Name: _____ Date: _____

1. Schacter and Gross (1968) gathered data from a group of 60 male students for about one hour in the afternoon. At the end of this period of time, a clock on the wall was correct (5:30 p.m.) for 20 participants, slow (5:00 p.m.) for 20 others, and fast (6:00 p.m.) for 20 more. The actual time for all groups was 5:30 p.m., the usual dinnertime for these students. While participants filled out a final questionnaire, the experimenters provided crackers for the students to eat. The weight of the crackers each student consumed was measured. The arithmetic means were 5:00 p.m. group, 20 grams; 5:30 p.m. group, 30 grams; 6:00 p.m. group, 40 grams. Identify for this study the (a) population, (b) sample, (c) independent variable, (d) levels of the independent variable, (e) dependent variable, (f) descriptive statistic, and (g) any inferences warranted by this study.

2. Hsee and Tang (2007) reported the results of a study in which 195 college students completed a happiness scale (from 1 to 7) just prior to taking their midterm exam. On this scale, 1 corresponded to *very unhappy* and 7 to *very happy*. On average, the students rated their happiness as 6.18. Identify for this study the (a) population, (b) sample, (c) dependent variable, and (d) descriptive statistic.

3. A *New York Times* article published on April 24, 2007, reported the research of Dr. Vallortigara, a neuroscientist at the University of Trieste, Italy. In this study, Dr. Vallortigara assessed whether a dog's tail wags in a preferred direction in response to positive as opposed to negative stimuli. First, Dr. Vallortigara recruited 30 dogs that were family pets. While filming a dog's tail from above, he allowed the dog to view (through a slot in its cage) its owner, an unfamiliar human, a cat, and an unfamiliar dominant dog. The study found that dogs' tails wagged to the right for the owner and to the left for the unfamiliar dominant dog. Identify for this study the (a) population, (b) sample, (c) independent variable, (d) levels of the independent variable, and (e) dependent variable.

4. An elementary school teacher is interested in the relation between sugar consumption and activity level in preschool children. The teacher gives 30 preschool children from Preppy Preschool Playland 0 milligrams, 20 milligrams, or 50 milligrams of sucrose (sugar) in a breakfast drink. He then observes their behavior for 30 minutes during their morning outdoor play period and codes their activity level. Identify for this study the (a) population, (b) sample, (c) independent variable, (d) levels of the independent variable, and (e) dependent variable.

5. In an experiment designed to assess the effects of disclosure of ingredients on the experience of taste, Lee, Frederick, and Ariely (2006) approached patrons at a local pub and asked them to taste and rate a new beer: the MIT Brew. Some participants were told about the secret ingredient in the beer (a few drops of balsamic vinegar) either before tasting (*before* condition) or after tasting but before rating (*after* condition). Other participants were not told anything regarding the secret ingredient (*not told* condition). Identify for this study the (a) population, (b) sample, (c) independent variable, (d) levels of the independent variable, and (e) dependent variable.

6. Identify at least one confounding variable that undermines the conclusion drawn in the following fictional study: Prof. Martin was interested in which of two popular statistics textbooks (*Statistics: It Will Change Your Life* and *Statistics: Bigger, Better, Stronger*) was better for students. Prof. Martin compared the two texts by assigning one text to a section of statistics taught by Prof. Miller from 10–11 a.m. on Monday, Wednesday, and Friday, and the other text to a section of statistics taught by Prof. Mervin from 7–10 p.m. on Wednesday evenings. At the end of the term, all students took the same comprehensive test. Students to whom *Statistics: Bigger, Better, Stronger* was assigned performed better on the test than did students to whom *Statistics: It Will Change Your Life* was assigned. Therefore, Prof. Martin concluded that the former textbook was the better one.

7. An operational definition specifies the operations or procedures used to measure or manipulate variables. A researcher is interested in investigating the relationship between thinking ability and educational success. What are some operational definitions that could be used in this study?

8. What is the difference between a within-groups and a between-groups design? What are the relative advantages and disadvantages of each type of design?

9. What are some advantages in using a correlational design over an experimental design?

10. Mark is interested in how his winter heating bills compare to those of others. He gets data from his utility company and finds that his monthly expenses are very high relative to the rest of the consumer data in winter months. Apply the concept of an outlier to Mark's situation and discuss how outlier analysis might be useful to him.

11. A statistic that summarizes a group of numbers is a(n) _____ statistic.

12. A statistic that uses sample data to make general estimates about the larger population is a(n) _____ statistic.

13. A five-star rating system for hotels is a(n) _____ variable.

14. A person's religious affiliation is a(n) _____ variable.

15. Continuous observations can typically take on _____ values than discrete observations.

16. A(n) _____ is a variable that meets the criteria for an interval and ratio variable.

17. Discrete values that the independent variable can take on are called the _____ of the independent variable.

18. A variable that is manipulated to determine its effects on another variable is a(n) _____ variable.

19. A(n) _____ variable makes it impossible to determine whether the independent variable is the cause of changes in the dependent variable.

20. A(n) _____ measure sets out to evaluate something and does that accurately.

21. A(n) _____ variable gets consistent results; that is, it produces the same assessment over time for an unchanging variable.

22. _____ is the process of drawing conclusions about whether or not a particular relation between variables is supported by the data.

23. When two or more variables vary together, they are said to be _____.

24. Each participant experiences all levels of the independent variable in a(n) _____ design.

25. Participants experience only one level of the independent variable in a(n) _____ design.

26. A data point that does not fit the overall pattern of the data is known as a(n) _____.

27. Participants who have very extreme results relative to other participants in a study are considered _____.

28. A researcher wanted to determine whether eating sugary cereal for breakfast increased the aggression of second graders during their morning play period. After feeding a group of 20 students sugary cereal for breakfast she observed that, on average, the students committed 4.5 aggressive behaviors during their morning play period. In this example, the descriptive statistic is:

A) the 4.5 aggressive behaviors.
B) the 20 students the researcher observed.
C) all second graders.
D) all second graders who ate sugary cereal for breakfast.

29. Wendy is a weight-loss group leader. To get a better idea of how to help those she will be working with to achieve their weight-loss goals, she wishes to know the average weight-loss goal of the individuals in her group. What kind of statistic should Wendy use?

A) reliability
B) population
C) inferential
D) descriptive

30. A community researcher wanted to explore the connection between the number of bathrooms in a house and the sale price of the house. She studied 1750 home sales in an economically diverse, medium-sized city and found that the average sale price went up by $63,000 for each full bath. What is the descriptive statistic in this study?

