Chapter 2: Statistics and the Research Process

MULTIPLE CHOICE

1. Behavioral scientists study the laws of nature regarding
   a. populations and samples.
   b. the behavior of living organisms.
   c. sea lions, gorillas, and other nonhuman species.
   d. the language of statistics.

   ANS: B DIF: Easy REF: p. 13

2. In statistics a *population* is
   a. the entire group to which a law of nature applies.
   b. a subset of a group to which a law of nature applies.
   c. all the people or subjects in the world.
   d. an infinite number that cannot be counted.

   ANS: A DIF: Easy REF: p. 14

3. Although researchers discuss the population of individuals, in statistics we talk of the population of
   a. samples.
   b. universes.
   c. groups.
   d. scores.

   ANS: D DIF: Easy REF: p. 14

4. In statistics a *sample* is
   a. the entire group to which a law of nature applies.
   b. a subset of a group to which a law of nature applies.
   c. all of the subjects in which we are interested.
   d. at least half of the subjects in the population.

   ANS: B DIF: Easy REF: p. 14

5. The individuals measured in a sample are called the
   a. participants.
   b. scores.
   c. population.
   d. observations.

   ANS: A DIF: Easy REF: p. 14

6. The logic behind samples and populations is that
   a. measuring the population is usually the desirable approach.
   b. the scores in a sample can be used to estimate the scores we would expect to find if we could measure a population.
   c. it is much less expensive to measure a sample than to measure an entire population.
   d. there is no need to measure an entire population because any sample produces the same results.

   ANS: B DIF: Easy REF: p. 14

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7. A *representative sample* is one that
   a. contains every possible score on the dependent variable.
   b. accurately reflect the characteristics of the population.
   c. is based on a systematic selection of participants.
   d. is also known as a biased sample.

   ANS: B DIF: Easy REF: p. 15

8. As a method for creating a sample, random sampling means that
   a. who gets chosen depends on chance.
   b. a representative sample always will be created.
   c. all scores will be random.
   d. there will be selectivity in our sample.

   ANS: A DIF: Easy REF: p. 15

9. Which of the following is the most accurate statement with regard to random sampling and the representativeness of the sample obtained?
   a. Random sampling always produces a representative sample.
   b. Random sampling usually does not produce a representative sample.
   c. Random sampling produces a representative sample about half the time.
   d. Random sampling should produce a representative sample but does not always do so.

   ANS: D DIF: Easy REF: p. 15

10. When a sample does not represent the population, any evidence obtained from that sample regarding a law of nature is
   a. possibly representative of the population.
   b. used to draw inferences.
   c. descriptive.
   d. misleading.

   ANS: D DIF: Easy REF: p. 15

11. A statistics class has 50% females and 50% males. A researcher randomly selects a sample that has 80% males and 20% females. Why should the researcher be cautious of making inferences about the entire class based on the sample?
   a. Because, by luck of the draw, the sample is unrepresentative of the population.
   b. Because, by luck of the draw, the sample is representative of the population.
   c. Because, by luck of the draw, the opinions of the females in the sample will not be the same as those of the females in the population.
   d. Because, by luck of the draw, the sample was too small.

   ANS: A DIF: Moderate REF: p. 15

12. Which of the following is a variable?
   a. the number of students in your statistics class today
   b. the date and month of the 4th of July
   c. the height of the players on a basketball team
   d. your latest test score

   ANS: C DIF: Moderate REF: p. 15

13. Quantitative variables measure _____ and qualitative variables measure _____.
   a. amount; classification
   b. classification; amount
   c. amount; quantity
   d. quality; classification

   ANS: A DIF: Easy REF: p. 16

14. We study laws of nature by studying the relationship between the _____ that measure the behaviors or events.
    a. scores
    b. variables
    c. relationships
    d. samples and populations

    ANS: B DIF: Easy REF: p. 16

15. When a change in the values of one variable is accompanied by a consistent change in the values of another variable, we have what is known as a
    a. cause-and-effect explanation.
    b. relationship.
    c. variable.
    d. set of scores.

