some people question whether experiments with animals are ________________ . They wonder whether it is right to place the ________________ of humans over those of animals.

7. Opposition to animal experimentation also raises the question of what ________________ should protect the well-being of animals.
Describe the goals of the ethical guidelines for psychological research.

**Objective 24:** Describe how personal values can influence psychologists’ research and its application, and discuss psychology’s potential to manipulate people.

8. Psychologists’ values ___________ (do/do not) influence their theories, observations, and professional advice.

9. Although psychology ___________ (can/cannot) be used to manipulate people, its purpose is to ___________.

10. (Thinking Critically) The viewpoint called ___________ questions scientific objectivity, arguing that most scientific concepts are merely ___________ constructs.

Psychological scientists ___________ (agree/disagree) on whether there is, in fact, a “real world” of psychological principles that science can reveal.

11. (Thinking Critically) People who serve on juries in capital punishment cases ___________ (do/do not) represent the greater population. They are ___________ (more/less) likely to be minorities and women.

12. (Thinking Critically) States with a death penalty ___________ (have/do not have) lower homicide rates.

**PROGRESS TEST 1**

**Multiple-Choice Questions**

Circle your answers to the following questions and check them with the answers beginning on page 33. If your answer is incorrect, read the explanation for why it is incorrect and then consult the appropriate pages of the text (in parentheses following the correct answer).

1. After detailed study of a gunshot wound victim, a psychologist concludes that the brain region destroyed is likely to be important for memory functions. Which type of research did the psychologist use to deduce this?
   a. the case study  
   c. correlation
   b. a survey     
   d. experimentation

2. In an experiment to determine the effects of exercise on motivation, exercise is the:
   a. control condition. 
   b. intervening variable. 
   c. independent variable. 
   d. dependent variable.

3. In order to determine the effects of a new drug on memory, one group of people is given a pill that contains the drug. A second group is given a sugar pill that does not contain the drug. This second group constitutes the:
   a. random sample. 
   c. control group. 
   b. experimental group. 
   d. test group.

4. Theories are defined as:
   a. testable propositions. 
   b. factors that may change in response to manipulation. 
   c. statistical indexes. 
   d. principles that help to organize, predict, and explain facts.

5. A psychologist studies the play behavior of third-grade children by watching groups during recess at school. Which type of research is being used?
   a. correlation 
   b. case study 
   c. experimentation 
   d. naturalistic observation
6. To ensure that other researchers can repeat their work, psychologists use:
   a. control groups.
   b. random assignment.
   c. double-blind procedures.
   d. operational definitions.

7. The scientific attitude of skepticism is based on the belief that:
   a. people are rarely candid in revealing their thoughts.
   b. mental processes can’t be studied objectively.
   c. the scientist’s intuition about behavior is usually correct.
   d. ideas need to be tested against observable evidence.

8. Which of the following is not a basic research technique used by psychologists?
   a. description
   b. replication
   c. experimentation
   d. correlation

9. Psychologists’ personal values:
   a. have little influence on how their experiments are conducted.
   b. do not influence the interpretation of experimental results because of the use of statistical techniques that guard against subjective bias.
   c. can bias both scientific observation and interpretation of data.
   d. have little influence on investigative methods but a significant effect on interpretation.

10. If shoe size and IQ are negatively correlated, which of the following is true?
    a. People with large feet tend to have high IQs.
    b. People with small feet tend to have high IQs.
    c. People with small feet tend to have low IQs.
    d. IQ is unpredictable based on a person’s shoe size.

11. Which of the following would be best for determining whether alcohol impairs memory?
    a. case study
    b. naturalistic observation
    c. survey
    d. experiment

12. Well-done surveys measure attitudes in a representative subset, or ____________________, of an entire group, or ____________________.
    a. population; random sample
    b. control group; experimental group
    c. experimental group; control group
    d. random sample; population

13. What is the mean of the following distribution of scores: 2, 3, 7, 6, 1, 4, 9, 5, 8, 2?
    a. 5
    b. 4
    c. 4.7
    d. 3.7

14. What is the median of the following distribution of scores: 1, 3, 7, 7, 2, 8, 4?
    a. 1
    b. 2
    c. 3
    d. 4

15. What is the mode of the following distribution: 8, 2, 1, 1, 3, 7, 6, 2, 0, 2?
    a. 1
    b. 2
    c. 3
    d. 7

16. In generalizing from a sample to the population, it is important that:
    a. the sample is representative of the population.
    b. the sample is large.
    c. the scores in the sample have low variability.
    d. all of the above are observed.

17. When a difference between two groups is “statistically significant,” this means that:
    a. the difference is statistically real but of little practical significance.
    b. the difference is probably the result of sampling variation.
    c. the difference is not likely to be due to chance variation.
    d. all of the above are true.

18. A lopsided set of scores that includes a number of extreme or unusual values is said to be:
    a. symmetrical.
    b. normal.
    c. skewed.
    d. dispersed.

19. Juwan eagerly opened an online trading account, believing that his market savvy would allow him to pick stocks that would make him a rich day trader. This belief best illustrates:
    a. the false consensus effect.
    b. illusory correlation.
    c. hindsight bias.
    d. overconfidence.

20. Which of the following is the measure of central tendency that would be most affected by a few extreme scores?
    a. mean
    b. range
    c. median
    d. mode
Matching Items
Match each term and concept with its definition or description.

Terms

1. culture
2. median
3. placebo effect
4. hindsight bias
5. mode
6. range
7. standard deviation
8. scatterplot
9. mean
10. measures of central tendency
11. measures of variation
12. false consensus effect
13. critical thinking
14. illusory correlation

Definitions or Descriptions

a. the mean, median, and mode
b. the difference between the highest and lowest scores
c. the arithmetic average of a set of scores
d. the range and standard deviation
e. the most frequently occurring score
f. the middle score in a distribution
g. a graphed cluster of dots depicting the values of two variables
h. a measure of variation based on every score
i. shared ideas and behaviors passed from one generation to the next
j. "I-knew-it-all-along" phenomenon
k. reasoning that does not blindly accept arguments
l. experimental results caused by expectations alone
m. overestimating others' agreement with us
n. false perception of a relationship between two variables

PROGRESS TEST 2

Progress Test 2 should be completed during a final chapter review. Answer the following questions after you thoroughly understand the correct answers for the section reviews and Progress Test 1.

Multiple-Choice Questions

1. Which of the following research methods does not belong with the others?
   a. case study
   b. survey
   c. naturalistic observation
   d. experiment

2. To prevent the possibility that a placebo effect or researchers' expectations will influence a study's results, scientists employ:
   a. control groups.
   b. experimental groups.
   c. random assignment.
   d. the double-blind procedure.