A) 1750 home sales
B) houses in economically diverse, medium-sized cities
C) number of bathrooms
D) average increase in sale price of $63,000 per bathroom

31. A descriptive statistic is generally defined as:

A) the entire group of interest about which we want to make conclusions.
B) a single number or group of numbers that organize, summarize, and communicate a group of numerical observations.
C) a subset, or smaller collection, of observations from the overall group of interest.
D) using data to make general estimates about the overall group of interest.

32. A medical researcher interested in asthma symptoms wanted to know how symptoms were affected in dry versus humid conditions. The researchers recruited 18 asthma patients to spend four weeks under two conditions: sleeping with a dehumidifier for two weeks to create a "dry" environment and sleeping with a humidifier for the remaining two weeks to create a "humid" environment. Patients were asked to rate their symptoms at regular intervals using a scale from "0 – no symptoms" to "20 – maximum asthma symptoms." The change in asthma symptoms from dry to humid conditions was 5.82, showing a reduction of symptoms in humid conditions. What was the descriptive statistic in this study?

A) change in responses on the scale of 5.82 on average
B) four weeks, with two weeks under each condition
C) 18 asthma patients
D) two sleeping conditions, dry and humid

33. A researcher wanted to determine whether eating sugary cereal for breakfast increased the aggression of second graders during their morning play period. After feeding a group of 20 students sugary cereal for breakfast she observed that, on average, the students committed 4.5 aggressive behaviors during their morning play period. In this example, the sample is:

A) the 4.5 aggressive behaviors.
B) the 20 students the researcher observed.
C) all second graders.
D) all second graders who ate sugary cereal for breakfast.

34. Hsee and Tang (2007) reported the results of a study in which 195 college students completed a happiness scale (from 1 to 7) just before taking a midterm exam. On this scale, 1 corresponded to *very unhappy* and 7 to *very happy*. On average, the students rated their happiness as 6.18. In this study, which of these would require an inferential statistic?

A) the average rating of happiness at 6.18
B) the conclusion that college students, on average, are rather happy prior to taking midterm exams
C) the conclusion that these 195 college students are rather happy prior to taking this midterm exam
D) the 195 college students who completed the happiness scale

35. Inferential statistics allow a researcher to:

A) summarize numerical observations for a population.
B) make inferences about a sample of interest given observations taken on a larger population.
C) make inferences about a population of interest given observations taken on a smaller sample.
D) summarize numerical observations for a sample.

36. Unnithan, Houser, and Fernhall (2006) were interested in whether playing the game Dance Dance Revolution (DDR) met the American College of Sports Medicine recommendations for exercise to improve cardiovascular health. Twenty-two adolescents, 10 of whom were classified as overweight and 12 of whom were not overweight, played DDR for 12 minutes. During the 12 minutes, the researchers measured each participant's heart rate. On average, the researchers found no difference between the heart rates of the two groups. Both groups' heart rates were above the minimum recommended for cardiovascular exercise. What is the sample in this study?

A) the 22 adolescents who participated in the study
B) all adolescents, both overweight and not overweight, who play DDR
C) the average heart rate for an adolescent playing DDR
D) the recommendation by the American College of Sports Medicine

37. Unnithan, Houser, and Fernhall (2006) were interested in whether playing the game Dance Dance Revolution (DDR) met the American College of Sports Medicine recommendations for exercise to improve cardiovascular health. Twenty-two adolescents, 10 of whom were classified as overweight and 12 of whom were not overweight, played DDR for 12 minutes. During the 12 minutes, the researchers measured each participant's heart rate. On average, the researchers found no difference between the heart rates of the two groups. Both groups' heart rates were above the minimum recommended for cardiovascular exercise. Which of these requires an inferential statistic?

A) the recommendation by the American College of Sports Medicine
B) recruiting the sample of 22 adolescents
C) the average heart rate for an adolescent playing DDR
D) the conclusion that adolescents will get cardiovascular benefit from playing DDR

38. A researcher wanted to determine whether eating sugary cereal for breakfast increased the aggression of second graders during their morning play period. After feeding a group of 20 students sugary cereal for breakfast she observed that, on average, the students committed 4.5 aggressive behaviors during their morning play period. In this example, the population is:

A) the 4.5 aggressive behaviors.
B) the 20 students the researcher observed.
C) all second graders.
D) all second graders who eat sugary cereal for breakfast.

39. Unnithan, Houser, and Fernhall (2006) were interested in whether playing the game Dance Dance Revolution (DDR) met the American College of Sports Medicine recommendations for exercise to improve cardiovascular health. Twenty-two adolescents, 10 of whom were classified as overweight and 12 of whom were not overweight, played DDR for 12 minutes. During the 12 minutes, the researchers measured each participant's heart rate. On average, the researchers found no difference between the heart rates of the two groups. Both groups' heart rates were above the minimum recommended for cardiovascular exercise. What is the population in this study?

A) the 22 adolescents who participated in the study
B) all adolescents, both overweight and not overweight, who play DDR
C) the average heart rate for an adolescent playing DDR
D) the recommendation by the American College of Sports Medicine

40. Why do researchers typically study samples rather than populations?

A) Entire populations can be too costly to study or impossible to access.
B) Entire populations are too variable to study.
C) Samples are more representative than their respective populations.
D) Studying a sample is more difficult than studying a population.

41. The statement “100 college-aged students participated in a study examining the relationship between gender and depression” is an example of a(n) _____ in research and statistics.

A) population
B) sample
C) descriptive statistic
D) inferential statistic

42. A community researcher wanted to explore the connection between the number of bathrooms in a house and the sale price of the house. He studied 1750 home sales in an economically diverse, medium-sized city and found that the average sale price went up by $63,000 for each full bath. What is the sample in this study?

A) 1750 home sales
B) houses in economically diverse, medium-sized cities
C) number of bathrooms
D) average increase in sale price of $63,000 per bathroom

43. A community researcher wanted to explore the connection between the number of bathrooms in a house and the sale price of the house. He studied 1750 home sales in an economically diverse, medium-sized city and found that the average sale price went up by $63,000 for each full bath. Which statement involves a logical inferential statistic based on this research?

A) Adding a bathroom to your house will cost $63,000.
B) On average, adding a bathroom to your house can increase the sale price.
C) Houses sell for $63,000 on average.
D) Bathrooms are highly desirable features of houses in medium-sized cities.

44. A community researcher wanted to explore the connection between the number of bathrooms in a house and the sale price of the house. She studied 1750 home sales in an economically diverse, medium-sized city and found that the average sale price went up by $63,000 for each full bath. What is a logical population to which the researcher would want to extend this finding?

