Chapter 02
The Scientific Method

Short Answer Questions

1. *(p. 29-31)* How is the empirical approach that is used in the scientific method different from a nonscientific (everyday) approach to knowledge?

The empirical approach involves the use of evidence based on direct observation and experimentation to determine what is true. A nonscientific (everyday) approach relies primarily on intuition and casual (unsystematic) observation to decide what is true.

Level: Factual

2. *(p. 38)* Distinguish between the reliability and the validity of a measurement and provide an example of a reliable measurement that may not be valid.

The reliability of a measure is indicated by its consistency; for example, when observers agree in their observations, the measurement is said to be reliable. Validity refers to the truthfulness of a measure—a valid measure of a construct measures what it claims to measure. An example of a reliable measure that may not be valid is a scale that provides the same weight each time a person steps on it, but is five pounds off. Another example is from research which indicates that raters agree on their ratings of trustworthiness when judging photos of individuals (reliability), but those ratings were unrelated to whether students cheated on a test (not valid).

Level: Factual

3. *(p. 42-44)* Distinguish between the nomothetic approach and the idiographic approach in descriptions of psychological phenomena.

The nomothetic approach is used to seek broad generalizations and universal laws (i.e., what "in general" is true) by studying large numbers of participants of a group and focusing on the "average" performance of the group. The idiographic approach is used to focus on the uniqueness of the individual by studying an individual intensively using single-case research.

Level: Factual

4. *(p. 47-48)* Explain how an experiment is used to understand the cause of a phenomenon by describing the three conditions for causal inference an experiment meets.

Researchers conduct an experiment when they manipulate an independent variable and observe the effects of the manipulation on a dependent variable measure. When differences on the dependent variable are observed for the conditions of the independent variable, covariation is met (i.e., different scores on the dependent variable covary with different conditions of the independent variable). In addition, because differences on the dependent variable are observed after the independent variable manipulation, the second condition for causal inference-time-order relationship-is met. When the experiment is free of confoundings the researcher is able to eliminate alternative explanations for the outcome, the third condition for causal inference.

Level: Conceptual

5. *(p. 49)* Describe the differences between basic and applied research.

In basic research the research psychologist seeks primarily to understand behavior and mental processes. Basic research is typically carried out in a laboratory using controlled experiments and is usually done with the goal of testing a theory about behavior. It is, in a sense, "seeking knowledge for its own sake." Applied research is conducted in order to improve people's lives and often is carried out in nonlaboratory settings (e.g., schools, workplaces). Applied research often builds upon findings from basic research; these findings are applied in natural settings with the scientific goal of creating change.

Level: Factual

Multiple Choice Questions

6. *(p. 29)* People's tendency to select news programs that do not challenge their attitudes or beliefs is explained by
A. hypothesis testing.
B. confirmation bias.
C. controlled observation.
D. a skeptical attitude.

Level: Applied

7. *(p. 29)* Which of the following is a cognitive error that can cause confirmation bias because we perceive a relationship when none exists?
A. subjective reporting
B. covariation of cause and effect
C. spurious relationship
D. illusory correlation

Level: Factual

8. *(p. 30)* The empirical approach emphasizes
A. direct observation and experimentation.
B. intuition and skepticism.
C. reliability and confirmation.
D. control and qualitative analysis.

Level: Factual

9. *(p. 30)* Which of the following is a characteristic of the scientific method?
A. confirmation bias
B. intuitive definitions
C. systematic observation
D. circular hypotheses

Level: Conceptual

10. *(p. 30)* As an approach to knowledge, the scientific method relies on
A. intuitive hypotheses.
B. subjective measurement.
C. empirical procedures.
D. deductive theorizing.

Level: Factual

11. *(p. 30)* The essential ingredient of scientific observation is
A. precise measurement.
B. control.
C. prediction.
D. application.

Level: Factual

12. *(p. 31-32)* The primary means scientists use to establish control in their observations is to
A. systematically manipulate an independent variable in an experiment.
B. train multiple observers.
C. establish the accuracy and precision of their measurements.
D. observe many dependent variables.

Level: Factual

13. *(p. 32)* Based on investigations with the horse Clever Hans, an important factor researchers should seek to control when testing whether dogs can sniff cancer in urine samples is
A. whether the dogs are tested indoors or outdoors.
B. that some samples should come from people and some from horses.
C. that the urine samples should come from a diverse group of patients.
D. whether, during testing, the dogs can see people who know which samples came from cancer patients.

