

## Chapter 2

### Research Approaches and Methods of Data Collection

#### Learning objectives

To be able to

- Describe the different types of variables used in quantitative research
- Explain the nature of causation and how researchers attempt to establish causation.
- Describe the key characteristics of experimental research approach as used in psychology.
- Describe the advantages and disadvantages of experimental research
- Describe the different settings in which experimental research is conducted and the advantages and disadvantages associated with each setting.
- Explain the differences between nonexperimental and experimental quantitative research methods.
- Compare and contrast the types of nonexperimental quantitative research
- Define and explain the goals and characteristics of qualitative research.
- Compare and contrast the different methods of data collection.

#### Multiple-choice questions

- 1) What is the main difference between descriptive and experimental research approaches?
- a) the former always uses qualitative data while the latter always uses quantitative data
  - b) descriptive research is done by social scientists while natural scientists do experimental research
  - c) descriptive research involves manipulating variables but experimental research does not
  - \* d) The former does not establish cause-and-effect relationships but the latter does
- 2) The \_\_\_\_\_ variable is the presumed cause of another variable while the \_\_\_\_\_ variable is the presumed effect.
- \* a) independent; dependent
  - b) dependent; independent
  - c) independent; extraneous
  - d) independent; mediating
- 3) In a study designed to identify factors involved in helping behavior, a man on a crowded bus clutches his chest and falls to the floor. In one of the conditions of the study the man is clean shaven and wearing a suit; in the other condition he has a scraggly beard and is wearing a dirty t-shirt and jeans. The amount of time it takes for someone to help the man is recorded. In this example the independent variable is
- a) the amount of time it takes someone to help.
  - \* b) the appearance of the man.
  - c) the participants in the study.

d) how crowded the bus is.

4) In a study designed to identify factors involved in helping behavior, a man on a crowded bus clutches his chest and falls to the floor. In one of the conditions of the study the man is clean shaven and wearing a suit; in the other condition he has a scraggly beard and is wearing a dirty t-shirt and jeans. The amount of time it takes for someone to help the man is recorded. In this example the dependent variable is

- \* a) the amount of time it takes someone to help.
- b) the appearance of the man.
- c) the participants in the study.
- d) how crowded the bus is.

5) A(n) \_\_\_\_\_ variable is one that is not under the control of the researcher but that may be influencing the outcome of the experiment.

- a) independent
- \* b) extraneous
- c) mediating
- d) moderating

6) A researcher is interested in the effects of teaching styles on learning. She randomly assigns students to either a lecture-based class taught at 8:00 a.m. or a discussion-based class taught at 2:00 p.m. Her results reveal that students in the discussion-based class performed better than those in the lecture-based class. In this example the time that the class is taught could be considered a(n) \_\_\_\_\_ variable, making it impossible to establish a causal connection between teaching method and classroom performance.

- a) independent
- b) dependent
- \* c) extraneous
- d) mediating

7) Several recent studies have found that moderate drinkers of alcohol have lowered levels of heart disease risk than non-drinkers. It has been hypothesized that moderate drinking may reduce stress which in turn may lead to a reduction in the risk of heart disease. In this example lowered stress levels would be considered a(n) \_\_\_\_\_ variable.

- a) independent
- b) dependent
- c) extraneous
- \* d) mediating

8) A(n) \_\_\_\_\_ variable specifies how a causal relationship between two variables is different depending on a particular situation or circumstance. For example, if a researcher finds that a new experimental drug is effective in alleviating depression in young adult but not older adults.

- a) mediating
- \* b) moderating
- c) extraneous

d) independent

9) According to your text there are three conditions for making justified claims of cause and effect. Which of the following is NOT one of these conditions:

- a) the independent and dependent variables must be related
- \* b) the dependent variable must be manipulated by the researcher
- c) the independent variable must precede the dependent variable
- d) no other plausible explanations between the independent and dependent variables should exist

10) An effect is

- a) a reaction that a person makes
- b) the difference between what you want to happen and what does happen
- c) the difference between what does happen and what you want to happen
- \* d) the difference between what would have happened in the absence of a treatment and what did actually happen

11) What does it mean to say that an observation is "objective?"

- a) the observation is empirical
- b) it is done by a trained, professional scientist
- c) the observation has a rational basis
- \* d) it is unaffected by the observer's personal biases

12) Experimental research, as opposed to qualitative and nonexperimental quantitative research, allows us to make statements about cause-and-effect relationships. Why is this so?