A) the 1750 homes involved in the research
B) home sales across the country in which the research was conducted
C) all home sales in diverse, medium-sized cities
D) home sales throughout the last decade

45. A sample is generally defined as:

A) the entire group of interest about which we want to make conclusions.
B) a single number or group of numbers that organize, summarize, and communicate a group of numerical observations.
C) a subset, or smaller collection, of observations from the overall group of interest.
D) using data to make general estimates about the overall group of interest.

46. A population is generally defined as:

A) the entire group of interest about which we want to make conclusions.
B) a single number or group of numbers that organize, summarize, and communicate a group of numerical observations.
C) a subset, or smaller collection, of observations from the overall group of interest.
D) using data to make general estimates about the overall group of interest.

47. An inferential statistic is generally defined as:

A) the entire group of interest about which we want to make conclusions.
B) a single number or group of numbers that organize, summarize, and communicate a group of numerical observations.
C) a subset, or smaller collection, of observations from the overall group of interest.
D) using data to make general estimates about the overall group of interest.

48. A medical researcher interested in asthma symptoms wanted to know how symptoms were affected in dry versus humid conditions. The researchers recruited 18 asthma patients to spend four weeks under two conditions: sleeping with a dehumidifier for two weeks to create a "dry" environment and sleeping with a humidifier for the remaining two weeks to create a "humid" environment. Patients were asked to rate their symptoms at regular intervals using a scale from "0 – no symptoms" to "20 – maximum asthma symptoms." The change in asthma symptoms from dry to humid conditions was 5.82, showing a reduction of symptoms in humid conditions. What was the sample in this study?

A) change in responses on the scale of 5.82 on average
B) four weeks, with two weeks under each condition
C) 18 asthma patients
D) two sleeping conditions, dry and humid

49. A medical researcher interested in asthma symptoms wanted to know how symptoms were affected in dry versus humid conditions. The researchers recruited 18 asthma patients to spend four weeks under two conditions: sleeping with a dehumidifier for two weeks to create a "dry" environment and sleeping with a humidifier for the remaining two weeks to create a "humid" environment. Patients were asked to rate their symptoms at regular intervals using a scale from "0 – no symptoms" to "20 – maximum asthma symptoms." The change in asthma symptoms from dry to humid conditions was 5.82, showing a reduction of symptoms in humid conditions. What is MOST likely the population of interest for this researcher?

A) the patients who participated in the study
B) all asthma sufferers
C) everyone who sleeps
D) patients during the four weeks of the study

50. A medical researcher interested in asthma symptoms wanted to know how symptoms were affected in dry versus humid conditions. The researchers recruited 18 asthma patients to spend four weeks under two conditions: sleeping with a dehumidifier for two weeks to create a "dry" environment and sleeping with a humidifier for the remaining two weeks to create a "humid" environment. Patients were asked to rate their symptoms at regular intervals using a scale from "0 – no symptoms" to "20 – maximum asthma symptoms." The change in asthma symptoms from dry to humid conditions was 5.82, showing a reduction of symptoms in humid conditions. Which statement involves an inferential statistic related to this research finding?

A) Asthma symptoms may be lowered, on average, with humid sleeping conditions.
B) You can expect your asthma symptoms to diminish if you move to a drier climate.
C) Varying your sleeping conditions can affect your health.
D) Asthma symptoms increase when patients sleep with humidifiers.

51. An elementary school teacher is interested in the relation between sugar consumption and activity level in preschool children. The teacher gives 30 preschool children from Preppy Preschool Playland 0 milligrams, 20 milligrams, or 50 milligrams of sucrose (sugar) in a breakfast drink. She then observes their behavior for 30 minutes during their morning outdoor play period and codes their activity level. In this example, the population is:

A) 30 preschool children.
B) the amount of sucrose.
C) all preschool children.
D) activity level.

52. An elementary school teacher is interested in the relation between sugar consumption and activity level in preschool children. The teacher gives 30 preschool children from Preppy Preschool Playland 0 milligrams, 20 milligrams, or 50 milligrams of sucrose (sugar) in a breakfast drink. She then observes their behavior for 30 minutes during their morning outdoor play period and codes their activity level. In this example, the sample is:

A) 30 preschool children.
B) the amount of sucrose.
C) all preschool children.
D) activity level.

53. Variables are:

A) specific values (in whole numbers) that represent an individual's category membership.
B) the value of physical, attitudinal, or behavioral characteristics for a given individual.
C) hypothetical ideas that have been developed to describe and explain human behavior.
D) observations of physical, attitudinal, or behavioral characteristics that can take on different values.

54. A variable that consists of separate specific categories for which there are no values between categories is:

A) discrete.
B) ratio.
C) continuous.
D) confounding.

55. Which of these is NOT a variable?

A) students' heights
B) students' scores on a statistic exam
C) maximum number of points possible on a 100-point exam
D) students' scores on an empathy scale

56. A variable for which there is an infinite number of values between any two points on the scale is:

A) discrete.
B) ratio.
C) continuous.
D) confounding.

57. Which variables are always discrete?

A) ratio and ordinal
B) ratio and interval
C) nominal and ordinal
D) nominal and interval

58. Emily is a student at a large university. When visiting professors during their office hours, she has noticed that many have refrigerators in their offices. She decides to survey 80 faculty and count the total number of refrigerators they have. What is the variable in this study?

A) the university where the data are collected
B) number of faculty, 80
C) total number of refrigerators
D) location of refrigerators

59. Emily is a student at a large university. When visiting professors during their office hours, she has noticed that many have refrigerators in their offices. She decides to survey 80 faculty and count the total number of refrigerators they have. What type of observation is she making?

A) discrete
B) continuous
C) discrete and ordinal
D) continuous and interval

60. When you read your college textbooks, you may sometimes find errors in them. If you track the number of errors based on the edition of the textbook, you might find that 1st editions have more errors than 3rd, 5th, and 10th editions. What type of variable is the edition of the text you are assessing?

A) nominal
B) ordinal
C) scale
D) dependent

61. A five-star rating system for movies is a(n) _____ variable.

A) nominal
B) ordinal
C) interval
D) ratio

62. A person's political affiliation is a(n) _____ variable.

A) nominal
B) ordinal
C) interval
D) ratio

63. The United States Department of Homeland Security Threat Advisory System measures threat as severe, high, elevated, guarded, or low. In this system, threat is:

A) continuous and ratio.
B) continuous and interval.
C) discrete and interval.
D) discrete and ordinal.

64. Eye color, assessed as blue, green, hazel, brown, and other, as a variable is measured on a(n) _____ scale.

A) nominal
B) ordinal
C) interval
D) ratio

65. In a student election, five people run for student body president. The votes are tallied to create a list of candidates from most to least popular. The number of votes is then removed so that a list of candidates from most to least popular is presented. This is a(n) _____ variable.