3. Which statement about the ethics of experimentation with people and animals is false?
   a. Only a small percentage of animal experiments use shock.
   b. Allegations that psychologists routinely subject animals to pain, starvation, and other inhumane conditions have been proven untrue.
   c. The American Psychological Association and the British Psychological Society have set strict guidelines for the care and treatment of human and animal subjects.
   d. Animals are used in psychological research more often than they are killed by humane animal shelters.

4. In an experiment to determine the effects of attention on memory, memory is the:
   a. control condition.
   b. intervening variable.
   c. independent variable.
   d. dependent variable.
5. One reason researchers base their findings on representative samples is to avoid the false consensus effect, which refers to our tendency to:
   a. overestimate the extent to which others share our belief.
   b. falsely perceive a relationship between two events when none exists.
   c. underestimate errors in our judgment.
   d. make all of the above reasoning errors.

6. Which of the following best describes the hindsight bias?
   a. Events seem more predictable before they have occurred.
   b. Events seem more predictable after they have occurred.
   c. A person’s intuition is usually correct.
   d. A person’s intuition is usually not correct.

7. The procedure designed to ensure that the experimental and control groups do not differ in any way that might affect the experiment’s results is called:
   a. variable controlling.
   b. random assignment.
   c. representative sampling.
   d. stratification.

8. Illusory correlation refers to:
   a. the perception that two negatively correlated variables are positively correlated.
   b. the perception of a correlation where there is none.
   c. an insignificant correlation.
   d. a correlation that equals −1.0.

9. In generalizing from a sample to the population, it is important that:
   a. the sample be representative.
   b. the sample be nonrandom.
   c. the sample not be too large.
   d. all of the above be true.

10. The strength of the relationship between two vivid events will most likely be:
    a. significant.
    b. positive.
    c. negative.
    d. overestimated.

11. Which of the following is true, according to the text?
    a. Because laboratory experiments are artificial, any principles discovered cannot be applied to everyday behaviors.
    b. No psychological theory can be considered a good one until it produces testable predictions.
    c. Psychology’s theories reflect common sense.
    d. Psychology has few ties to other disciplines.

12. Which type of research would allow you to determine whether students’ college grades accurately predict later income?
    a. case study  
    b. naturalistic observation  
    c. experimentation  
    d. correlation

13. In a test of the effects of air pollution, groups of students performed a reaction-time task in a polluted or an unpolluted room. To what condition were students in the unpolluted room exposed?
    a. experimental  
    b. randomly assigned  
    c. control  
    d. dependent

14. In order to study the effects of lighting on mood, Dr. Cooper had students fill out questionnaires in brightly lit or dimly lit rooms. In this study, the independent variable consisted of:
    a. the number of students assigned to each group.
    b. the students’ responses to the questionnaire.
    c. the room lighting.
    d. the subject matter of the questions asked.

15. What is the mode of the following distribution of scores: 2, 2, 4, 4, 4, 14?
    a. 2  
    c. 5  
    b. 4  
    d. 6

16. What is the mean of the following distribution of scores: 2, 5, 8, 10, 11, 4, 6, 9, 1, 4?
    a. 2  
    c. 6  
    b. 10  
    d. 15

17. What is the median of the following distribution: 10, 7, 5, 11, 8, 6, 9?
    a. 6  
    c. 8  
    b. 7  
    d. 9

18. Which of the following is the measure of variation that is most affected by extreme scores?
    a. mean  
    c. mode  
    b. standard deviation  
    d. range
19. The set of scores that would likely be most representative of the population from which it was drawn would be a sample with a relatively:
   a. large standard deviation.
   b. small standard deviation.
   c. large range.
   d. small range.

20. If a difference between two samples is not statistically significant, which of the following can be concluded?
   a. The difference is probably not a true one.
   b. The difference is probably not reliable.
   c. The difference could be due to sampling variation.
   d. All of the above can be concluded.

**Matching Items**
Match each term with its definition or description.

<table>
<thead>
<tr>
<th>Terms</th>
<th>Definitions or Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. hypothesis</td>
<td>a. an in-depth observational study of one person</td>
</tr>
<tr>
<td>2. theory</td>
<td>b. the variable being manipulated in an experiment</td>
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<tr>
<td>3. independent variable</td>
<td>c. the variable being measured in an experiment</td>
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<td>4. dependent variable</td>
<td>d. the “treatment-absent” condition in an experiment</td>
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<td>5. experimental condition</td>
<td>e. testable proposition</td>
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<tr>
<td>6. control condition</td>
<td>f. repeating an experiment to see whether the same results are obtained</td>
</tr>
<tr>
<td>7. case study</td>
<td>g. the process in which research participants are selected by chance for different groups in an experiment</td>
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<tr>
<td>8. survey</td>
<td>h. an explanation using an integrated set of principles that organizes and predicts observations</td>
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<td>9. replication</td>
<td>i. the research strategy in which the effects of one or more variables on behavior are tested</td>
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<tr>
<td>10. random assignment</td>
<td>j. the “treatment-present” condition in an experiment</td>
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<td>11. experiment</td>
<td>k. the research strategy in which a representative sample of individuals is questioned</td>
</tr>
<tr>
<td>12. double-blind</td>
<td>l. experimental procedure in which neither the research participant nor the experimenter knows which condition the participant is in</td>
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**PSYCHOLOGY APPLIED**

Answer these questions the day before an exam as a final check on your understanding of the chapter's terms and concepts.

**Multiple-Choice Questions**

1. You decide to test your belief that men drink more soft drinks than women by finding out whether more soft drinks are consumed per day in the men’s dorm than in the women’s dorm. Your belief is a(n) ________, and your research prediction is a(n) ________.
   a. hypothesis; theory
   b. theory; hypothesis
   c. independent variable; dependent variable
   d. dependent variable; independent variable

2. Your roommate is conducting a survey to learn how many hours the typical college student studies each day. She plans to pass out her questionnaire to the members of her sorority. You point out that her findings will be flawed because:
   a. she has not specified an independent variable.
   b. she has not specified a dependent variable.
   c. the sample will probably not be representative of the population of interest.
   d. of all the above reasons.
3. The concept of control is important in psychological research because:
   a. without control over independent and dependent variables, researchers cannot describe, predict, or explain behavior.
   b. experimental control allows researchers to study the influence of one or two independent variables on a dependent variable while holding other potential influences constant.
   c. without experimental control, results cannot be generalized from a sample to a population.
   d. of all the above reasons.

4. Martina believes that high doses of caffeine slow a person's reaction time. In order to test this belief, she has five friends each drink three 8-ounce cups of coffee and then measures their reaction time on a learning task. What is wrong with Martina's research strategy?
   a. No independent variable is specified.
   b. No dependent variable is specified.
   c. There is no control condition.
   d. There is no provision for replication of the findings.

5. A researcher was interested in determining whether her students' test performance could be predicted from their proximity to the front of the classroom. So she matched her students' scores on a math test with their seating position. This study is an example of:
   a. experimentation.
   b. correlational research.
   c. a survey.
   d. naturalistic observation.