    ANS: B DIF: Easy REF: p. 16

16. Which of the following is an example of a quantitative variable?
    a. gender
    b. make of automobile (e.g., Ford, Chevy) you drive
    c. eye color
    d. height

    ANS: D DIF: Moderate REF: p. 16

17. Which of the following is an example of a qualitative variable?
    a. weight
    b. IQ
    c. salary
    d. type of detergent you use

    ANS: D DIF: Moderate REF: p. 16

18. Which of the following statements indicates the existence of a relationship?
    a. As height increases, there is a tendency for weight to also increase.
    b. The average score on the statistics test was 77.0.
    c. My sister made 14 errors on her last psychology test.
    d. Six of the old oak trees on campus were struck by lightning last year.

    ANS: A DIF: Moderate REF: p. 16

19. A relationship can exist
    a. only when the association between the scores of two variables is perfectly consistent.
    b. only when two quantitative variables are used.
    c. only when the association is a simple "the greater *X* is, the greater *Y* is."
    d. even if the association between the scores of two variables is not perfectly consistent.

    ANS: D DIF: Easy REF: p. 17

20. Of the following data sets, which shows a relationship?

Sample A		Sample B		Sample C		Sample D	
X	*Y*	*X*	*Y*	*X*	*Y*	*X*	*Y*
1	10	1	5	1	10	1	10
1	11	1	6	1	10	1	21
2	15	2	6	2	10	2	11
2	16	2	5	2	10	2	20
3	20	3	5	3	10	3	15
3	21	3	6	3	10	3	16

a. Sample A
b. Sample B
c. Sample C
d. Sample D

ANS: A DIF: Moderate REF: p. 17

21. The extent to which close to one value of *Y* is consistently associated with one and only one value of *X* is called
a. individual differences.
b. the tendency to change.
c. the strength of the relationship.
d. the error of the scores.

ANS: C DIF: Easy REF: p. 18

22. When there is no consistent pattern between two variables, there is said to be
a. a strong relationship.
b. a weak relationship.
c. no relationship.
d. individual differences.

ANS: C DIF: Easy REF: p. 18

23. Research is concerned not only with the existence of a relationship, but with the _____ of that relationship.
a. individual differences
b. strength
c. errors
d. cause-and-effect

ANS: B DIF: Easy REF: p. 18

24. In the question, "for a *given* score on one variable, what scores occur on the *other* variable?" What is the "*given*" variable?
a. the *X* variable
b. the *Y* variable
c. either variable can be the "given" variable
d. neither *X* nor *Y* is the "given" variable

ANS: A DIF: Easy REF: p. 20

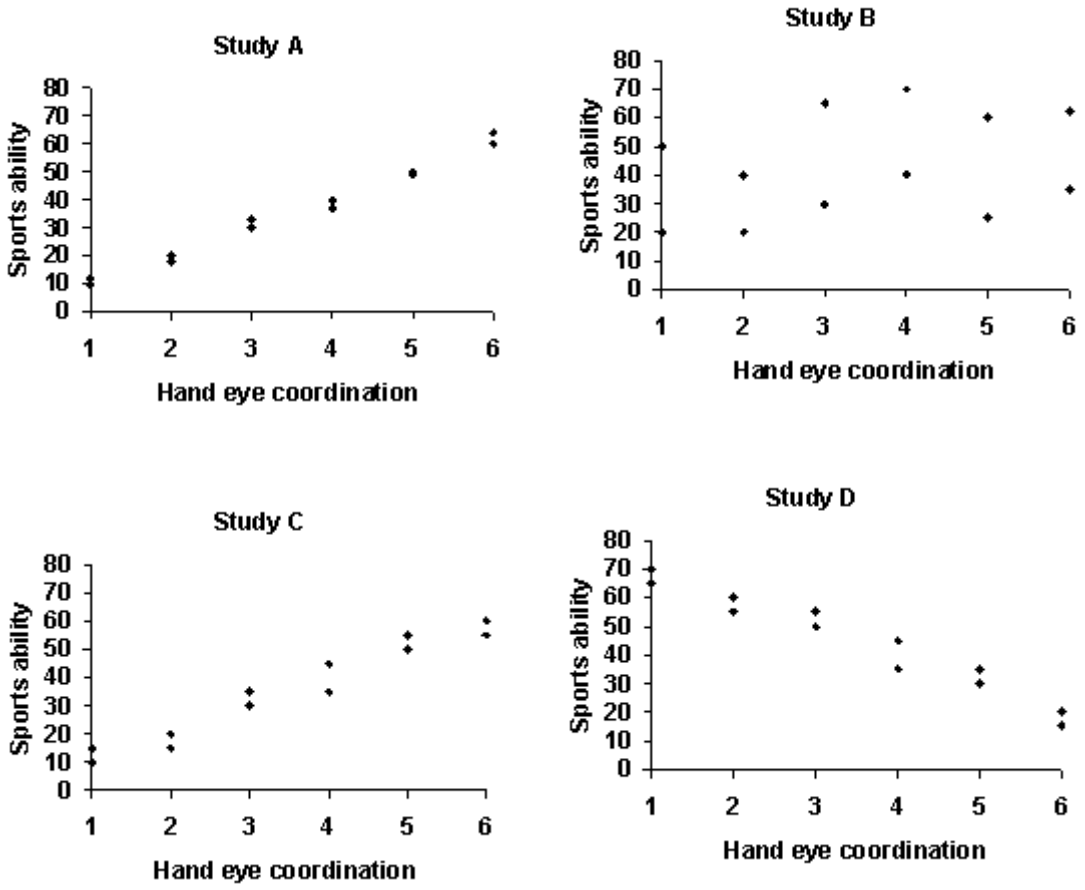
25. A relationship can be described using the general format "scores on the *Y* variable change as _____ changes in the *X* variable."
a. a function of
b. plotted
c. different
d. there are no