- a) Experimental research involves studying how two variables covary.
- b) Experimental research uses statistical analysis.
- \* c) In experimental research, we can observe the effects of manipulating variables under controlled conditions.
- d) Experimental research uses objective observations.

13) Which of the following is NOT a defining characteristic of a psychological experiment?

- a) it involves objective observation
- b) variables are manipulated in a highly controlled environment
- \* c) it always takes place in a laboratory
- d) one or more factors are varied while the rest are held constant

14) According to the text, a "phenomenon that is made to occur" in a psychology experiment is

- a) an emotion.
- b) a thought.
- \* c) an observable behavior.
- d) a natural event.

15) Which of the following is NOT a strength of the experimental approach?

- \* a) proving your hypothesis is correct

- b) inferring a causal relationship
- c) manipulating precisely one or more variables
- d) controlling extraneous variables

16) What is the most critical aspect of the experimental method that allows us to make statements about cause and effect based on experimental data?

- a) real-life setting
- b) operationalism
- c) objectivity
- \* d) control

17) As noted in your text, one disadvantage of the experimental approach is the inability to:

- a) control extraneous variables
- b) establish cause and effect
- \* c) assess the effects of variables that cannot be manipulated
- d) make objective observations

18) According to your text, what is probably the most commonly cited disadvantage of using laboratory experiments to learn about human behavior?

- \* a) because they tend to be done in highly controlled settings, their results may not be generalizable to the real world
- b) with their mechanistic approach to human behavior, they ignore the participants' thoughts and emotions
- c) operational definitions reduce the abstract concept to a trivial level, making broad interpretations difficult at best
- d) because they tend to use other species, the results are usually irrelevant to human behavior

19) Which of the following would not be considered a field experiment?

- a) effects of computer-based instruction on computing confidence in a teacher training program
- \* b) effects of music on memory performance among introductory psychology students
- c) effects of self-selected incentives on productivity among auto workers
- d) effects of television violence on playground aggression among kindergarteners.

20) What is the main difference between experimentation done in a field setting and experimentation done in a laboratory?

- a) in field experimentation, variables are not manipulated
- b) in field experimentation, no attempt is made to control extraneous variables
- \* c) in field experimentation, the setting is "real life" and not contrived
- d) in field experimentation, one can study only a small number of people

21) Compared with field research, which of the following is true about laboratory research?

- a. laboratory research achieves greater naturalism
- b. laboratory research allows for greater generalizability of research
- \* c. laboratory research achieves a greater degree of control over extraneous variables

d. field research does not allow for direct manipulation of variables

22) Field experiments, according to Tunnell (1977), should include:

- a) natural behaviors.
- b) natural settings.
- c) natural treatments.

\* d) all of the above.

23) An advantage of doing experiments in the laboratory over the field setting is that

a) participants can be randomly assigned in the lab.

\* b) more extraneous variables can be held constant in the lab.

c) variables can be manipulated in the lab.

d) there is no selection bias in the lab.

24) Why might laboratory experiments be criticized as less than valuable and potentially problematic?

a) they are subjective and that leads to a lack of confidence in results

\* b) laboratory-based results may not generalize to the "real world"

c) without further study, knowledge gained in a lab is severely limited

d) we can never really understand human behavior

25) An increasing number of researchers are conducting experiments over the Internet because of the advantages it affords. Which of the following is NOT an advantage of using the Internet to conduct and experiment?

a) ease of access to culturally diverse populations

b) having access to a large sample of individuals

c) a tremendous cost savings over other types of experiments

\* d) there can be multiple submissions by the same person

26) An increasing number of researchers are conducting experiments over the Internet because of the advantages it affords. Which of the following is NOT a disadvantage of using the Internet to conduct and experiment?

\* a) the experiment is brought to the participant instead of the participant coming to the experiment

b) there is a less experimental control

c) there is a greater probability of self-selection

d) there is a greater probability of dropout of participants

27) Nonexperimental quantitative research is particularly useful for

\* a) developing hypotheses for new experiments.

b) deciding which variable causes which effect.

c) understanding more fully a person's current motivational and emotional state.

d) controlling relevant environmental variables.

28) What is the primary weakness of a correlational study?

a) an inability to determine if two variables are associated

b) we cannot determine whether a relationship is direct or inverse

- c) correlational studies tend to be artificial
- \* d) we cannot establish cause and effect with a correlational study

29) In chapter 1, we learned that the main objectives of scientific research are description, explanation, prediction, and control. Of all the nonexperimental research techniques studied, correlational research is particularly well suited for which objectives?