6. Your best friend criticizes psychological research for being artificial and having no relevance to behavior in real life. In defense of psychology's use of laboratory experiments you point out that:
   a. psychologists make every attempt to avoid artificiality by setting up experiments that closely simulate real-world environments.
   b. psychologists who conduct basic research are not concerned with the applicability of their findings to the real world.
   c. most psychological research is not conducted in a laboratory environment.
   d. psychologists intentionally study behavior in simplified environments in order to gain greater control over variables and to test general principles that help to explain many behaviors.

7. A professor constructs a questionnaire to determine how students at the university feel about nuclear disarmament. Which of the following techniques should be used in order to survey a random sample of the student body?
   a. Every student should be sent the questionnaire.
   b. Only students majoring in psychology should be asked to complete the questionnaire.
   c. Only students living on campus should be asked to complete the questionnaire.
   d. From an alphabetical listing of all students, every tenth (or fifteenth, e.g.) student should be asked to complete the questionnaire.

8. If eating saturated fat and the likelihood of contracting cancer are positively correlated, which of the following is true?
   a. Saturated fat causes cancer.
   b. People who are prone to develop cancer prefer foods containing saturated fat.
   c. A separate factor links the consumption of saturated fat to cancer.
   d. None of the above is necessarily true.

9. To say that "psychology is a science" means that:
   a. psychologists study only observable behaviors.
   b. psychologists study thoughts and actions with an attitude of skepticism and derive their conclusions from direct observations.
   c. psychological research should be free of value judgments.
   d. all of the above are true.

10. Rashad, who is participating in a psychology experiment on the effects of alcohol on perception, is truthfully told by the experimenter that he has been assigned to the "high-dose condition." What is wrong with this experiment?
    a. There is no control condition.
    b. Rashad's expectations concerning the effects of "high doses" of alcohol on perception may influence his performance.
    c. Knowing that Rashad is in the "high-dose" condition may influence the experimenter's interpretations of Rashad's results.
    d. Both b. and c. are correct.
11. A friend majoring in anthropology is critical of psychological research because it often ignores the influence of culture on thoughts and actions. You point out that:
   a. there is very little evidence that cultural diversity has a significant effect on specific behaviors and attitudes.
   b. most researchers assign participants to experimental and control conditions in such a way as to fairly represent the cultural diversity of the population under study.
   c. it is impossible for psychologists to control for every possible variable that might influence research participants.
   d. even when specific thoughts and actions vary across cultures, as they often do, the underlying processes are much the same.

12. The scientific attitude of humility is based on the idea that:
   a. researchers must evaluate new ideas and theories objectively rather than accept them blindly.
   b. scientific theories must be testable.
   c. simple explanations of behavior make better theories than do complex explanations.
   d. researchers must be prepared to reject their own ideas in the face of conflicting evidence.

13. Which of the following procedures is an example of the use of a placebo?
   a. In a test of the effects of a drug on memory, a participant is led to believe that a harmless pill actually contains an active drug.
   b. A participant in an experiment is led to believe that a pill, which actually contains an active drug, is harmless.
   c. Participants in an experiment are not told which treatment condition is in effect.
   d. Neither the participants nor the experimenter knows which treatment condition is in effect.

14. If height and body weight are positively correlated, which of the following is true?
   a. There is a cause-effect relationship between height and weight.
   b. As height increases, weight decreases.
   c. Knowing a person's height, one can predict his or her weight.
   d. All of the above are true.

15. The football team's punter wants to determine how consistent his punting distances have been during the past season. He should compute the:
   a. mean. c. mode.
   b. median. d. standard deviation.

16. Joe believes that his basketball game is always best when he wears his old gray athletic socks. Joe is a victim of the phenomenon called:
   a. statistical significance.
   b. overconfidence.
   c. illusory correlation.
   d. hindsight bias.

17. Esteban refuses to be persuaded by an advertiser's claim that people using their brand of gasoline average 50 miles per gallon. His decision probably is based on:
   a. the possibility that the average is the mean, which could be artificially inflated by a few extreme scores.
   b. the absence of information about the size of the sample studied.
   c. the absence of information about the variation in sample scores.
   d. all of the above.

18. Bob scored 43 out of 70 points on his psychology exam. He was worried until he discovered that most of the class earned the same score. Bob's score was equal to the:
   a. mean. c. mode.
   b. median. d. range.

19. The four families on your block all have annual household incomes of $25,000. If a new family with an annual income of $75,000 moved in, which measure of central tendency would be most affected?
   a. mean. c. mode
   b. median. d. standard deviation.

20. Dr. Salazar recently completed an experiment in which she compared reasoning ability in a sample of females and a sample of males. The means of the female and male samples equaled 21 and 19, respectively, on a 25-point scale. A statistical test revealed that her results were not statistically significant. What can Dr. Salazar conclude?
   a. Females have superior reasoning ability.
   b. The difference in the means of the two samples is probably due to chance variation.
   c. The difference in the means of the two samples is reliable.
   d. None of the above is true.
Essay Question

Elio has a theory that regular exercise can improve thinking. Help him design an experiment evaluating this theory. (Use the space below to list the points you want to make, and organize them. Then write the essay on a separate piece of paper.)

KEY TERMS

Writing Definitions

Using your own words, on a separate piece of paper write a brief definition or explanation of each of the following.

1. hindsight bias
2. critical thinking
3. theory
4. hypothesis
5. operational definition
6. replication
7. case study
8. survey
9. false consensus effect
10. population
11. random sample
12. naturalistic observation
13. correlation
14. scatterplot
15. illusory correlation
16. experiment
17. double-blind procedure
18. placebo effect
19. experimental condition
20. control condition
21. random assignment
22. independent variable
23. dependent variable
24. mode
25. mean
26. median
27. range
28. standard deviation
29. statistical significance
30. culture
Cross-Check

As you learned in the Prologue, reviewing and overlearning of material are important to the learning process. After you have written the definitions of the key terms in this chapter, you should complete the crossword puzzle to ensure that you can reverse the process—recognize the term, given the definition.

ACROSS
1. Score that falls at the 50th percentile, cutting a distribution in half.
7. Explanation using an integrated set of principles that organizes and predicts behaviors or events.
9. Most frequently occurring score in a distribution.
14. Descriptive research strategy in which one person is studied in great depth.
15. Measure of variation computed as the difference between the highest and lowest scores in a distribution.
16. Measure of central tendency computed by adding the scores in a distribution and dividing by the number of scores.
19. Perception of a correlation between two events where none exists.
20. Descriptive research technique in which a representative, random sample of people is questioned about their attitudes or behaviors.
22. Sample in which every member of the population has an equal chance of being included.