ANS: A DIF: Easy REF: p. 20

26. Greater vertical spread among the data points on a graph indicate
    a. a weaker relationship
    b. a stronger relationship
    c. the presence of a relationship
    d. a cause-and-effect relationship

    ANS: A DIF: Easy REF: p. 21

27. Which of the graphs below shows the strongest relationship between hand eye coordination and sports ability?



    a. Study A
    b. Study B
    c. Study C
    d. Study D

    ANS: A DIF: Moderate REF: p. 21

28. If I want to summarize the characteristics of my statistics class to my friend, I should use
    a. an experimental design.
    b. a correlational design.
    c. inferential statistics.
    d. descriptive statistics.

    ANS: D DIF: Moderate REF: p. 21

29. Which of the following statements is descriptive?
    a. The average weight of students in the statistics class is 143 pounds.
    b. The USDA has tested 12% of the corn crop and believes that the total corn crop will be unaffected by last year's drought.
    c. On the basis of incoming freshmen SAT scores, I think that next year's class will have a GPA of 2.48.
    d. On the basis of a survey of 15% of the student body, I think that the students, in general, would prefer fewer potato dishes served in the cafeteria.

    ANS: A DIF: Moderate REF: p. 21

30. In order to make statements about the population from information obtained from a sample, we must use
    a. an experimental design.
    b. a correlational design.
    c. inferential statistics.
    d. descriptive statistics.

    ANS: C DIF: Easy REF: p. 22

31. A number that describes a characteristic of a sample of scores is called a
    a. descriptive score.
    b. summary score.
    c. statistic.
    d. parameter.

    ANS: C DIF: Easy REF: p. 22

32. Which of the following statements is inferential?
    a. The proportion of students having brown hair is 0.64.
    b. The students at Transylvania University gave 116 pints of blood in the last blood drive.
    c. If recycling efforts continue as they have, energy costs will drop by 16%.
    d. Professor G. Hi-Man polled his students and found that 74% prefer cumulative exams.

    ANS: C DIF: Moderate REF: p. 22

33. A number that describes a characteristic of a population of scores is called a
    a. descriptive score.
    b. summary score.
    c. statistic.
    d. parameter.

    ANS: D DIF: Easy REF: p. 23

34. Statistics are represented by _____, and parameters are represented by _____.
    a. numbers; letters
    b. letters; numbers
    c. English letters; Greek letters
    d. Greek letters; English letters

    ANS: C DIF: Easy REF: p. 23

35. The way a study is laid out is called its
    a. independent variable.
    b. dependent variable.
    c. design.
    d. parameters.

    ANS: C DIF: Easy REF: p. 23

36. If a researcher actively changes or manipulates one variable and then measures the scores on another variable, the researcher is conducting
    a. a population measurement.
    b. an experiment.
    c. a correlation.
    d. a nonrandom sample.