Level: Conceptual

14. *(p. 32)* The factors that the researcher controls or manipulates in order to determine their effect on behavior are called the
A. relevant variables.
B. independent variables.
C. intervening variables.
D. dependent variables.

Level: Factual

15. *(p. 32)* In a study investigating the effects of two different types of music on students' test performance, the music represents the
A. independent variable.
B. intervening variable.
C. dependent variable.
D. applied variable.

Level: Applied

16. *(p. 32-33)* In an experiment that compares aggressive responses following exposure to media violence (present, absent) in television programming, "aggressive responses" is the _____ and "exposure to media violence" is the _____.
A. construct; operational definition
B. operational definition; construct
C. independent variable; dependent variable
D. dependent variable; independent variable

Level: Applied

17. *(p. 33)* In a study examining the number of proofreading errors make when students are tested while reading under bright or dim lighting, the number of proofreading errors represents the
A. control variable.
B. intervening variable.
C. dependent variable.
D. independent variable.

Level: Applied

18. *(p. 33)* The term scientists use to refer to a psychological concept is
A. construct.
B. validity.
C. variability.
D. operational definition.

Level: Factual

19. *(p. 34)* An operational definition of a construct is
A. an intervening variable that connects independent and dependent variables.
B. a specific procedure for producing or measuring the construct.
C. reliable, because it is consistent.
D. valid, because it is truthful.

Level: Factual

20. *(p. 34)* When intelligence is defined using a paper-and-pencil test that emphasizes understanding of logical relationships and familiarity with the meaning of words, intelligence is being defined with
A. a construct definition.
B. a hypothetical definition.
C. a conceptual definition.
D. an operational definition.

Level: Applied

21. *(p. 34)* Which of the following characteristics is most assured when scientists use operational definitions to communicate?
A. reliable measurement
B. meaningfulness
C. clarity of meaning
D. valid measurement

Level: Conceptual

22. *(p. 35)* One disadvantage that results from the use of operational definitions is that
A. the reliability and validity of the operational definition become equivalent.
B. the number of psychological constructs becomes smaller.
C. communication among scientists becomes confused.
D. a potentially limitless number of operational definitions exists for any construct.

Level: Conceptual

23. *(p. 35)* When scientists report their findings they strive to describe
A. only what they have observed.
B. only their inferences about behavior.
C. what they have observed along with their inferences.
D. only aspects of what they have observed that differ from what they expected to observe.

Level: Factual

24. *(p. 35-36)* Suppose you come across a car accident at an intersection and observe that a small car is severely damaged and a large SUV appears to have only a headlight broken. If you describe the accident as occurring because the SUV hit the smaller car, your report likely includes
A. contaminated observations.
B. inferences.
C. distorted behaviors.
D. illusory correlations.

Level: Applied

25. *(p. 36)* Which of the following is an accepted check that scientists can use to determine whether a scientific report is unbiased?
A. the precision of the data that are reported
B. parsimony of explanation
C. clear operational definitions
D. agreement between observers

Level: Factual

26. *(p. 36)* A researcher calibrates an instrument by placing a five-pound weight on a scale to see if the scale gives a reading of 5.0 pounds. The researcher is testing the scale's
A. reliability.
B. validity.
C. accuracy.
D. correlation.

Level: Applied

27. *(p. 36)* A student sets a computer program to record participants' responses to materials in her experiment to the millisecond, rather than to the tenth of a second. Which characteristic of the measuring instrument is the student trying to ensure?
A. accuracy
B. precision
C. validity
D. reliability

Level: Applied

28. *(p. 37)* The main difference between physical measurement and psychological measurement is that *physical measurement*
A. uses humans as the measurement instruments.
B. requires multiple observers to assess agreement.
C. involves dimensions with agreed-upon standards and instruments.
D. is quantitative and nomothetic.

Level: Factual

29. *(p. 37)* When using psychological measurement of a dimension such as aggression, psychologists often base their measurements of people's aggressiveness on
A. agreement among a number of observers regarding their ratings of behavior on an aggressiveness scale.
B. consensus among researchers in the field of aggression as to the theoretical definition of aggression.
C. consistency across operational definitions of aggression.
D. availability of a precise measuring instrument, preferably based on a physiological response.

Level: Factual

30. *(p. 38)* A new measure of intelligence (e.g., speed of processing spatial distances) would be a valid measure of intelligence if scores on the new measure were
A. unrelated to scores on other accepted measures of intelligence.
B. more varied across people than scores on other accepted measures of intelligence.
C. more precise than scores on other accepted measures of intelligence.
D. related to scores on other accepted measures of intelligence.