DOWN
2. Experimental condition in which research participants are exposed to the independent variable being studied.
3. In an experiment, the variable being manipulated and tested by the investigator.
4. Research method in which behavior is observed and recorded in naturally occurring situations without any manipulation or control.
5. A precise definition of the procedures used to identify a variable.
6. Careful reasoning that examines assumptions, discerns hidden values, evaluates evidence, and assesses conclusions.
8. The bias in which we believe, after learning an outcome, that we could have foreseen it.
10. Our tendency to overestimate the extent to which others share our beliefs and behaviors.
11. Control procedure in which neither the experimenter nor the research participants are aware of which condition is in effect.
12. Testable prediction, often implied by a theory.
13. Measure that indicates the extent to which one factor predicts another factor.
17. Experimental condition in which the treatment of interest is withheld.
18. When a research participant’s expectations produce the results of an experiment, it is called a _______ effect.

ANSWERS

Chapter Review

The Need for Psychological Science
1. hindsight bias; common; both children and adults
2. after the fact
3. overconfidence; bias
4. equally wrong
5. curiosity; skepticism; humility
6. critical thinking
7. scientific method; observations; theories; revised; observations
8. theory; hypotheses; research
9. operational definitions; replicate
10. organizes; predictions
11. descriptive; correlation; experimental

Description
1. case study
2. hypotheses; atypical
3. survey
4. wording
5. false consensus effect
6. random; population; does
7. are
8. vivid
9. naturalistic observation
10. describe
11. social; solitary; varies

Correlation
1. correlated; predict; correlation coefficient
2. scatterplots
3. positively correlated; negatively correlated; inversely
4. strength; weakness; causation; cause-effect
This is an example of a negative correlation. As one factor (time spent studying) increases, the other factor (anxiety level) decreases.
5. predicted
6. event; caused; explanation
7. illusory correlation
8. confirm; superstitious
9. random events
10. more; do

Experimentation
1. cause; effect; statistically; factors
2. do; experiments; manipulates; holding constant (controlling)
3. behavior; experimental; effect
4. placebo; placebo effect
5. double-blind procedure
6. experimental; control
7. random assignment
8. independent; dependent
9. manipulate; independent; measure; dependent; control; variables
Experimentation has the advantage of increasing the investigator’s control of both relevant and irrelevant variables that might influence behavior. Experiments also permit the investigator to go beyond observation and description to uncover cause-effect relationships in behavior.

Statistical Reasoning
1. statistics
2. data; organize; bar graph; scale labels; range
3. mode; median; mean
4. mode
5. total sum; number
6. 50th
7. skewed; mean
8. low; high
9. range; standard deviation
10. difference between the lowest and highest scores
11. crude; is
12. more accurate; takes
13. representative
14. low
15. less
16. significance; chance; reliable; relatively large
17. practical

Frequently Asked Questions About Psychology
1. principles; laboratory; stress in their marriages
2. control; general principles
3. ideas; behaviors; attitudes; traditions
4. principles or processes; dyslexia; brain; genders
5. similarities; diseases
6. ethical; well-being
7. safeguards
Ethical guidelines require investigators to (1) obtain informed consent from potential participants, (2) protect them from harm and discomfort, (3) treat information obtained from participants confidentially, and (4) fully explain the research afterward.
8. do
9. can; enlighten
10. postmodernism; social; agree
11. do not; less
12. do not have
Progress Test 1

Multiple-Choice Questions

1. a. is the answer. In a case study one subject is studied in depth. (p. 26)
   b. In survey research a group of people is interviewed.
   c. Correlations identify whether two factors are related.
   d. In an experiment an investigator manipulates one variable to observe its effect on another.

2. c. is the answer. Exercise is the variable being manipulated in the experiment. (p. 38)
   a. A control condition for this experiment would be a group of people not permitted to exercise.
   b. An intervening variable is a variable other than those being manipulated that may influence behavior.
   d. The dependent variable is the behavior measured by the experimenter—in this case, the effects of exercise.

3. c. is the answer. The control condition is that for which the experimental treatment (the new drug) is absent. (p. 37)
   a. A random sample is a subset of a population in which every person has an equal chance of being selected.
   b. The experimental condition is the group for which the experimental treatment (the new drug) is present.
   d. "Test group" is an ambiguous term; both the experimental and control group are tested.

4. d. is the answer. (p. 24)
   a. Hypotheses are testable propositions.
   b. Dependent variables are factors that may change in response to manipulated independent variables.
   c. Statistical indexes may be used to test specific hypotheses (and therefore as indirect tests of theories), but they are merely mathematical tools, not general principles, as are theories.

5. d. is the answer. In this case, the children are being observed in their normal environment rather than in a laboratory. (p. 29)
   a. Correlational research measures relationships between two factors. The psychologist may later want to determine whether there are correlations between the variables studied under natural conditions.
   b. In a case study, one subject is studied in depth.
   c. This is not an experiment because the psychologist is not directly controlling the variables being studied.

6. d. is the answer. (p. 25)
7. d. is the answer. (p. 23)
8. b. is the answer. Replication is the repetition of an experiment in order to determine whether its findings are reliable. It is not a research method. (p. 25)
9. c. is the answer. (p. 48)
   a., b., & d. Psychologists' personal values can influence all of these.
10. b. is the answer. (p. 31)
    a. & c. These answers would have been correct had the question stated that there is a positive correlation between shoe size and IQ. Actually, there is probably no correlation at all!
11. d. is the answer. In an experiment, it would be possible to manipulate alcohol consumption and observe the effects, if any, on memory. (p. 36)
    a., b., & c. These answers are incorrect because only by directly controlling the variables of interest can a researcher uncover cause-effect relationships.
12. d. is the answer. (p. 28)
    a. A sample is a subset of a population.
    b. & c. Control and experimental groups are used in experimentation, not in survey research.
13. c. is the answer. The mean is the sum of scores divided by the number of scores. \[ (2 + 3 + 7 + 6 + 1 + 4 + 9 + 5 + 8 + 2) / 10 = 4.7 \] (p. 41)
14. d. is the answer. When the scores are put in order (1, 2, 3, 4, 7, 7, 8), 4 is at the 50th percentile, splitting the distribution in half. (p. 41)
15. b. is the answer. The mode is the most frequently occurring score. Because there are more "twos" than any other number in the distribution, 2 is the mode. (p. 41)
16. d. is the answer. (pp. 42–43)
17. c. is the answer. (p. 43)
   a. A statistically significant difference may or may not be of practical importance.
   b. This is often the case when a difference is not statistically significant.
18. c. is the answer. (p. 41)
19. d. is the answer. (p. 22)
   a. This is the tendency to overestimate the extent to which others share our beliefs.
   b. This is the false perception of a relationship between two events.
   c. This is the tendency to believe, after learning an outcome, that one could have foreseen it.
20. a. is the answer. As an average, calculated by adding all scores and dividing by the number of scores, the mean could easily be affected by the inclusion of a few extreme scores. (p. 41)
b. The range is not a measure of central tendency.
c. & d. The median and mode give equal weight to all scores; each counts only once and its numerical value is unimportant.