    ANS: B DIF: Easy REF: p. 23

37. Suppose you are interested in how participants perform under different temperature conditions. You randomly select 30 participants and randomly assign them to work in one of three rooms. The rooms differ only with respect to temperature. You instruct all participants to solve the same jigsaw puzzle, and then you measure how long it takes each one to finish. This research is an example of
    a. a correlational study.
    b. population measurement.
    c. an experimental study.
    d. the use of descriptive statistics.

    ANS: C DIF: Moderate REF: p. 23

38. The variable that is systematically changed or manipulated by a researcher in an experiment is called the
    a. independent variable.
    b. correlational variable.
    c. dependent variable.
    d. extraneous variable.

    ANS: A DIF: Easy REF: p. 23

39. Suppose you are interested in how participants perform under different temperature conditions. You randomly select 30 participants and randomly assign them to work in one of three rooms. The rooms differ only with respect to temperature. You instruct all participants to solve the same jigsaw puzzle, and then you measure how long it takes each one to finish. In this research, temperature serves as the
    a. condition.
    b. independent variable.
    c. dependent variable.
    d. sample.

    ANS: B DIF: Moderate REF: p. 23

40. Technically, behavior-influencing variables that an experimenter cannot change by doing something to participants are called a(n)
    a. independent variable.
    b. quasi-independent variable.
    c. dependent variable.
    d. quasi-dependent variable.

    ANS: B DIF: Easy REF: p. 24

41. A specific amount or category of the independent variable that creates the specific situation under which the participants' scores on some other variable are measured is called a(n)
    a. independent variable.
    b. dependent variable.
    c. condition.
    d. statistic.

    ANS: C DIF: Easy REF: p. 24

42. The variable that is measured under each condition as an experiment is being carried out is called the
    a. independent variable.
    b. correlational variable.
    c. dependent variable.
    d. extraneous variable.

    ANS: C DIF: Easy REF: p. 24

43. The _____ is (are) the overall variable(s) the researcher is investigating, whereas the _____ is (are) the specific category(ies) under which the participant is tested.
    a. dependent variable; independent variable
    b. independent variable; dependent variable
    c. conditions of an independent variable; independent variable
    d. independent variable; conditions of an independent variable

    ANS: D DIF: Easy REF: p. 24

44. The dependent variable
    a. measures a behavior.
    b. influences a behavior.
    c. is manipulated by the researcher.
    d. has two or more conditions or levels.

    ANS: A DIF: Easy REF: p. 24

45. If we categorize participants' income as "below poverty level" or "above poverty level" and then measure their general level of happiness, income would be considered a(n)
    a. continuous variable.
    b. dependent variable.
    c. true independent variable.
    d. quasi-independent variable.

    ANS: D DIF: Moderate REF: p. 24

46. Lighting condition, if controlled by the researcher, would be considered a(n)
    a. continuous variable.
    b. dependent variable.
    c. true independent variable.
    d. quasi-independent variable.

    ANS: C DIF: Moderate REF: p. 24

47. A researcher investigates whether there is a relationship between gender and color discrimination by randomly selecting 50 males and 50 females and asking them to discriminate between colors. The variable measuring accuracy in color discrimination is a
    a. true independent variable.
    b. quasi-independent variable.
    c. dependent variable.
    d. nominal scale.

    ANS: C DIF: Moderate REF: p. 24

48. A researcher investigates whether there is a relationship between hours of sleep and memory for photographs by having 40 people sleep in the laboratory and waking 20 randomly selected participants after 4 hours of sleep and the others after 8 hours of sleep. After they are awakened, each participant is asked to study 12 photographs and then recall as many details from the photographs as possible. What is the independent variable in this study?
    a. number of details recalled from photographs
    b. hours of sleep
    c. sleeping in the laboratory
    d. there is no independent variable; the study is correlational

    ANS: B DIF: Moderate REF: p. 24

49. A researcher investigates whether there is a relationship between participating in athletics and GPA by comparing GPAs from 20 randomly selected athletes with those from 20 randomly selected non-athletes. The variable measuring participation in athletics is a(n)
    a. true independent variable.
    b. quasi-independent variable.
    c. dependent variable.
    d. interval scale.