- \* a) description and prediction
- b) explanation and control
- c) prediction and control
- d) description, explanation, prediction, and control

30) The “third variable” issue refers to

- \* a) the possibility that two variables are correlated because both are caused by a third variable.
- b) the ambiguity introduced when doing more complex research with more than two variables.
- c) not considering “age” as a variable when doing developmental research.
- d) the influence of confounding factors in quantitative experimental research.

31) The third variable problem refers to

- a) correlations that are not reliable.
- b) correlations that cannot be used to infer causation.
- \* c) correlations that are causally linked through another factor.
- d) correlations must include a minimum of three factors to be reliable.

32) Ramon determines that in his neighborhood “amount of ice cream consumed” and “number of violent crimes” are positively correlated -- the more ice cream consumed, the more crimes are committed. He concludes that something in ice cream leads people to commit violent crimes.

What has Ramon overlooked?

- \* a) the "third variable" problem as some other variable could lead to an increase in both ice cream consumption and violent crime
- b) the reactive effect as the people in his neighborhood were probably aware that he was observing them, and altered their behavior toward what they thought he wanted to see
- c) his observations are qualitative and therefore inappropriate
- d) he collected his data only after-the-fact

33) If we find that two variables are correlated, which of the following conclusions would be unjustified?

- \* a) we know that changes in one of the variables cause changes in the other
- b) we know that we can predict to some extent the value of one variable if we know the value of the other
- c) we know that the two variables covary, i.e., change in value together
- d) we know that we have quantified a relationship between the two variables

34) Although we cannot establish causality from a correlational study, statistical techniques are available to help clarify established relationships. One of these is known as \_\_\_\_\_ and

involves identifying multiple variables that are related to a single outcome either directly or indirectly (through mediating variables).

- \* a) path analysis
- b) triangulation
- c) multiple covariance
- d) test of mediation

35) You want to conduct a study to determine whether single car accidents tend occur more frequently at a particular time of day (i.e. early morning hours). What kind of study would you be conducting?

- a) meta-analysis
- b) longitudinal
- \* c) natural manipulation
- d) phenomenological

36) In a longitudinal study of a behavior, a researcher would

- a) select groups of participants from each age group and study each group at one time.
- b) observe and participate in the behavior in question.
- c) measure the degree to which the behavior changed when a factor thought to influence it also changes.
- \* d) study one group of similarly aged people for a long period of time.

37) A researcher decides to measure the development of moral reasoning from early to late childhood. At a single point in time she tests 20 four-year olds, 20 six-year olds, and 20 eight-year olds by presenting each with the same moral dilemma and recording their responses. She then compares the performance of the three groups. The researcher is using a type of design referred to as:

- a) longitudinal
- \* b) cross-sectional
- c) cohort-sequential
- d) qualitative

38) Suppose a researcher used a cross-sectional research design and found that older adults tend to be more socially conservative than younger adults. He concludes that as we get older we tend to become more conservative in our thinking. Which of the following is a potential problem with this conclusion?

- a) the researcher cannot establish causation because this is a qualitative study
- b) the problem of attrition has not been addressed
- \* c) an age-cohort effect could explain these findings
- d) we can't be sure if these findings are generalizable

39) A research technique that combines features of both longitudinal and cross-sectional designs – testing cohorts of individuals but also retesting them over time – is referred to as a \_\_\_\_\_ design.

- \* a) cross-sequential
- b) qualitative

- c) repeated cross-sectional
- d) grouped longitudinal

40) For his senior thesis, Jacob is studying the development of motor coordination in monkeys from birth to old age, but only has one semester to collect his data. What kind of descriptive research design should he use?

- a) longitudinal
- b) correlational
- \* c) cross sectional
- d) historical

41) Qualitative research can be described in the following way:

- a) it is objective, involves multiple methods, and focuses on people in subcultures
- b) it is opinionated, involves two specific methods, and focuses on cultures, not people
- c) it is emotional, involves historical methods, and focuses on people with odd cultural practices
- \* d) it is interpretive, involves multiple methods, and focuses on people in their natural environment

42) The cohort-sequential design is an alternative developmental design that

- \* a) makes multiple observations of several cohorts with overlapping ages.
- b) makes multiple observations of several cohorts of widely differing ages.
- c) makes multiple observations of a single cohort over a very long time span.
- d) makes single observations of multiple cohorts over a very long time span.

43) Qualitative research is interpretive, which involves

- \* a) extracting information from non-numerical data.
- b) using objective measurements.
- c) quantifying non-numerical data.
- d) observing in the natural environment.