**Matching Items**

1. i (p. 45) 6. b (p. 42) 11. d (p. 41)
2. f (p. 41) 7. h (p. 42) 12. m (p. 28)
3. l (p. 37) 8. g (p. 31) 13. k (p. 24)
4. j (p. 20) 9. c (p. 41) 14. n (p. 33)
5. e (p. 41) 10. a (p. 41)

**Progress Test 2**

**Multiple-Choice Questions**

1. d. is the answer. Only experiments can reveal cause-effect relationships; the other methods can only describe relationships. (p. 36)
2. d. is the answer. (p. 37)
   a., & b. The double-blind procedure is one way to create experimental and control groups.
   c. Research participants are randomly assigned to either an experimental or a control group.
3. d. is the answer. Animal shelters are forced to kill 50 times as many dogs and cats as are used in research. (p. 47)
4. d. is the answer. (p. 38)
   a. The control condition is the comparison group, in which the experimental treatment (the treatment of interest) is absent.
   b. Memory is a directly observed and measured dependent variable in this experiment.
   c. Attention is the independent variable, which is being manipulated.
5. a. is the answer. (p. 28)
   b. This refers to illusory correlation.
   c. This refers to overconfidence.
6. b. is the answer. (p. 20)
   a. The phenomenon is related to hindsight rather than foresight.
   c. & d. The phenomenon doesn’t involve whether or not the intuitions are correct but rather people’s attitude that they had the correct intuition.
7. b. is the answer. If enough subjects are used in an experiment and they are randomly assigned to the two groups, any differences that emerge between the groups should stem from the experiment itself. (p. 39)
   a., c., & d. None of these terms describes precautions taken in setting up groups for experiments.
8. b. is the answer. (p. 33)
9. a. is the answer. (p. 42)
   b. & c. Large, random samples are more likely to be representative of the populations from which they are drawn.
10. d. is the answer. Because we are sensitive to dramatic or unusual events, we are especially likely to perceive a relationship between them. (p. 34)
   a., b., & c. The relationship between vivid events is no more likely to be significant, positive, or negative than that between less dramatic events.
11. b. is the answer. (p. 25)
   a. In fact, the artificiality of experiments is part of an intentional attempt to create a controlled environment in which to test theoretical principles that are applicable to all behaviors.
   c. Some psychological theories go against what we consider common sense; furthermore, on many issues that psychology addresses, it’s far from clear what the “common sense” position is.
   d. Psychology has always had ties to other disciplines, and in recent times, these ties have been increasing.
12. d. is the answer. Correlations show how well one factor can be predicted from another. (p. 30)
   a. Because a case study focuses in great detail on the behavior of an individual, it’s probably not useful in showing whether predictions are possible.
   b. Naturalistic observation is a method of describing, rather than predicting, behavior.
   c. In experimental research the effects of manipulated independent variables on dependent variables are measured. It is not clear how an experiment could help determine whether IQ tests predict academic success.
13. b. is the answer. The control condition is the one in which the treatment—in this case, pollution—is absent. (p. 37)
   a. Students in the polluted room would be in the experimental condition.
   c. Presumably, all students in both conditions were randomly assigned to their groups. Random assignment is a method for establishing groups, rather than a condition.
   d. The word dependent refers to a kind of variable in experiments; conditions are either experimental or control.
14. c. is the answer. The lighting is the factor being manipulated. (p. 38)
   a. & d. These answers are incorrect because they involve aspects of the experiment other than the variables.
b. This answer is the dependent, not the independent, variable.

15. b. is the answer. (p. 41)

16. c. is the answer. The mean is the sum of the scores divided by the number of scores (60/10 = 6). (p. 41)

17. c. is the answer. When the scores are put in order (5, 6, 7, 8, 9, 10, 11), 8 is at the 50th percentile, splitting the distribution in half. (p. 41)

18. d. is the answer. Since the range is the difference between the highest and lowest scores, it is by definition affected by extreme scores. (p. 41)

a. & c. The mean and mode are measures of central tendency, not of variation.
b. The standard deviation is less affected than the range because, when it is calculated, the deviation of every score from the mean is computed.

19. b. is the answer. Averages derived from scores with low variability tend to be more reliable estimates of the populations from which they are drawn. Thus, a. and c. are incorrect. Because the standard deviation is a more accurate estimate of variability than the range, d. is incorrect. (p. 43)

20. d. is the answer. A difference that is statistically significant is a true difference, rather than an apparent difference due to factors such as sampling variation, and it is reliable. (p. 43)

Matching Items

1. e (p. 25) 2. h (p. 24) 3. b (p. 38) 4. c (p. 38) 5. j (p. 37) 6. d (p. 37) 7. a (p. 26) 8. k (p. 27) 9. f (p. 25) 10. g (p. 37) 11. i (p. 36) 12. l (p. 37)

Psychology Applied

Multiple-Choice Questions

1. b. is the answer. A general belief such as this one is a theory; it helps organize, explain, and generate testable predictions (called hypotheses) such as “men drink more soft drinks than women.” (pp. 24, 25)

C. & d. Independent and dependent variables are experimental treatments and behaviors, respectively. Beliefs and predictions may involve such variables, but are not themselves those variables.

2. c. is the answer. The members of one sorority are likely to share more interests, traits, and attitudes than will the members of a random sample of college students. (p. 28)

a. & b. Unlike experiments, surveys do not specify or directly manipulate independent and dependent variables. In a sense, survey questions are independent variables, and the answers, dependent variables.

3. b. is the answer. (p. 38)

a. Although the descriptive methods of case studies, surveys, naturalistic observation, and correlational research do not involve control of variables, they nevertheless enable researchers to describe and predict behavior.

b. Whether or not a sample is representative of a population, rather than control over variables, determines whether results can be generalized from a sample to a population.

c. This answer is incorrect for the same reason as (b). This would constitute a biased sample.

4. c. is the answer. In order to determine the effects of caffeine on reaction time, Martina needs to measure reaction time in a control, or comparison, group that does not receive caffeine. (p. 37)

a. Caffeine is the independent variable.
b. Reaction time is the dependent variable.
d. Whether or not Martina’s experiment can be replicated is determined by the precision with which she reports her procedures, which is not an aspect of research strategy.

5. b. is the answer. (pp. 30–31)

a. This is not an experiment because the researcher is not manipulating the independent variable (seating position); she is merely measuring whether variation in this factor predicts test performance.

b. If the study were based entirely on students’ self-reported responses, this would be a survey.

c. This answer is incorrect for the same reason as (b). This would constitute a biased sample.

6. d. is the answer. (p. 45)

7. d. is the answer. Selecting every tenth person would probably result in a representative sample of the entire population of students at the university. (p. 28)

a. It would be difficult, if not impossible, to survey every student on campus.
b. Psychology students are not representative of the entire student population.
c. This answer is incorrect for the same reason as (b). This would constitute a biased sample.

