Unit II - Answer Key

Research Methods:

Thinking Critically With Psychological Science

Module 4 - The Need for Psychological Science

While You Read

4-1

1. Hindsight bias is the tendency to believe, after learning an outcome, that one would have foreseen it. (Also known as the I-knew-it-all-along phenomenon.)

2. By knowing the outcome—that the play did not work—the speaker can call it stupid as if to suggest he or she knew all along it wouldn't work.

3. We tend to think we know more than we do.

4. Random sequences often don't look random. In hindsight bias, a person would not perceive their observation as random for they'd want to take the credit for knowing it all along. For overconfidence, people want to believe they had great qualities naturally, not just by chance.

After You Read

Module 4 Review

P **1.** Karl is flipping a coin to pass the time. For the last ten flips it has come up heads. He predicts that his eleventh flip will also be heads and is right!

HB **2.** Bruce is a sports writer for the high school newspaper. On Friday afternoon he is confident that the soccer team will win, but on Tuesday publishes a long story with all of the reasons why he knew that the team was sure to lose the

state championship game.

3. Janelle, a senior in high school with a 3.0 GPA, is filling out her college applications. When asked by her friends and family what schools she is applying to and what schools she thinks she will get into, she lists Princeton, Yale, Harvard and Stanford and says she thinks she will get into all of them, except maybe for Harvard, which is her reach school.

O

4. Shreya and Steve break up. Their classmate, Iram, tells her mother that she knew all along the two of them were not going to make it.

HB

5. Fiona, a student in your class, is certain the instructor does not like her. For the last three class sessions, the instructor has not called on her to answer a question, even though her hand was raised.

P

Module 5 - The Scientific Method and Description

While You Read

5-1

1. A theory is an explanation using an integrated set of principles that organizes observations and predicts behaviors or events.

   Answers will vary.

2. A hypothesis is a testable prediction, often implied by a theory.

   Answers will vary.

3. Operationally defining the variables allows for a researcher to be specific about the terms used in their study. There is no 'right' operational definition (for example "too many books" may be defined as 3 books or 30 books, each can be correct for a specific study. This allows for repetition and replication, which is essential.

4. If a result is true, it should show itself over and over. If a study shows that caffeine increases GPA, then replication of that study should show the same results. Replicated studies with the same results can lead to advancing our knowledge.

5. Answers will vary.

   a. IV: Sleep

   DV: Memory

   b. IV: Smiling

   DV: Number of friends

5-2

Descriptive Research Method	**Benefits**	**Drawbacks**	**Key Characteristics**
Case Study	In-depth research on strange issues	Only one individual or small identified group; may be misleading if individual is not typical	In-depth study; not generalizable to population
Naturalistic Observation	Allows for unobtrusive observation in a natural environment; allows for description of human behaviors	*Does not explain behavior* Presence of observer may alter behavior	Researcher goes to subject's environment; allows for natural behaviors to occur and be observed
Survey	A quick pulse of a large group of people; allows for checking of attitudes and behaviors of a large group of people	Wording effects could bias the response; sampling bias could effect the validity of the response	Quick to administer; subject to response bias; wording effects; random sampling is key

1. They allow researchers to describe what they are seeing but do not provide a way for the researcher to explain why what they are seeing is happening.

2. People might respond differently to a request for affirmative action versus preferential treatment. Words have different meanings and surveys can phrase, or frame, questions differently to intentionally produce the result they wish to achieve.

3. **a.** Take every 5th name off a master student list for the school, put the names of all the students in your school into a hat, and choose randomly. Other answers will work as well.

b. Choose from phone books, Apple iTunes registered users, ask every 5th person leaving a record store. Other answers will work as well.

After You Read

Module 5 Review

1. T **a.** Freshmen carry more books than seniors.

H **b.** When smoking cigarettes, teens are more likely to recall geometry proofs.

H **c.** Increase in television viewing results in decreased attention.

T **d.** Flu vaccinations increase the risk of developing the flu.

T **e.** Dogs see in color.

2. **a.** "Excessive caffeine consumption": Student answers should provide some specificity and will vary, for example, "5 cups of coffee."

b. **"**Overeating": Will vary. For example, "eating one dozen doughnuts."

c. "Sleep deprived": Will vary. For example, "getting less than 3 hours of sleep."

d. "Good music:" Will vary. For example, students may list a favorite band on genre.