    ANS: B DIF: Moderate REF: p. 24

50. A researcher investigates whether there is a relationship between type of background music being listened to and responses to a mood inventory by having 60 randomly selected participants complete the mood inventory, with 20 randomly assigned to each of three rooms. In one room classical music is played in the background, in another hard rock music, and in a third country music. The type of background music variable is a(n)
    a. true independent variable.
    b. quasi-independent variable.
    c. dependent variable.
    d. interval scale.

    ANS: A DIF: Moderate REF: p. 24

51. A researcher investigated whether a person's mood influences another person's mood. The researcher randomly divided the participants into three groups. Participants in the first group interacted with a happy person. Participants in the second group interacted with a sad person. Participants in the third group interacted with an emotionally neutral person. After the interaction, the researcher measured how happy the participants were. What are the conditions of the independent variable in this study?
    a. happy, sad, neutral
    b. happiness of the other person
    c. happiness of the participant
    d. there are no conditions of an independent variable—this is a correlational study

    ANS: A DIF: Moderate REF: p. 24

52. Suppose you are interested in how participants perform under different temperature conditions. You randomly select 30 participants and randomly assign them to work in one of three rooms. The rooms differ only with respect to temperature. You instruct all participants to solve the same jigsaw puzzle, and then you measure how long it takes each one to finish. The dependent variable in this research is the
    a. jigsaw puzzle.
    b. time required to finish the jigsaw puzzle.
    c. temperature.
    d. room the participants are in.

    ANS: B DIF: Moderate REF: p. 24

53. Suppose you are interested in how participants perform under different temperature conditions. You randomly select 30 participants and randomly assign them to work in one of three rooms. The rooms differ only with respect to temperature. You instruct all participants to solve the same jigsaw puzzle, and then you measure how long it takes each one to finish. In this research, the experimenter is investigating whether
    a. participants can solve a jigsaw puzzle in different rooms.
    b. participants can solve a jigsaw puzzle under different temperature conditions.
    c. the time required to solve a jigsaw puzzle depends on temperature.
    d. temperature depends on the time required to solve a jigsaw puzzle.

    ANS: C DIF: Moderate REF: p. 24

54. In graphing the results of an experiment, we place the independent variable
    a. to the left of the independent variable scores.
    b. to the right of the independent variable scores.
    c. on the *X* axis.
    d. on the *Y* axis.

    ANS: C DIF: Easy REF: p. 25

55. In graphing, which variable is on the vertical axis?
    a. The X variable
    b. The Y variable
    c. Conditions of the independent variable
    d. The "given" variable

    ANS: B DIF: Easy REF: p. 25

56. An instructor investigates whether the end of the chapter questions aid test performance by randomly assigning participants to one of two groups. One group completes half the questions, and another completes all the questions. Performance on a test is measured. The instructor should ask the question:
    a. Does completing all the questions produce high test performance?
    b. Do students prefer to complete half the questions or all the questions?
    c. Are there consistent changes in the amount of questions answered as a function of test performance?
    d. Are there consistent changes in test performance as a function of number of questions answered?

    ANS: D DIF: Moderate REF: p. 25

57. Descriptive statistics are always applied to
    a. true independent variables.
    b. dependent variables.
    c. quasi-independent variables.
    d. conditions.

    ANS: B DIF: Easy REF: p. 26

58. In a(n) _____, the experimenter measures scores on both variables, whereas in a(n) _____, the experimenter manipulates or changes one variable and measures scores on the other.
    a. correlational study; research design
    b. research design; experiment
    c. correlational study; experiment
    d. experiment; correlational study

    ANS: C DIF: Easy REF: p. 26

59. Suppose you randomly select 40 participants, measure the length of each one's index finger, and also administer an IQ test to each. This research is an example of a(n)
    a. correlational study.
    b. dependent variable.
    c. experimental study.
    d. independent variable.

    ANS: A DIF: Moderate REF: p. 26

60. A researcher investigates whether there is a relationship between hours spent watching television and children's vocabulary by asking 40 randomly selected 11-year-olds how many hours of television they watch per week and then having them take a vocabulary test. What is the independent variable in this study?
    a. hours of television watching
    b. vocabulary scores
    c. age of the subjects
    d. there is no independent variable; the study is correlational

    ANS: D DIF: Moderate REF: p. 26

61. Suppose you randomly select 40 participants, measure the length of each one's index finger, and also administer an IQ test to each. The dependent variable in this study is
    a. the length of the index finger.
    b. the IQ scores.
    c. the 40 participants.
    d. nonexistent—there is no dependent variable; this is a correlational study.