44) \_\_\_\_\_ research is primarily descriptive and useful in theory generation while \_\_\_\_\_ research is more useful in testing hypotheses.

- a. Quantitative; qualitative
- \* b. Qualitative; quantitative
- c. Experimental; correlational
- d. Cross-sectional; longitudinal

45) Qualitative researchers use many methods in part to

- a) find one that produces the expected outcome.
- b) make the process more like an experiment.
- \* c) provide a better understanding of the phenomenon being investigated.
- d) verify their quantitative observations.

46) Which of the following could be considered a limitation of qualitative research?

- a) because it is typically conducted in an artificial laboratory setting the findings may not



- apply to the real world
- b) results from qualitative research are overly objective – not allowing for interpretation of individual participants perspectives
- c) it is not particularly useful for generating theoretical ideas
- \* d) different researchers may provide different interpretations of the same data

47) Phenomenologists hoping to gain an understanding of the experiences of people that have been abducted by terrorists, would rely primarily on

- \* a) face-to face interviews.
- b) participant observation.
- c) gathering of artifacts.
- d) collective case studies.

48) You would like to identify the teaching techniques and strategies used by professors whom students say are the best instructors. One research approach that could be used to identify the strategies these professors are using is to use

- a) longitudinal analysis.
- \* b) naturalistic observation.
- c) correlation.
- d) meta-analysis.

49) If a researcher joined a religious cult to see how members are recruited and why affiliation is so strong, she would be using the

- a) ex post facto method.
- b) phenomenological method.
- \* c) participant-observer method.
- d) experimental method.

50) A significant risk inherent in participant observation is

- a) the introduction of extraneous variables.
- b) the need for disguise and possible discovery.
- c) the need for deception.
- \* d) the reactive effect.

### Vocabulary

Define the following in psychological terms:

Experimental research	Descriptive research	Quantitative research
Numerical data	Qualitative research	Non-numerical data
Variable	Categorical variable	Quantitative variable
Independent variable	Dependent variable	Cause-and-effect relationship
Extraneous variable	Mediating variable	Moderator variable
Causation	Cause	Effect
Psychological experiment	Manipulation	Confounding variables
Causal description	Causal explanation	Field experiment
Laboratory experiment	Internet experiment	Correlational research

Nonexperimental quantitative research		Third variable problem
Path analysis	Direct effect	Indirect effect
Natural manipulation research		Cross-sectional study
Longitudinal study	Cohort-sequential design	Qualitative research
Triangulation	Method of data collection	Tests
Questionnaire	Interviews	Focus group
Observation	Naturalistic observation	Laboratory observation
Time-interval sampling	Event sampling	Existing data
Documents	Physical data	Archived research data

### Essay questions

- 1) Identify two non-experimental research techniques discussed in your textbook. Describe the major advantages and limitations of each.
- 2) Describe a simple experiment (do not use one discussed in your text) and identify the independent and dependent variables.
- 3) Define and distinguish mediating and moderating variables.
- 4) Explain the phrase “cause and effect.” Define each and then explain how determinism is important to a scientific use of the word “cause.”
- 5) How does your book define a psychological experiment? Discuss each of the four important components of this definition.
- 6) List and discuss the advantages and disadvantages of the experimental approach.
- 7) One of the advantages of the experimental approach is the ability to control extraneous variables. What are extraneous variables? Describe a simple experiment illustrating how extraneous variables might be controlled. Why is the control of extraneous variables important?
- 8) Experiments are sometimes criticized because they often take place in highly artificial laboratory settings where the experimenter has a lot of control over the environment. Explain why this is actually an advantage in establishing a causal relationship between two variables.
- 9) How does a field experiment differ in practice from naturalistic observation? How does a field experiment differ from a laboratory experiment? What are the strengths and weaknesses associated with field experimentation?
- 10) Compare and contrast laboratory experiments, field experiments and Internet experiments. Include the relative advantages and disadvantages of each.
- 11) What is the distinguishing characteristic of nonexperimental quantitative research? Identify the methods presented in your text as examples of nonexperimental quantitative research.

12) Why is correlational research unable to establish causal relationships? What is the *third variable problem*, and why is it critical to the understanding of the misuse of correlational evidence to imply causation?

13) What is natural manipulation research? Explain how natural manipulation research is similar to and different from correlational research.

14) Describe a cohort-sequential design and explain how it is a combination of the longitudinal and cross-sectional designs. What advantages does the cohort-sequential design have over the longitudinal and cross-sectional designs?