3.

S **a.** A high school principal wants to determine whether she should use the building funds for a renovated student courtyard or a faculty exercise room.

CS **b.** An army doctor wants to see how soldiers are handling the transition back to civilian life.

NO **c.** A parent is curious to know how their child behaves at daycare.

NO **d.** A researcher is interested to know what groups choose to sit together in the high school cafeteria.

S **e.** The athletic department is trying to determine which new sport to offer next year.

4.

a.

- flaw:

  The sample is not representative of the school at large and the results of the survey would not be generalizable to the entire school. Freshman students may have different priorities and opinions than juniors or seniors.

- correction:

  The principal should ensure a random sample of students by accessing a student roster for each grade and either taking every 3rd (or 5th or 9th or nth) name, generating a computer randomization, or putting all of the names in a “hat” and selecting at random. Other corrections may apply as well.

b.

- flaw:

  The residents who are home between those hours may represent a particular type of individual (housewives home in the morning, shift-workers absent in the evenings, families who have dinner and do not answer the phone), and thus the results of the poll will not be generalizable to the population as a whole. In addition, some residents may not have a home phone and thus would not be included in the poll.

- correction:

  The campaign should attempt computerized calling from a randomized national phone book at periodic intervals throughout the day (every hour, every 2 hours, every nth hour). Other corrections may apply as well.

c.

- flaw:

  The survey may not reach all of her voters/citizens, as everyone may not read the community paper. In addition, the extra effort required to make a phone call to respond may result in only those citizens with the desire and interest to respond being included in the results. In either case, the results of her survey will not be generalizable.

- correction:

  The mayor could initiate a calling campaign using randomized numbers from the local phone book. The mayor could also send a committee of folks around to homes to solicit opinions. Other corrections may apply as well.

Module 6 - Correlation and Experimentation

While You Read

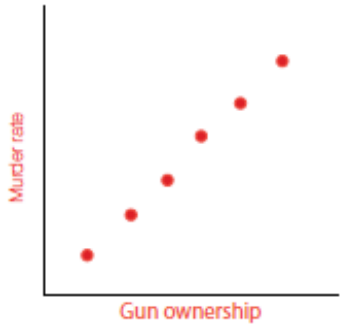
6-1

1. As height increases, weight also increases. The second example should demonstrate an understanding that both variables move in the same direction.
2. As age increases, number of hours of sleep per night decreases. The second example should demonstrate an understanding that the two variables move in opposite directions.

6-2

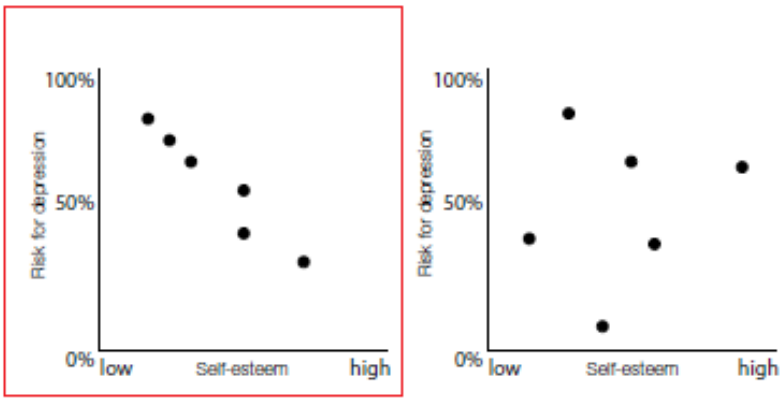
1.
   a. Positive
   b. Because the two sets of scores (mental illness rate and smoking rate) rise together.

2.



3.

a.



b. The dots tend to correlate downward, inversely.

c. No; correlation does not imply causation.

d. No; correlation does not imply causation.

e. Just because two variables seem to be impacted positively or negatively in the same manner and ratio, causation does not exist.

6-3

1. An illusory correlation is the perception of a relationship where none exists.

2. When we notice random coincidences, we may forget that they are random and instead see them as correlation.

6-4

1. Answers will vary.

2. • Independent variable: carbohydrate consumption

- Dependent variable: running times

3. Random sampling is the first step in selecting a population to study and will result in a test group representative of that population.