    ANS: D DIF: Moderate REF: p. 26

62. In an experiment, the researcher _____, in a correlational study, the researcher _____.
    a. measures two variables; measures a single variable known as the dependent variable
    b. measures two variables; measures a single variable known as the independent variable
    c. actively tries to make a relationship; observes to see if a relationship exists.
    d. observes to see if a relationship exists; actively tries to make a relationship

    ANS: C DIF: Easy REF: p. 27

63. Which of the following studies is best for showing that the first variable causes changes in the second variable?
    a. A researcher asks people who are entering the grocery store how hungry they are and then asks them how much they spent on food as they leave the store.
    b. A researcher assigns participants to sleep various amounts of hours and then observes how cranky they are.
    c. A researcher asks participants how well they like to think and how many books they have read in the last 6 months.
    d. A researcher asks participants how many hours per week they listened to Beethoven while growing up and then gives them a math ability test.

    ANS: B DIF: Moderate REF: p. 27

64. Suppose you randomly select 40 participants, measure the length of each one's index finger, and also administer an IQ test to each. In this, you are investigating whether
    a. there is a relationship between index fingers and IQ.
    b. there is a relationship between length of index finger and IQ score.
    c. long index fingers cause subjects to have high IQ scores.
    d. IQ depends on length of index finger.

    ANS: B DIF: Moderate REF: p. 27

65. Which measurement scale includes a zero, but not a true zero?
    a. ordinal
    b. interval
    c. ratio
    d. nominal

    ANS: B DIF: Easy REF: p. 28

66. Which measurement scale indicates how one individual is qualitatively different from another?
    a. nominal.
    b. ordinal.
    c. interval.
    d. ratio.

    ANS: A DIF: Easy REF: p. 28

67. "My son just finished 3rd in the local marathon." The scale of measurement involved in this statement is
    a. nominal.
    b. ordinal.
    c. interval.
    d. ratio.

    ANS: B DIF: Moderate REF: p. 28

68. "My roommate's IQ is 95." The scale of measurement involved in this statement is
    a. nominal.
    b. ordinal.
    c. interval.
    d. ratio.

    ANS: C DIF: Moderate REF: p. 28

69. "Watch for me on the football field. I'll be wearing number 32." The scale of measurement involved in this statement is
    a. nominal.
    b. ordinal.
    c. interval.
    d. ratio.

    ANS: A DIF: Moderate REF: p. 28

70. Which of the following orders lists the scales of measurement from the scale that provides the least specific information to the scale that provides the most specific information?
    a. ratio, interval, ordinal, nominal
    b. ratio, interval, nominal, ordinal
    c. ordinal, nominal, interval, ratio
    d. nominal, ordinal, interval, ratio

    ANS: D DIF: Easy REF: p. 29

71. Which measurement scale has a true zero?
    a. ordinal
    b. interval
    c. ratio
    d. nominal

    ANS: C DIF: Easy REF: p. 29

72. A *continuous* variable _____ (does/does not) allow fractional amounts. A *discrete* variable _____ (does/does not) allow fractional amounts.
    a. does; does
    b. does; does not
    c. does not; does
    d. does not; does not

    ANS: B DIF: Easy REF: p. 29

73. "My daughter is four years old." The scale of measurement involved in this statement is
    a. nominal.
    b. ordinal.
    c. interval.
    d. ratio.

    ANS: D DIF: Moderate REF: p. 29

74. Income is an example of a(n)
    a. independent variable.
    b. dependent variable.
    c. continuous variable.
    d. discrete variable.

    ANS: C DIF: Moderate REF: p. 29

75. What do the design of the study and the scale of measurement have in common?
    a. They are the aspects of a study to consider when deciding whether to conduct statistical analysis.
    b. They are the aspects of a study that are known only by the researcher.
    c. They are the aspects of a study to consider when deciding which descriptive or inferential statistic to use.
    d. They are the aspects of a study that are known only after the study is completed.

    ANS: C DIF: Difficult REF: pp. 23 & 29

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