A) nominal
B) ordinal
C) interval
D) ratio

66. The number of times a person eats fast food each week is:

A) discrete and ratio.
B) continuous and interval.
C) discrete and interval.
D) continuous and ordinal.

67. A person's grade point average on a scale from 0 to 4.0 is a(n) _____ variable.

A) nominal
B) ordinal
C) interval
D) ratio

68. The amount of food a person eats each week (as measured in ounces) is:
A) continuous and ratio.
B) continuous and interval.
C) discrete and interval.
D) continuous and ordinal.

69. The measurement of the performance of runners in a race based on their finishing places is a(n) _____ variable. The measurement of the performance of runners in a race based on their times to complete the race is a(n) _____ variable.
A) ratio; interval
B) ordinal; ratio
C) ordinal; nominal
D) nominal; ordinal

70. In a student election, five people run for student body president. The votes are tallied to create a list of candidates from most to least popular. When the number of votes are actually presented, this is a(n) _____ variable.
A) nominal
B) ordinal
C) interval
D) ratio

71. Imagine that a variable "sensitivity to others" is measured from 10 (low) to 80 (high). Although it is possible to have low sensitivity to others, it is not conceptually possible to have no sensitivity at all. What type of variable is this MOST likely to be?
A) nominal
B) ordinal
C) interval
D) ratio

72. The number of aces in tennis matches is calculated for 50 elite tennis players. What type of variable is number of aces?
A) nominal
B) ordinal
C) interval
D) ratio

73. The difference between an interval and a ratio variable is that:

A) ratio scales indicate only difference, but interval scales indicate difference and order.
B) interval scales indicate only difference, but ratio scales indicate difference and order.
C) on a ratio scale, the number 0 corresponds to an absence of the quality, but this is not true for an interval scale.
D) there are equal intervals between points on an interval scale, but this is not true for a ratio scale.

74. Which types of variables are considered scale variables by statistical computing packages such as SPSS?

A) continuous and ratio
B) continuous and interval
C) discrete and interval
D) ratio and interval

75. _____ variables are almost always continuous.

A) Ordinal
B) Interval
C) Nominal
D) Ratio

76. In 2010, there was an interesting lawsuit about bagels. A company claimed to have created a new way to recreate "Brooklyn style" bagels and then reported that another bagel producer stole its recipe. A researcher wonders if bagel sales might have been affected simply by the story making the national news, so she tracks total bagel sales in dollars for one year before and after the news story hits. What type of variable is total bagel sales?

A) nominal
B) ordinal
C) scale
D) independent

77. When you read your college textbooks, you may sometimes find errors in them. If you track the number of errors based on the edition of the textbook, you might find that 1st editions have more errors than 3rd, 5th, and 10th editions. What type of variable is the number of errors found?

A) nominal
B) ordinal
C) scale
D) independent

78. A *New York Times* article published on April 24, 2007, reported the research of Dr. Vallortigara, a neuroscientist at the University of Trieste, Italy. In this study, Dr. Vallortigara assessed whether a dog's tail wags in a preferred direction in response to positive as opposed to negative stimuli. First, Dr. Vallortigara recruited 30 dogs that were family pets. While filming a dog's tail from above, he allowed the dog to view (through a slot in its cage) its owner, an unfamiliar human, a cat, and an unfamiliar dominant dog. The study found that dogs' tails wagged to the right for the owner and to the left for the unfamiliar dominant dog. What type of measure was the independent variable in this study?

A) nominal
B) ordinal
C) interval
D) ratio

79. A *New York Times* article published on April 24, 2007, reported the research of Dr. Vallortigara, a neuroscientist at the University of Trieste, Italy. In this study, Dr. Vallortigara assessed whether a dog's tail wags in a preferred direction in response to positive as opposed to negative stimuli. First, Dr. Vallortigara recruited 30 dogs that were family pets. While filming a dog's tail from above, he allowed the dog to view (through a slot in its cage) its owner, an unfamiliar human, a cat, and an unfamiliar dominant dog. The study found that dogs' tails wagged to the right for the owner and to the left for the unfamiliar dominant dog. What type of measure was the dependent variable in this study?

A) nominal
B) ordinal
C) interval
D) ratio

80. The term *level* refers to:

A) a variable that is manipulated to determine its effects on another variable.
B) the discrete values that a variable can take on.
C) a situation in which two variables have the same value.
D) a situation in which there are no confounding variables.

81. The variable that is manipulated or observed in order to determine its effects on another variable is the _____ variable.

A) scale
B) independent
C) dependent
D) confounding

82. A researcher was interested in the effects of gender on attitudes toward women in leadership positions. The researcher surveyed a group of individuals, 12 of whom were men and 12 of whom were women. In this example, *men* is a(n) _____ variable.

A) level of the independent
B) independent
C) dependent
D) confounding

83. A researcher was interested in the effects of gender on attitudes toward women in leadership positions. The researcher surveyed a group of individuals, 12 of whom were men and 12 of whom were women. In this example, *gender* is the _____ variable.

A) level of the independent
B) independent
C) dependent
D) confounding

84. A *New York Times* article published on April 24, 2007, reported the research of Dr. Vallortigara, a neuroscientist at the University of Trieste, Italy. In this study, Dr. Vallortigara assessed whether a dog's tail wags in a preferred direction in response to positive as opposed to negative stimuli. First Dr. Vallortigara recruited 30 dogs that were family pets. While filming a dog's tail from above, he allowed the dog to view (through a slot in its cage) its owner, an unfamiliar human, a cat, and an unfamiliar dominant dog. The study found that dogs' tails wagged to the right for the owner and to the left for the unfamiliar dominant dog. What is the independent variable in this study?

A) finding that dogs' tails went rightward for the owner and leftward for an unfamiliar dog
B) the 30 dogs recruited for the study
C) how far each dog wagged its tail to the right or left
D) the type of visual stimulus provided to the dog

85. The outcome variable that we expect to change with changes in the independent variable is the _____ variable.

A) confounding
B) noise
C) dependent
D) scale

86. A researcher was interested in the effects of gender on attitudes toward women in leadership positions. The researcher surveyed a group of individuals, 12 of whom were men and 12 of whom were women. In this example, what is the dependent variable?