Random assignment is the manner in which participants in the experimental or control group are selected and this should be representative as well with each participant having an equal change of being in either group.

After You Read

Module 6 Review

1.

__P__ **a.** The number of fast food restaurants: the obesity rate in the U.S.

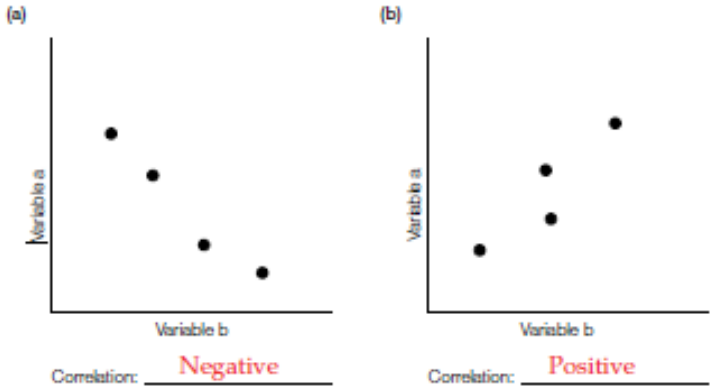
__P__ **b.** The average U.S. household income: number of vacations per year

__N__ **c.** The illiteracy rate: the presence of Head Start or early intervention education programs.

__N__ **d.** The number of hours spent commuting to and from work; the amount of dinners cooked at home from scratch.

__P__ **e.** Hours spent learning a skill; proficiency in the skill.

2.



3. (a) has a stronger correlation than (b).

4. Student answers should demonstrate an understanding that the sign is not what is important here, but the fact that the -0.75 is a stronger relationship than +0.50 and so a more accurate prediction can be made.

5. a rough estimate would fall between 0.5 and 0.8

- Independent Variable- Use of the note cards
- Dependent Variable- Scores on exams
- Experimental Group- Studies with note cards
- Control Group- Studies without note cards
- Double-Blind Procedure- Students and researchers would not know which group is the subject of the study

Module 7 - Research Design and Ethics in Psychology

While You Read

7-1

1. To explore cause and effect.

2. Questions like this cannot be tested because there is no way to gather that data. As the text points out, researchers can examine how a belief in an afterlife affects people while they are alive.

7-2

1. Because laboratory experiments cannot re-create exact behaviors of everyday life they are used to test theoretical principles. The goal is to reveal general principles that may help explain many behaviors.

7-3

1. They want to understand how different species think and learn and behave, and because humans are animals as well, they seek to understand humans through research on animals.

2. Is it right to put the well-being of humans above that of animals?

What safeguards should protect the well-being of animals in research?

3. Dogs transitioning from shelters to adoptive homes benefitted from researching techniques to reduce stress. Other studies have improved care in zoos, natural habitats and increased awareness and empathy for all animals.

7-4

1.

1. Informed consent: telling participants enough to enable them to choose whether they wish to participate
2. Protecting participants from physical or emotional harm and discomfort
3. Debriefing people: fully explaining the research afterwards
4. Keeping information about individual participants confidential

7-5

1. No, because researchers' values influence their choice of topics on which to experiment—for example, sex discrimination or gender differences, and for example, worker productivity or worker morale

After You Read

Module 7 Review

__IC__ **1.** A teacher in your school gives you a mandatory anonymous drug use survey to complete in class and tells you she cannot let you know why you are completing the survey because it would throw off her results.

__H__ **2.** You agree to participate in an experiment that is designed to measure your ability to lie in various circumstances. Under the direction of the researcher, you make false statements to your mother, your best friend, and your favorite teacher. The guilt you feel after lying to these influential and important people has you questioning your morals and values.

IC **3.** A researcher is interested in studying how young children learn to read. She does not speak to the parents but consults the principal of the elementary school and visits the first grade classroom to videotape the students as they participate in a reading exercise.

D **4.** At the conclusion of a study testing memory and mood, you are released by the researcher, paid a small fee, and thanked for your time.