8. d. is the answer. (pp. 30–32)

a. Correlation does not imply causality.
b. Again, a positive correlation simply means that two factors tend to increase or decrease together; further relationships are not implied.
c. A separate factor may or may not be involved. That the two factors are correlated does not imply a separate factor. There may, for example, be a
direct causal relationship between the two factors themselves.

9. b. is the answer. Psychology is a science because psychologists use the scientific method and approach the study of behavior and mental processes with attitudes of curiosity, skepticism, and humility. (p. 23)
   a. Psychologists study both overt (observable) behaviors and covert thoughts and feelings.
   c. Psychologists' values definitely do influence their research.

10. d. is the answer. (p. 37)
    a. The low-dose comparison group is the control group.

11. d. is the answer. (p. 46)
    a. In fact, just the opposite is true.
    b. Actually, psychological experiments tend to use the most readily available people, often white North American college students.
    c. Although this may be true, psychological experiments remain important because they help explain underlying processes of human behavior everywhere. Therefore, d. is a much better response than c.

12. d. is the answer. (p. 23)
    a. This follows from the attitude of skepticism, rather than humility.
    b. & c. Although both of these are true of the scientific method, neither has anything to do with humility.

13. a. is the answer. (p. 37)
    b. Use of a placebo tests whether the behavior of a research participant, who mistakenly believes that a treatment (such as a drug) is in effect, is the same as it would be if the treatment were actually present.
    c. & d. These are examples of blind and double-blind control procedures.

14. c. is the answer. If height and weight are positively correlated, increased height is associated with increased weight. Thus, one can predict a person's weight from his or her height. (p. 30)
    a. Correlation does not imply causality.
    b. This situation depicts a negative correlation between height and weight.

15. d. is the answer. A small or large standard deviation indicates whether a distribution is homogeneous or variable. (p. 42)
    a., b., & c. These statistics would not give any information regarding the consistency of performance.

16. c. is the answer. A correlation that is perceived but doesn't actually exist, as in the example, is known as an illusory correlation. (p. 33)

17. d. is the answer. (pp. 41, 42)

18. c. is the answer. (p. 41)
    a. The mean is computed as the sum of the scores divided by the number of scores.
    b. The median is the midmost score in a distribution.
    d. The range is the difference between the highest and lowest scores in a distribution.

19. a. is the answer. The mean is strongly influenced by extreme scores. In this example, the mean would change from $25,000 to (75,000 + 25,000 + 25,000 + 25,000 + 25,000)/5 = $35,000. (p. 41)
    b. & c. Both the median and the mode would remain $25,000, even with the addition of the fifth family's income.
    d. The standard deviation is a measure of variation, not central tendency.

20. b. is the answer. (p. 43)
    a. If the difference between the sample means is not significant, then the groups probably do not differ in the measured ability.
    c. When a result is not significant it means that the observed difference is unreliable.

Essay Question

Elio's hypothesis is that daily aerobic exercise for one month will improve memory. Exercise is the independent variable. The dependent variable is memory. Exercise could be manipulated by having people in an experimental group jog for 30 minutes each day. Memory could be measured by comparing the number of words they recall from a test list studied before the exercise experiment begins, and again afterward. A control group that does not exercise is needed so that any improvement in the experimental group's memory can be attributed to exercise, and not to some other factor, such as the passage of one month's time or familiarity with the memory test. The control group should engage in some nonexercise activity for the same amount of time each day that the experimental group exercises. The participants should be randomly selected from the population at large, and then randomly assigned to the experimental and control groups.
Key Terms

Writing Definitions

1. Hindsight bias refers to the tendency to believe, after learning an outcome, that one would have foreseen it; also called the I-knew-it-all-along phenomenon. (p. 20)

2. Critical thinking is careful reasoning that examines assumptions, discerns hidden values, evaluates evidence, and assesses conclusions. (p. 24)

3. A theory is an explanation using an integrated set of principles that organizes and predicts behaviors or events. (p. 24)

4. A hypothesis is a testable prediction, often implied by a theory; testing the hypothesis helps scientists to test the theory. (p. 25)
   Example: In order to test his theory of why people conform, Solomon Asch formulated the testable hypothesis that an individual would be more likely to go along with the majority opinion of a large group than with that of a smaller group.

5. An operational definition is a precise statement of the procedures (operations) used to define research variables. (p. 25)

6. Replication is the process of repeating an experiment, often with different participants and in different situations, to see whether the basic finding generalizes to other people and circumstances. (p. 25)

7. The case study is an observation technique in which one person is studied in great depth, often with the intention of revealing universal principles. (p. 26)

8. The survey is a technique for ascertaining the self-reported attitudes or behaviors of a representative, random sample of people. (p. 27)

9. The false consensus effect is the tendency to overestimate the extent to which others share our beliefs and behaviors. (p. 28)

10. A population consists of all the members of a group being studied. (p. 28)

11. A random sample is one that is representative because every member of the population has an equal chance of being included. (p. 28)

12. Naturalistic observation involves observing and recording behavior in naturally occurring situations without trying to manipulate and control the situation. (p. 29)

13. Correlation is a measure of the extent to which two factors vary together, and thus of how well either factor predicts the other. The correlation coefficient is a statistical measure of the relationship; it can be positive or negative. (p. 30)
   Example: If there is a positive correlation between air temperature and ice cream sales, the warmer (higher) it is, the more ice cream is sold. If there is a negative correlation between air temperature and sales of cocoa, the cooler (lower) it is, the more cocoa is sold.

14. A scatterplot is a depiction of the relationship between two variables by means of a graphed cluster of dots. (p. 31)

15. Illusory correlation is the perception of a relationship where none exists. (p. 33)

16. An experiment is a research method in which a researcher directly manipulates one or more factors (independent variables) in order to observe their effect on some behavior or mental process (the dependent variable); experiments therefore make it possible to establish cause-effect relationships. (p. 36)

17. A double-blind procedure is an experimental procedure in which neither the experimenter nor the research participants are aware of which condition is in effect. It is used to prevent experimenters' and participants' expectations from influencing the results of an experiment. (p. 37)

18. The placebo effect occurs when the results of an experiment are caused by a participant's expectations about what is really going on. (p. 37)

19. The experimental condition of an experiment is one in which participants are exposed to the independent variable being studied. (p. 37)
   Example: In the study of the effects of a new drug on reaction time, participants in the experimental condition would actually receive the drug being tested.

20. The control condition of an experiment is one in which the treatment of interest, or independent variable, is withheld so that comparison to the experimental condition can be made. (p. 37)
   Example: The control condition for an experiment testing the effects of a new drug on reaction time would be a group of participants given a placebo (inactive drug or sugar pill) instead of the drug being tested.