A) the 12 men in the study
B) the 12 women in the study
C) gender of the participants
D) participants' attitudes toward women in leadership positions

87. Dr. Feldman was interested in the effect of Valium on motor performance. He injected 30 rats in the experimental group with a small amount of Valium and 30 rats in the control group with saline solution. Following injection, he measured the rate of bar pressing by both groups of rats. On average, rats in the control group had 800 presses per hour and rats in the experimental group had 715 presses per hour. The same testing box was used for both groups of rats, but different student assistants tested the control and experimental groups. In this example, having two different student assistants test the two groups is a(n) _____ variable.

A) confounding
B) ordinal
C) independent
D) dependent

88. A *New York Times* article published on April 24, 2007, reported the research of Dr. Vallortigara, a neuroscientist at the University of Trieste, Italy. In this study, Dr. Vallortigara assessed whether a dog's tail wags in a preferred direction in response to positive as opposed to negative stimuli. First Dr. Vallortigara recruited 30 dogs that were family pets. While filming a dog's tail from above he allowed the dog to view (through a slot in its cage) its owner, an unfamiliar human, a cat, and an unfamiliar dominant dog. The study found that dogs' tails wagged to the right for the owner and to the left for the unfamiliar dominant dog. What is the dependent variable in this study?

A) finding that dogs' tails went rightward for the owner and leftward for an unfamiliar dog
B) the 30 dogs that were recruited for the study
C) whether the dog wagged its tail to the right or left
D) the type of visual stimulus provided to the dog

89. A researcher studies length of time in college, first through fourth year, and its relation to academic motivation. To get the most detail out of her measures, she assesses each student in both the fall and spring semesters of each of their four years in school. She finds that students have increasingly higher motivation from their first semester to their seventh semester (the start of their fourth year), with a trailing off in the last semester. What is the independent variable in this study?

A) year in school
B) semester in school
C) academic motivation
D) time of year in which the assessment was completed

90. A researcher studies year in college, first through fourth year, and its relation to academic motivation. To get the most detail out of her measures, she assesses each student in both the fall and spring semesters of each their four years in school. She finds that students have increasingly higher motivation from their first to fourth year, with a trailing off in the last semester. What is the dependent variable in this study?

A) year in school
B) semester in school
C) academic motivation
D) time of year in which the assessment was completed

91. In the Coke/Pepsi Challenge, tasters try to identify regular and diet versions of these popular beverages under “blind” conditions, where they can't see the two products. How many levels are there to the independent variable?

A) 1
B) 2
C) 4
D) 8

92. In 2010, there was an interesting lawsuit about bagels. A company claimed to have created a new way to recreate “Brooklyn style” bagels and then reported that another bagel producer stole its recipe. A researcher wonders if bagel sales might have been affected simply by the story making the national news, so she tracks total bagel sales in dollars for one year before and after the news story hits. What is the independent variable in this study?

A) the types of bagels sold
B) total sales
C) the news story
D) the lawsuit

93. In 2010, there was an interesting lawsuit about bagels. A company claimed to have created a new way to recreate “Brooklyn style” bagels and then reported that another bagel producer stole its recipe. A researcher wonders if bagel sales might have been affected simply by the story making the national news, so she tracks total bagel sales in dollars for one year before and after the news story hits. What is the dependent variable in this study?

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94. A weight-management researcher was interested in whether the size of breakfast could deter overall food consumption throughout the rest of the day. He creates two breakfast groups, a 350-calorie breakfast and a 750-calorie breakfast, assigns six participants to each group, and tracks their total calories eaten in one day. Because of the detailed attention needed to accurately interview participants about their eating, he works with the high-calorie group and has his assistant interview the low-calorie group. What is the independent variable in this study?

A) total calories consumed
B) the breakfasts
C) weight loss experienced in the day
D) the researcher conducting the interviews

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A) total calories consumed
B) the low- and high-calorie breakfasts
C) weight loss experienced in the day
D) the researcher conducting the interviews

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A) 1
B) 2
C) 6
D) 12

98. An elementary school teacher is interested in the relation between sugar consumption and activity level in preschool children. The teacher gives 30 preschool children from Preppy Preschool Playland 0 milligrams, 20 milligrams, or 50 milligrams of sucrose (sugar) in a breakfast drink. She then observes their behavior for 30 minutes during their morning outdoor play period and codes their activity level. In this example, the independent variable is:

A) 30 preschool children.
B) the amount of sucrose.
C) all preschool children.
D) activity level.

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C) all preschool children.
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100. Prof. Martin was interested in which of two popular statistics textbooks (*Statistics: It Will Change Your Life* and *Statistics: Bigger, Better, Stronger*) was better for students. Prof. Martin compared the two texts by assigning one text to a section of statistics taught by Prof. Miller from 10 to 11 a.m. on Monday, Wednesday, and Friday, and the other text to a section of statistics taught by Prof. Mervin from 7 to 10 p.m. on Wednesday evenings. At the end of the term, all students took the same comprehensive test. Students to whom *Statistics: Bigger, Better, Stronger* was assigned performed better on the test than did students to whom *Statistics: It Will Change Your Life* was assigned. Therefore, Prof. Martin concluded that the former textbook was the better one. What was the independent variable in this study?

A) statistics textbooks
B) professors
C) comprehensive test
D) students

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A) statistics textbooks
B) professors
C) comprehensive test scores
D) students

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A) number of classes per week
B) professors teaching course
C) comprehensive test scores
D) time of day course is taught

103. When a test measures what it is intended to measure, the test is said to be:

A) a scale variable.
B) continuous.
C) reliable.
D) valid.

104. Jonathon has taken the GRE three times. Every time he takes it he gets a 500 on the math section. This implies that:

A) the GRE is a valid test.
B) the GRE is a reliable test.
C) the GRE is neither a valid nor a reliable test.
D) Jonathon is not motivated to improve his score on the math section.

105. The Beck Depression Inventory is a scale intended to measure depression levels, with higher scores indicating higher levels of depression. If the Beck test is a valid measure of depression, we would expect that:

A) the results of the inventory could not be consistently replicated.
B) a person's score on the inventory would not be related to his or her level of depression.
C) people who get higher scores on the inventory would be more depressed than people who get lower scores.
D) people who get lower scores on the inventory would be more depressed than people who get higher scores.

106. The Consideration of Future Consequences scale is intended to measure the extent to which an individual considers the future when making immediate choices. If the scale is a reliable measure, we would expect that:

A) a person's score on the scale might change from day to day.
B) a person's score on the scale would be relatively stable from day to day.
C) people with higher scores on the scale would have a greater tendency to consider future consequences.
D) people with lower scores on the scale would have a lower tendency to consider future consequences.

107. People debate whether standardized tests, such as the ACT and SAT, are predictors of college performance. This is essentially a debate about:

A) validity.
B) reliability.
C) confounding variables.
D) hypothesis testing.