15) What is qualitative research? What are the inherent limitations of this type of research?

16) What are the six major methods of data collection as outlined in your text? Briefly summarize some of the strengths and weaknesses of each.

### Classroom exercise suggestions

1) One of the primary goals of this chapter is to provide students with an overview of the many different research approaches and data collection methods available to researchers. Remind students that much of the information contained in the chapter will be explored more fully in other sections of the text. To bring home the point that many topics can be explored in multiple ways you might use one of the activities below:

- Ask the class to generate ideas of student behaviors that they would be interested in studying (e.g., chatting on Facebook, partying, couples holding hands etc). Lead the discussion toward a single behavior that could be researched. After a behavior is selected this should lead to a discussion of operational definitions as you define precisely the behavior that will be studied. This is a good opportunity to point out that many psychological constructs can be operationalized in multiple ways. After the target behavior has been properly defined have students think of the different research approaches presented in the chapter and how they might use these to study the behavior. Depending on the behavior chosen students should have no trouble identifying several different methods that could be used. Finally, you should also prompt them to relate each method to an objective of science (description, prediction, etc) presented in chapter 1.
- As an alternative to the activity above you might provide groups of students with a simple hypothesis and ask them to brainstorm ideas of how it could be tested. Providing each group with the same hypothesis will give you (and the other students) an opportunity to discuss the advantages and disadvantages of each suggested multiple research approaches.
- I use one or both of the activities above and then continue to reference them throughout the semester. As we discuss more advanced designs our original research idea becomes more and more complex.

2) At this point in the semester it will be difficult for most students to decipher scientific journal articles but one easy way to help them distinguish different research methods is by utilizing popular media reports of scientific research. This also encourages students to exercise their critical thinking skills – an important goal of the course. There are several ways you might incorporate this in your discussion:

- Have students bring to class popular media reports of scientific research (e.g., from magazines, newspapers, or from online sites like Google news). Ask students to indicate the type of research approach used (e.g., experimental or correlational), the most important results of the study, and any explicit or implied implications of the findings. In many cases students will find it difficult to determine the type of research design that was used in the original study (e.g., correlational or experimental). They may also find unwarranted implications of causality – for instance when the original research design was simply correlational.
- Jonathan Mueller maintains a very good website containing links to media reports (and often misrepresentations) of scientific research. In many instances research findings from correlational studies are reported in a way that implies causality. In addition to the article links this site also includes multiple student activities that would be appropriate to accompany your discussion of this chapter.  
[http://jonathan.mueller.faculty.noctrl.edu/100/correlation\\_or\\_causation.htm](http://jonathan.mueller.faculty.noctrl.edu/100/correlation_or_causation.htm)
- Finally, Hall and Seery (2006) present an activity in which students compare media reporting of a research finding to the original source. They report that the activity is effective in making students more aware of the limitations of media reporting of research findings.

Hall, S.S. & Seery, B.L. (2006). Behind the facts: Helping students evaluate media reports of psychological research. *Teaching of Psychology*, 33, 101-104.

3) The text points out that correlational research is helpful in accomplishing the scientific objectives of description and prediction. To extend this discussion you might describe how correlational research often stimulates hypotheses that are tested in an experimental manner – thus establishing causality and accomplishing the objective of explanation. For example, correlational research finding a positive association between playing violent video games and aggressive behavior is difficult to interpret because of issues of direction of effect and potential third variables. However, these findings have stimulated a wealth of experimental research investigating the precise nature of the causal relationship. For the correlational findings below have students generate ways to test the relationship experimentally. The discussion should naturally lead to issues of random assignment and control of extraneous variables. This may also serve as a preview of ethical issues involved in using random assignment.

- Students who sit at the front of the classroom make better grades than those that sit in the back.

- Researchers have found a positive relationship between the degree of satisfaction couples feel experience in their relationship and the amount of time they spend together.
- There is a negative relationship between exercise and anxiety.
- Participation in leisure activities has been associated with a lower risk of dementia in older adults.

4) The site below, maintained by Alan Levine, presents simple explanations for five different research methodologies (experimental, correlational, naturalistic observation, surveys, and case studies). The site is well-done and contains summaries and quizzes for each of the five methodologies.

[http://www.mcli.dist.maricopa.edu/proj/res\\_meth/login.html](http://www.mcli.dist.maricopa.edu/proj/res_meth/login.html)

5) This University of Denver site provides links to various online experiments in which students can participate. You may find this to be more appropriate for later in the course.

<http://www.du.edu/psychology/methods/>