21. Random assignment is the procedure of assigning participants to the experimental and control conditions by chance in order to minimize preexisting differences between those assigned to the different groups. (p. 37)
22. The **independent variable** of an experiment is the factor being manipulated and tested by the investigator. (p. 38)
   
   Example: In the study of the effects of a new drug on reaction time, the drug is the **independent variable**.

23. The **dependent variable** of an experiment is the factor being measured by the investigator. (p. 38)
   
   Example: In the study of the effects of a new drug on reaction time, the participants’ reaction time is the **dependent variable**.

24. The **mode** is the most frequently occurring score in a distribution; it is the simplest measure of central tendency to determine. (p. 41)

25. The **mean** is the arithmetic average, the measure of central tendency computed by adding the scores in a distribution and dividing by the number of scores. (p. 41)

26. The **median**, another measure of central tendency, is the score that falls at the 50th percentile, cutting a distribution in half. (p. 41)
   
   Example: When the **mean** of a distribution is affected by a few extreme scores, the **median** is the more appropriate measure of central tendency.

27. The **range** is a measure of variation computed as the difference between the highest and lowest scores in a distribution. (p. 42)

28. The **standard deviation** is a computed measure of how much scores in a distribution deviate around the mean. Because it is based on every score in the distribution, it is a more precise measure of variation than the range. (p. 42)

29. **Statistical significance** means that an obtained result, such as the difference between the averages for two samples, very likely reflects a real difference rather than sampling variation or chance factors. Tests of statistical significance help researchers decide when they can justifiably generalize from an observed instance. (p. 43)

30. **Culture** is the enduring behaviors, ideas, attitudes, and traditions shared by a large group of people and transmitted from one generation to the next. (p. 45)

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**Cross-Check**

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**FOCUS ON VOCABULARY AND LANGUAGE**

**Page 19:** . . . to remedy their own woes, millions turn to "psychology." In order to alleviate or fix (remedy) their misery, anxiety, grief, pain, and suffering (woes), people seek help from "psychology." (Psychology is in quotes because Myers wants to point out that not everything you think of as "psychology" is part of scientific psychology.)

**The Need for Psychological Science**

**Page 19:** . . . helps winnow sense from nonsense. Winnow means to separate out and was originally used to describe the separation of chaff (dust, etc.) from the grains of wheat. The scientific method helps sort out, or separate (winnow), good ideas from bad ones.

**Page 19:** Some people think psychology merely documents what people already know and dresses it in jargon. Some people criticize psychology, saying that it simply reports (documents) common sense, or what’s obvious to everyone. Instead of stating something plainly, the critics suggest, psychology translates the information into the specialized and obscure vocabulary of the discipline (dresses it up in jargon). Myers makes it very clear with some good examples that this criticism is not justified and points out that our intuitions about reality can often be very mistaken (they can lead us astray).

**Page 20:** How easy it is to seem astute when drawing the bull’s eye after the arrow has struck. In the sport of archery the task is to shoot the arrow at the red circle in the center of the target (the bull’s eye). If we first shoot an arrow, then draw the target so that the arrow is in the center (in the bull’s eye), we can appear to be very accurate. Myers uses this analogy to illustrate how the hindsight bias (or the I-know-it all-along phenomenon) can lead us to believe that we are shrewd (astute) and would have been able to predict outcomes that we have learned after-the-fact.

**Page 20:** “Out of sight, out of mind” and “Absence makes the heart grow fonder.” These two sayings, or
expressions, about romantic love have opposite meanings. The first one suggests that when couples are apart (out of sight) they are less likely to think about each other (out of mind) than when they are together. The second saying makes the point that being separated (absence) increases the feelings of love the couple shares (makes the heart grow fonder). People who are told that the results of a study support the first expression (out of sight, out of mind) see this as mere common sense. People told that the results support the second expression (absence makes the heart grow fonder) also say this is obviously true. There is clearly a problem here; relying on common sense can lead to opposite conclusions.

Page 21: . . . our intuition may tell us that familiarity breeds contempt. . . . This expression and others are based on many casual observations but are often wrong. For example, is it true that the better you know someone (familiarity), the more likely it is that you will dislike the person (have contempt)? In fact, research shows that the opposite is probably true. (Your text, again and again, will emphasize the fact that our common sense and intuition do not always provide us with reliable evidence.)

Page 22: . . . drop a course . . . This means to stop going to class and to have your name removed from the class list.

Page 22: . . . lackluster predictions . . . Lackluster originally meant to be deficient in brightness or to be dull. Lackluster predictions are forecasts that are usually wrong. As Myers notes, those who made them (those who erred) tended to be overconfident about their ability to foretell the future. Along with hindsight bias, this overconfidence often leads us to overestimate our intuitions.

Page 23: Underlying all science is, first, a hard-headed curiosity . . . Hard-headed here means to be practical, uncompromising, realistic, or unswayed by sentiment. All science, including psychology, is guided by this realistic desire to know (curiosity) about nature and life.

Page 23: . . . leap of faith. This is a belief in something in the absence of demonstrated proof. Some questions—about the existence of God or life after death, for example—cannot be answered by science and cannot be scientifically proved or disproved; if a person believes, then it is on the basis of trust and confidence alone (leap of faith).

Page 23: . . . the proof is in the pudding. This comes from the expression “the proof of the pudding is in the eating.” A pudding is a sweet dessert. We can test (or prove) the quality of the dessert (pudding) by trying it (eating). Likewise, many questions, even if they appear to make little sense (crazy-sounding ideas), can be tested using the scientific method.

Page 23: . . . auras . . . An aura is a bright glow surrounding a figure or an object. Some believe that humans have auras which only those with extrasensory abilities can see. The magician James Randi proposed a simple test of this claim, but nobody who is alleged to have this magical power (aura-seer) has taken the test.

Page 23: More often, science relegates crazy-sounding ideas to the mountain of forgotten claims. . . . The use of scientific inquiry can get rid of or dispose of (relegate) non-sensible concepts (crazy-sounding ideas) to the large stack or pile (mountain) of ridiculous claims no longer remembered.

Page 23: In the arena of competing ideas . . . An arena is an area where games, sports, and competitions take place. Myers is suggesting that in an area (arena) where there is a contest between ideas (competing ideas), skeptical testing can help discover the truth.

Page 23: . . . then so much the worse for our ideas. This means that we have to give up, or get rid of, our ideas if they are shown to be wrong (so much the worse for them). We have to be humble (i.e., have humility).

Page 23: “The rat is always right.” This early motto (a phrase used as a maxim or guiding principle) comes from the fact that for most of the first half of the twentieth century psychology used animals in its research (especially in the study of learning). The rat became a symbol of this research, and its behavior or performance in experiments demonstrated the truth. If the truth, as shown by the rat, is contrary to the prediction or hypothesis, then one has to be humble about it and try another way.