C **5.** You are appointed to serve on the Institutional Review Board (IRB) at the research university where you teach, and will be screening research proposals to safeguard participant's well-being. A proposal is presented in which a researcher will be gathering data on the correlation between divorce and alcohol use disorder in celebrities. The proposal lists the research methodology, the sample population, and the manner in which the results of the study will be communicated. The researcher intends to write an article for a journal in the field, and also publish the results of the study in an entertainment magazine. He feels that if people know the actual names of the participants, they may take the results more seriously and so he intends to list the names in the entertainment article.

Module 8 - Statistical Reasoning in Everyday Life

While You Read

8-1

1. Statistics are important and are all around us, in advertising to research findings. Knowledge of statistics helps us to think critically about the data we encounter each day.

8-2

1. Bar graphs (histograms) can be easily distorted to make a difference seem greater than it really is. If you read the data points and do not just look at the graph's lines it will be harder to be misled.

8-3

1. Mean: the arithmetic average

Median: the middle score in a distribution

Mode: the most frequently occurring score

2. **a.** Outliers skew the mean either positively or negatively.

b. Outliers have little to no effect on the median.

c. Outliers have little to no effect on the mode.

d. The median provides the most accurate picture of data when there are extreme scores.

8-4

1. The range is 51.

2. It tells us whether scores are packed together or dispersed.

3. The data were spread out all over—more diverse data.

4. It would indicate very similar data clustered around the mean score

5. ~68% of scores fall within one standard deviation from the mean—34% on each side of the mean.

~95% of scores fall within two standard deviations from the mean

~99% of scores fall within three standard deviations from the mean

6.

a. mean 9 median 9 mode 15

b. Calculate the range of the data. 12

8-5

1. Descriptive statistics organize data meaningfully on a bar graph, etc.

Inferential statistics allow for generalization of data to infer the probability of something being true in a population.

8-6

1. Representative samples are better than biased ones.

Less-variable observations are more reliable than those that are more variable.

More cases are better than fewer.

2. The standard is if the odds of the result occurring by chance are less than 5%

3. It most likely did not occur by chance.

After You Read

Module 8 Review

1. **a.** mean 9 **b.** median 7 **c.** mode 6

2. The median. As Figure 8.2 and the accompanying text discussed, the mean will be positively skewed due to the inclusion of an outlier, 22, which is far removed from the bulk of the data.

3. 19

4.

a. 68% of the scores will fall within one standard deviation of the mean.

b. A score of 120 will fall within the second standard deviation.

c. The student may score either between 70 and 85 or between 115 and 130 to fall within THE second standard deviation.

5.

a. between 75 and 85.

b. The student may score anywhere from 70–90.

c. approximately 5%

✓ Check Yourself

a. Plants watered with the town's water supply will show increases in disease.

b. Experimental group: those watered with town water Control group: those watered with bottled, distilled water

c. She put numbers on scraps of paper in a hat and randomly drew them.

d. The botanist/researcher asked a neighbor to record leaf condition and evaluate the plants after 6 weeks. He did not know which plants had received which water treatment.

e. A placebo was not used.

f. The IV was the suspected contaminants in the town water supply. The DV was the condition of the plant leaves, stems, and roots (yellowing, withering, and wilting).

g. The operational definition of the IV is the water from the town supply and distilled, bottled water. The operational definition of the DV is the leaf, stem, and root conditions.

h. A possible confounding variable could have been the condition of the plant prior to being included in the study. It is possible a fungus could have been present on the experimental group plants, unbeknownst to the botanist, that could have resulted in the poor leaf, stem, and root conditions. Additional confounding variables could be stated as long as they are plausible, affect only one of the two groups, and are explained by the student.

i. Yes, it accurately measured what it was supposed to.

✓ Check Yourself

Mean of the data: 76.8

Median of the data: 80

Mode of the data: 89 and 73—this is bimodal

Range: 59

Variance: 235.9296

Standard Deviation: 15.76

1. Answers will vary: adapt to the varying needs of this diverse class with differentiated curriculum, break the students up into smaller sub groups, etc. Other answers that recognize the impact of the data will work.

2. The instructor's students have a mean score of 76.8 on exams but that mean is influenced by outliers—specifically the 40—so the median score of 80 may be a more useful descriptor.
3. The range is quite large, meaning student performance to date in his course has differed greatly. The standard deviation of 15.76 tells us that his students perform quite differently from one another and from the mean. This means this AP instructor will need to find ways to teach students who are struggling AND those who seem to be mastering the content covered thus far.