108. Clayton has a history of depression. As part of his self-care, he takes a depression assessment every six months. His results tend to be very consistent, except when he is in a serious depression and his results show elevated levels of depression. The tendency for his results to be consistent supports the _____ of the assessment.

A) validity
B) reliability
C) continuous nature
D) confounding nature

109. Clayton has a history of depression. As part of his self-care, he takes a depression assessment every six months. His results tend to be very consistent, except when he is in a serious depression and his results show elevated levels of depression. The fact that Clayton's results vary with his changes in mood, mirroring his depression levels, supports the _____ of the assessment.

A) validity
B) reliability
C) continuous nature
D) confounding nature

110. Hypothesis testing refers to:

A) drawing conclusions about whether a particular relation between variables is supported by the evidence.
B) the direct manipulation of an independent variable in an attempt to assess its effects on a dependent variable.
C) summarizing data using descriptive statistics.
D) measuring a variable of interest using an operational definition.

111. In an experiment designed to assess the effects of disclosure of ingredients on the experience of taste, Lee, Frederick, and Ariely (2006) approached patrons at a local pub and asked them to taste and rate a new beer: the MIT Brew. Some participants were told about the secret ingredient in the beer (a few drops of balsamic vinegar) either before tasting (*before* condition) or after tasting but before rating (*after* condition). Other participants were not told anything regarding the secret ingredient (*not told* condition). Which aspect of this study is an operational definition of the dependent variable?

A) sample of patrons at the local pub
B) disclosure of the ingredients
C) experience of taste
D) participants' responses on the taste rating scale

112. An operational definition is one that:
A) can be flexibly implemented by any researcher.
B) defines a variable in terms of observable and measurable behaviors.
C) defines a variable in terms of a hypothetical construct.
D) is used to determine the independent variable of an experiment.

113. In 2000, Bartels and Zeki performed a study in which they hypothesized that there may be special pathways in the brain that support the feeling of romantic love. To test their hypothesis they recruited volunteers who reported themselves to be "truly, deeply, and madly in love." They then used brain imaging methods to determine which areas of the volunteers' brains were active when looking at pictures of their loved one. How did these researchers operationally define romantic love?
A) They asked volunteers if they were in a romantic relationship.
B) They gave volunteers a Depth of Love scale.
C) They used self-reports of volunteers who claimed to be "truly, deeply, and madly in love."
D) These researchers did not operationally define romantic love.

114. A correlation measures the relationship among _____ or more variables.
A) two
B) three
C) four
D) five

115. Controlling for _____ variables permits researchers to make statements about cause–effect relationships between variables.
A) discrete
B) reliable
C) scale
D) confounding

116. A researcher is interested in the effectiveness of natural remedies for allergies. The researcher randomly assigns to 30 allergy sufferers a treatment of herbal tea, homeopathic doses of the allergens, or a traditional antihistamine. What type of research design has the researcher employed?
A) within-groups
B) experimental
C) correlational
D) operational research

117. Random assignment refers to a situation in which:
A) participants self-select into a particular condition in the study.
B) the experimenter randomly determines whether to use a single-blind or double-blind research design.
C) every person in the population has an equal chance of being selected for participation in the study.
D) every participant in the study has an equal chance of being assigned to any condition or level of the independent variable.

118. The purpose of random assignment to groups is to:
A) control confounding variables.
B) ensure that you have a representative sample.
C) control extraneous variables.
D) reduce the noise in your study.

119. What research technique is crucial to drawing the conclusion that the independent variable caused the change in the dependent variable?
A) random selection
B) random assignment to groups
C) double-blind experiment
D) quasi-experiment

120. Why does random assignment help control for confounding variables?
A) Random assignment ensures that participants in a study are properly motivated to perform the experimental task that will be required of them.
B) Random assignment eliminates individual differences by removing individuals with the same characteristics from the study and only using individuals who have different characteristics.
C) By randomly assigning people to groups, individual differences that may influence the dependent variable are randomly distributed throughout the conditions, rather than being systematically related to the independent variable.
D) By randomly assigning people to groups, all individuals with similar characteristics are grouped together in the same condition.

121. A *New York Times* article published on April 24, 2007, reported the research of Dr. Vallortigara, a neuroscientist at the University of Trieste, Italy. In this study, Dr. Vallortigara assessed whether a dog's tail wags in a preferred direction in response to positive as opposed to negative stimuli. First Dr. Vallortigara recruited 30 dogs that were family pets. While filming a dog's tail from above, he allowed the dog to view (through a slot in its cage) its owner, an unfamiliar human, a cat, and an unfamiliar dominant dog. The study found that dogs' tails wagged to the right for the owner and to the left for the unfamiliar dominant dog. What type of research design did Dr. Vallortigara employ?

A) between-groups
B) within-groups
C) non-experimental
D) quasi-experimental

122. A researcher wants to assess well-being among dog and cat owners. She administers a well-being assessment to 125 dog owners and 163 cat owners. What type of research design is being used?

A) experimental research
B) random assignment design
C) between-groups
D) within-groups

123. Reading times are collected for bilingual participants, comparing their reading speed across their two languages. What type of research design would MOST likely be used in this study?

A) experimental research
B) random assignment design
C) between-groups
D) within-groups

124. An outlier is defined as:

A) data that lies outside of the desired range.
B) a score that is extreme relative to the other data in a sample.
C) an error in data collection and entry.
D) a person who gives incorrect information.

125. Appropriate treatment of outliers can involve:

A) examining them to see what they reveal about the variables being studied.
B) deleting them so that they do not affect statistical analyses.
C) studying them rather than the remainder of the data.
D) changing axes on graphs so that they cannot be seen.

126. Interesting things can be learned from examining scores that do not fit with the overall pattern of data. This is known as:
A) the exception to the rule analysis.
B) trend analysis.
C) outlier analysis.
D) analysis of the exception.

127. Outlier analysis involves:
A) analyzing existing records, such as newspaper reports or formal reports published by the government.
B) making inferences from the pattern of performance exhibited by most of the participants in the study.
C) summarizing the patterns exhibited by most of the participants in the study.
D) examining observations that do not fit the overall pattern of data in an effort to understand the factors that influence the dependent variable.