Page 24: We all view nature through the spectacles of our preconceived ideas. This means that what we already believe (our preconceived ideas) influences, and to some extent determines, what we look for and actually see or discover in nature. It’s as though the type of eyeglasses (spectacles) we wear limits what we can see.

Page 24: . . . gut feelings . . . This refers to basic intuitive reactions or responses. Critical thinking requires determining whether a conclusion is based simply on a subjective opinion (gut feeling) or anecdote (a story someone tells) or on reliable scientific evidence.

Page 24: . . . debunked . . . This means to remove
glamour or credibility from established ideas, persons, and traditions. Myers points out that scientific evidence and critical inquiry have indeed discredited (debunked) many popular presumptions.

Page 24: . . . one cannot simply “play the tape” and relive long-buried or repressed memories. . . . This is an example of a discredited (debunked) idea that hidden (repressed) memories can be accurately and reliably retrieved (brought back) intact and complete in the same way that playing a tape on a VCR allows us to watch exactly the same show over and over again.

Page 26: . . . a scientific approach helps us sift reality from illusion. A scientific (or empirical) attitude can separate (sift) what’s real from what is not and take us beyond the constraints (limits) of our beliefs, experience, intuition, and common sense.

Description

Page 27: Numbers can be numbing . . . and Anecdotes are often more startling. We are often overwhelmed and our senses deadened (numbed) by the sometimes inappropriate use of statistics and numbers. We are also alarmed or frightened (startled) by the strange stories people tell (anecdotes).

Page 27: As psychologist Gordon Allport (1954, p. 9) said, “Given a thimbleful of [dramatic] facts we rush to make generalizations as large as a tub.” A thimble is a small metal container which fits over the top of the thumb or finger and is used while sewing to push the needle through the material, and a tub is a very large container (e.g., a bathtub). Allport is saying that given a small amount of information (a thimbleful), we tend to make very big assumptions (generalizations as large as a tub).

Page 29: . . . 1500 randomly sampled people, drawn from all areas of a country, provide a remarkably accurate snapshot of the opinions of a nation. A snapshot is a picture taken with a camera, and it captures what people are doing at a given moment in time. A good survey (1500 randomly selected representative people) gives an accurate picture (snapshot) of the opinions of the whole population of interest (the target group).

Correlation

Page 31: Statistics can help us see what the naked eye sometimes misses. When looking at an array of data consisting of different measures (e.g., height and temperament) for many subjects, it is very difficult to discern what, if any, relationships exist. Statistical tools, such as the correlation coefficient and the scatterplot, can help us see clearly what the unaided (naked) eye might not see. As Myers notes, we sometimes need statistical illumination to see what is in front of us.

Page 34: If someone flipped a coin six times, which of the following sequences of heads (H) and tails (T) would be most likely: HHTTTT or HTTHHT or HHHHHH? Flipping a coin means throwing or tossing the coin into the air and observing which side is facing up when it lands. (The side of the coin that usually has the imprint of the face of a famous person on it—e.g., the president or the queen—is called heads (H) and the other side is called tails (T).) By the way, all of the above sequences are equally likely, but most people pick HTTHTH. Likewise, any series of five playing cards (e.g., a bridge or poker hand in a game of cards) is just as likely as any other hand.

Page 35: “cold hands” . . . “hot hands” . . . In this context, “hot” and “cold” do not refer to temperature. Here, being hot (or having “hot hands”) means doing well, and doing well consistently is having a hot streak. Having a run of poor luck is a cold streak. The crucial point, however, is that our intuition about sequences of events (streaks or streaky patterns) often deceives us. True random sequences often are not what we think they should be, and thus, they don’t appear to be really random. When we think we’re doing well (“hot hands”), we’re very often not; we are merely noting or overinterpreting certain sequences (streaks) found in any random data.

Experimentation

Page 39: Let’s Recap. Recap is an abbreviation of recapitulate, which means to repeat or go over briefly, to summarize. Myers summarizes (recaps) the important points in each section of the chapter.

Statistical Reasoning

Page 40: Off the top-of-the-head estimates often misread reality and then mislead the public. Without knowing actual data and numbers (statistics), people may guess at the figures (they make top-of-the-head estimates), and these guesses do not represent the true nature of things (they often misread reality) and consequently can deceive (mislead) the public. The figures generated in this manner are often easy to articulate, such as 10 percent or 50 percent (big round numbers) and, when repeated (echoed) by others, may eventually be believed to be true by most people (they become public misinformation).

Page 41: Because the bottom half of British income earners receive only a quarter of the national income
cake, most British people, like most people everywhere, make less than the mean. Incomes are not normally distributed (they do not follow a bell-shaped curve when plotted as a frequency distribution), so a better measure of central tendency than the mean (arithmetic average) is either the median (the score in the middle) or the mode (the most frequently occurring score). In Myers’ example, half the people earn 25 percent of all the money earned in the country (national income cake); in this uneven (skewed) distribution, therefore, most people earn below-average wages.

Page 42: It [standard deviation] better gauges whether scores are packed together or dispersed, because it uses information from each score (Table 1.4). The most commonly used statistic for measuring (gauging) how much scores differ from one another (their variation) is the standard deviation (SD). Using this formula, each score is compared to the mean; the result is an index of how spread out (dispersed) the scores are. A relatively small SD indicates that most of the scores are close to the average; a relatively large SD indicates that they are much more variable.

Page 44: Data are “noisy.” Differences between groups may simply be due to random (chance) variations (fluctuations) in those particular samples. When data have a great deal of variability, they are said to be “noisy,” which may limit our ability to generalize from them to the larger population. In order to determine if differences are reliable, we should be sure that (a) samples are random and representative, (b) scores in the sample are similar to each other (have low variability), and (c) a large number of subjects or observations are included. If these principles are followed, we can confidently make inferences about the differences between groups.

Frequently Asked Questions About Psychology

Page 45: . . . plunge in. In this context, plunge in means to move ahead quickly with the discussion. Similarly, when you dive into a swimming pool [plunge in], you do so quickly.) Before going on with the discussion of psychology (plunging in), Myers addresses some important issues and questions.

Page 46: To understand how a combustion engine works, you would do better to study a lawn mower’s engine than a Mercedes’. A Mercedes is a very complex luxury car, and a lawn mower (a machine for cutting grass in the garden) has a very simple engine. To understand the principles underlying both machines, it is easier to study the simpler one. Likewise, when trying to understand the nervous system, it is better to study a simple one (e.g., a sea slug) than a complex one (a human).

Page 48: . . . most universities today screen research proposals through an ethics committee. . . . Ethics committees (groups of people concerned with moral behavior and acceptable standards of conduct) subject research proposals to rigorous tests (screen them) to ensure that they are fair and reasonable and that they do not harm the participants’ well-being.

Page 48: Values can also color “the facts.” Our values (what we believe is right and true) can influence (color) our observations, interpretations, and conclusions (“the facts”).