128. Inferential statistics summarize a group, while descriptive statistics help us make estimates about a larger population.
A) True
B) False

129. Descriptive statistics summarize a group, while inferential statistics help us make estimates about a larger population.
A) True
B) False

130. Holiday spending for a major electronics store is calculated for both its store-based sales (2.3 million) and online sales (1.4 million). These are both descriptive statistics.
A) True
B) False

131. A population is necessarily smaller than its respective sample.
A) True
B) False

132. A sample is necessarily smaller than its respective population.
A) True
B) False

133. Discrete observations can typically take on more values than continuous observations.
A) True
B) False

134. Continuous observations can typically take on more values than discrete observations.
A) True
B) False

135. Mattress size, including twin, full, queen, king, and California king, is a nominal variable.
A) True
B) False

136. Mattress size, including twin, full, queen, king, and California king, is an ordinal variable.
A) True
B) False

137. Square footage, such as that used to describe home size, is a ratio variable.
A) True
B) False

138. Square footage, such as that used to describe home size, is an interval variable.
A) True
B) False

139. Confounding variables are connected to the dependent variable such that we cannot know which variable causes the effect we observe.
A) True
B) False

140. Confounding variables are connected to the independent variable such that we cannot know which variable causes the effect we observe.
A) True
B) False

141. A test with poor validity cannot have good reliability.
A) True
B) False

142. A test with low reliability cannot have good validity.
A) True
B) False

143. If a test is reliable, then we know that it is valid.
A) True
B) False

144. In a between-groups research design, a participant experiences one and only one of the levels of the independent variable.
A) True
B) False

145. In a between-groups research design, a participant experiences more than one of the levels of the independent variable.
A) True
B) False

146. In a within-groups research design, a participant experiences more than one of the levels of the independent variable.
A) True
B) False

147. In a within-groups research design, a participant experiences only one of the levels of the independent variable.
A) True
B) False

148. In a between-groups research design, a participant experiences more than one of the levels of the dependent variable.
A) True
B) False

149. In a between-groups research design, a participant experiences one and only one of the levels of the dependent variable.
A) True
B) False

150. In a within-groups research design, a participant experiences more than one of the levels of the dependent variable.
A) True
B) False

151. In a within-groups research design, a participant experiences only one of the levels of the dependent variable.
A) True
B) False

152. Outliers compromise research, including the ability to learn interesting things about the variables.
A) True
B) False

153. Outliers are typically nuisances to a study and should immediately be excluded without further analysis.
A) True
B) False

154. Which "branch" of statistics uses numerical observations and incorporates them into an organized and informative summary of the data?
A) inferential
B) descriptive
C) population
D) sample

155. In order to assess the effect of pet ownership on health, a researcher surveys 150 people who own pets and 150 people who do not own pets. The sample being studied is:

A) all pet owners.
B) the survey being used.
C) 150 pet owners.
D) 300 people.

156. There are three different types of Olympic medals: gold, silver, and bronze. Which variable describes the different types of Olympic medals?

A) nominal
B) ordinal
C) interval
D) ratio

157. Variables that can take on only certain numbers such as whole numbers are:

A) ordinal.
B) ratio.
C) continuous.
D) discrete.

158. Most evaluations of teaching are done on five-point scales from strongly disagree (1) to strongly agree (5), or very unsatisfied (1) to very satisfied (5). These response options are best considered to be measured on a(n) _____ scale.

A) nominal
B) ordinal
C) interval
D) ratio

159. Continuous observations are related to scale variables as _____ observations are related to nominal and ordinal variable(s).

A) discrete
B) ratio
C) valid
D) reliable

160. In the famous Zimbardo prison study, Stanford students were assigned the role of either a prisoner or a guard so that the experimenters could examine prison life behaviors and interactions. The experiment was intended to run for two weeks but was stopped after only six days because of the brutal behavior of the guards and the depression of the prisoners. What was the independent variable in this study?

A) participants' behaviors
B) depression
C) role assigned to student
D) length of the study

161. Matthew is interested in measuring whether there is a difference in time spent sleeping at night in a given week between elementary school–aged children and high school–aged students. In this study, the independent variable is MOST likely to be:

A) time spent sleeping.
B) time of day.
C) age.
D) a given week.

162. Matthew is interested in measuring whether there is a difference in time spent sleeping at night in a given week between elementary school–aged children and high school–aged students. In this study, the dependent variable is MOST likely to be:

A) time spent sleeping.
B) time of day.
C) age.
D) a given week.

163. A variable that is systematically linked with the factor a researcher believes is causing the overall effect in your research is called the _____ variable. The presence of such a variable can prevent the researcher from knowing what is really causing the effect.

A) independent
B) dependent
C) confounding
D) interfering

164. A reliable measure:
A) is consistent.
B) measures what it was intended to measure.
C) predicts actual behavior.
D) co-varies with the independent variable.

165. Victor noticed that every time he ate cheese or drank milk he had an upset stomach afterward. He concluded that he was probably lactose intolerant and decided to stop eating dairy to see if he felt better. This is an example of:
A) hypothesis testing.
B) reliability.
C) operational definitions.
D) validity.

166. Maria wants to know if identical twins raised in different environments have different IQ scores. What type of research design is NOT available for Maria to use because she cannot randomly assign the participants?
A) non-experimental
B) between-groups
C) correlational
D) experimental

167. In which type of research design does each participant experience all levels of the independent variable?
A) non-experimental
B) between-groups
C) correlational
D) within-groups

168. What is the term for studies designed to examine the few participants who are very different from the majority of other participants?
A) outlier analysis
B) between-groups design
C) within-groups design
D) archival studies

169. College students at 20 campuses around the country were polled to find out how many students own MP3 players. The number of MP3 owners at one campus represents a(n) _____ statistic.

A) population
B) descriptive
C) inferential
D) sample

170. College students at 20 campuses around the country were polled to find out how many students own MP3 players. This small representative group of students is called a:

A) population.
B) median.
C) mode.
D) sample.

171. To build a sample, the U.S. Census records the number of people in a household. What type of data is this?

A) construct
B) hypothesis
C) discrete
D) continuous

172. The type of car you drive is which type of variable?

A) nominal
B) ordinal
C) interval
D) ratio

173. The total number of Olympic medals won by a country is an example of which type of variable?

A) nominal
B) ordinal
C) interval
D) ratio

174. The number of children per household on the U.S. Census is an example of which type of variable?

A) nominal
B) ordinal
C) interval
D) ratio

175. Psychologists studying infant memory want to determine at what age babies can remember specific events. An experimenter uses several puppets to demonstrate a series of actions while the infant watches. After a delay, the experimenter records how many of the actions the child imitates when playing with the puppets. The dependent variable is the:

A) number of imitated actions.
B) type of puppet used by the experimenter.
C) activity level of the child.
D) length of the experiment.

176. A popular sports drink company sampled 20 people who drink its product regularly and found that they performed better during a physical test than did those who do not drink the product regularly. What might be a possible confound in the study?

A) The sample size is small.
B) It rained on the day of the physical test.
C) Regular drinkers of sports drinks may be more athletic than those who are not.
D) The company funding the test was biased since it sells sports drinks.

177. A researcher was interested in assessing whether a new medication had negative side effects on reaction time. He performed an experiment on a group of rats. One group of rats received the medication, and the other group of rats did not. The researcher then measured reaction time differences between the two groups on a series of tasks. In this experiment, the independent variable is:

A) reaction time.
B) tasks.
C) rats.
D) medication.

178. A researcher was interested in assessing whether a new medication had negative side effects on reaction time. He performed an experiment on a group of rats. One group of rats received the medication, and the other group of rats did not. He then measured reaction time differences between the two groups on a series of tasks. In this experiment, the dependent variable is:

A) reaction time.
B) tasks.
C) rats.
D) medication.

179. One reason for doing correlational research is to evaluate the relationship between two variables that are related to each other either positively or negatively. However, a correlation is vulnerable to what variable, which systematically co-varies with the variable of interest?

A) independent
B) confounding
C) dependent
D) interval

180. An assessment that produces the same results each time it is administered is said to be _____, even though it may not be measuring what we are interested in studying.

A) reliable
B) valid
C) confounded
D) experimental

181. The CDC is testing the effectiveness of a recent campaign promoting a healthy lifestyle. What is the best operational definition for *healthy lifestyle*?

A) Eat right and stay fit.
B) Watch your weight and make efforts to lose weight if you are overweight or obese.
C) Eat 5 servings of fruits/vegetables and be physically active for 30 minutes or more daily.
D) Take care of yourself so you can live to be 100.

182. Lawrence is testing a series of new commercials on a sample audience for an advertising company. He wants to see which of 10 commercials receives the highest rating from audiences, and he wants to use a different audience for each commercial. What design should Lawrence use?

A) correlational
B) repeated-measures
C) within-groups
D) between-groups

183. Would an analysis of outliers provide useful information even though they are not representative of the majority of participants?

A) yes, because it may reveal another factor that affects the dependent variable
B) yes, but only because they need to be explained as noise
C) no, because outliers skew the main results in a study
D) no, because you should always discard the outliers in a data set

Answer Key

1. (a) The population is male students; (b) the sample is the 60 male students who participated in the study; (c) the independent variable is the time that appeared on the clock; (d) the levels of the independent variable were correct, slow, and fast; (e) the dependent variable was the amount of crackers eaten by each student in grams; (f) there are three descriptive statistics provided: the means of each group—20 grams for the slow group, 30 grams for the correct group, and 40 grams for the fast group; (g) one could infer that male students in general eat more when they believe it to be past their dinner hour.
2. (a) The population is all college students just about to take a midterm exam; (b) the sample is the 195 college students selected for this study; (c) the dependent variable is the student's rating on the happiness scale; and (d) the descriptive statistic is the average of the happiness ratings, which is 6.18.
3. (a) The population is all dogs that are family pets; (b) the sample is 30 dogs selected for this study; (c) the independent variable is the type of visual stimulus the dog was allowed to see; (d) the levels of the independent variable are owner, unfamiliar human, a cat, and an unfamiliar dominant dog; (e) the dependent variable is the direction in which the dog wagged its tail.
4. (a) The population is all preschool children; (b) the sample is the 30 preschool children who the teacher studied; (c) the independent variable is the amount of sucrose given to the children; (d) the levels of the independent variable are 0 milligrams, 20 milligrams, and 50 milligrams; (e) the dependent variable is each child's activity level.
5. (a) The population is people who are patrons of pubs; (b) the sample is patrons approached in this study; (c) the independent variable is whether the patron was told about the secret ingredient in the MIT Brew; (d) the levels of the independent variable are told before, told after, or not told; (e) the dependent variable is the patron's taste rating for the beer.
6. There are several possible confounding variables that students may identify. One confound is the time at which the sections of the class are taught: one in the evening and the other in the morning. A second confound is the distribution of the class sections: one meets once a week, the other three times a week. A third confound is that different instructors taught each of the courses. A fourth confound is the time of day and length of time which the class is taught at one time: mornings for one hour, evenings for three hours.
7. Operational definitions are needed for the terms *thinking ability* and *educational success.* This is because the variables do not have specific definitions. An example of operational definitions that could be used in this study can be seen in the following research question: What is the relationship between IQ scores on an intelligence scale (operational definition for thinking ability) and GPA (operational definition for educational success)? Another example: It is hypothesized that problem-solving scores on a standardized test (operational definition for thinking ability) will impact grades in an engineering course (operational definition for educational success).
8. In a within-groups design all participants are exposed to all levels of the independent variable, but in a between-groups design each participant experiences only one level of the independent variable. One advantage to the within-groups design is that it requires

fewer participants. If all the participants can participate in all conditions of the study, fewer individuals need to be recruited. Another advantage to the within-groups design is that it allows each participant to serve as their own baseline or control, against which we can measure any change across the various levels. One disadvantage to the within-groups study is order effects. By virtue of having participated in one condition of the study, participants may change their response in subsequent conditions. Another disadvantage to the within-groups study is carryover effects. Because the participants are in more than condition, the impact of one condition may carry over into the next condition, either compounding the effect or creating a unique effect. The between-groups design does not have these problems because each participant experiences only one of the conditions.

9. There are situations where random assignment to groups may not be available, which makes the use of a correlational design more practical because it has fewer restrictions. In correlational research, we do not have to manipulate any variables but only measure them and look for relations (correlations) between them. Also, sometimes we cannot conduct experiments because of ethical safeguards.
10. An outlier is any data point that is very high or low relative to the rest of the data. Mark's monthly expenses are described as very high compared to the other consumer data, so his expenses can be considered to be outlier data. Outlier analysis involves close examination of those exceptional scores to determine what might be influencing their value. In Mark's case, he might want to consider what other factors could influence the dependent variable, monthly expenses. For example, his behaviors that result in high heating costs, such as sleeping with a window slightly open at night, might be a contributing factor. Also, the quality of his home insulation, windows, and other factors could be the cause of his high costs.
11. descriptive
12. inferential
13. ordinal
14. nominal
15. more
16. scale variable
17. levels, categories
18. independent
19. confounding
20. valid
21. reliable
22. Hypothesis testing
23. correlated
24. within-groups
25. between-groups
26. outlier
27. outliers
28. A
29. D
30. D
31. B

32. A
33. B
34. B
35. C
36. A
37. D
38. D
39. B
40. A
41. B
42. A
43. B
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180. A
181. C
182. D
183. A