Level: Factual

31. *(p. 38)* An individual's score on a test such as the SAT represents how that person consistently performs on such a test only if the SAT test is a _____ measure.
A. precise
B. reliable
C. valid
D. standardized

Level: Applied

32. *(p. 38)* Researchers are more likely to achieve reliable observations when
A. one observer has spent a long time observing an event.
B. one observer reports having observed a very unusual event.
C. two observers provide unique descriptions of an event.
D. two observers show agreement in their descriptions of an event.

Level: Factual

33. *(p. 38)* Research suggests that when judging photos of people's faces, people demonstrate high levels of agreement regarding which faces appear trustworthy, but that these ratings don't correspond to whether the people in the photos are guilty or innocent of cheating on a test. This finding indicates that measurements can be _____, yet not _____.
A. reliable; valid
B. precise; accurate
C. nomothetic; idiographic
D. basic; applied

Level: Applied

34. *(p. 38)* Reliability refers to the _____ of measurement, and validity refers to the _____ of measurement.
A. calibration; trustworthiness
B. accuracy; precision
C. consistency; truthfulness
D. testability; parsimony

Level: Factual

35. *(p. 38)* A researcher develops a brief questionnaire measure of people's level of optimism. To determine whether his measure is a good one, he asks a sample of people to complete his questionnaire twice, separated by one month. At the second session, he also asks his participants to complete another measure of optimism—one that has been an accepted measure of optimism for many years. Using this procedure, the researcher is establishing the
A. independent variable of optimism.
B. precision and accuracy of his measure.
C. reliability and validity of his measure.
D. nomothetic and idiographic features of optimism.

Level: Applied

36. *(p. 38)* The testable, tentative explanations scientists use to explain events are called
A. confirmatory biases.
B. hypotheses.
C. heuristics.
D. causal inferences.

Level: Factual

37. *(p. 38)* The idea that people purchase "green" products in order to achieve higher status by behaving altruistically is
A. a hypothesis.
B. a circular argument.
C. reliable and valid.
D. all of these

Level: Factual

38. *(p. 39)* What characteristic distinguishes scientific hypotheses from casual, everyday hypotheses?
A. certainty
B. intuitive appeal
C. testability
D. circularity

Level: Factual

39. *(p. 40)* A researcher's hypothesis predicts that people are more aggressive following exposure to media violence because they find the violence disturbing. A potential problem with this hypothesis is
A. the concept "disturbing" is not adequately defined.
B. it appeals to forces not recognized by science.
C. it is circular: "aggression" and "disturbing" refer to the same thing.
D. all of these

Level: Applied

40. *(p. 40)* Scientists would likely reject the hypothesis that a person was violent because the person was possessed by the Devil. Scientists reject a hypothesis like this one not because it is inherently wrong, but because the hypothesis lacks the necessary scientific characteristic of being
A. complex.
B. circular.
C. concise.
D. testable.

Level: Factual

41. *(p. 40)* When an hypothesis is stated in such a way that the event to be explained becomes the explanation itself (e.g., the child is distractable because he has attention deficit disorder), the hypothesis is said to be
A. inadequately defined.
B. circular.
C. appealing to forces not recognized by science.
D. redundant.

Level: Factual

42. *(p. 40)* Four goals of research in psychology are
A. reliability, validity, experimentation, and theory construction.
B. description, prediction, explanation, and application.
C. description, correlation, experimentation, and theory construction.
D. observation, measurement, causal inference, and explanation.

Level: Factual

43. *(p. 40)* The criteria used to classify and define mental disorders in the *Diagnostic and Statistical Manual of Mental Disorders* represent an illustration of which of the following goals of the scientific method?
A. description
B. prediction
C. explanation
D. therapy

Level: Factual

44. *(p. 42)* Using the nomothetic approach, psychologists seek to
A. describe one individual's behavior in relation to his or her environment.
B. create change in an individual's life.
C. eliminate confoundings in their experiments.
D. establish general laws of behavior that apply to a diverse population.

Level: Factual

45. *(p. 42-43)* The nomothetic approach in psychology (or in any science) is intended to establish broad generalizations and universal "laws." When using the nomothetic approach researchers are likely to make
A. many observations of one individual.
B. observations of many individuals and focus on extreme scores.
C. observations of many individuals and focus on the average (typical) score.
D. few observations of a few individuals and focus on the scores that occur most often.

Level: Conceptual

46. *(p. 42-43)* A cross-cultural study that examined helping behaviors in 23 large cities around the world found that, in general, people in Rio de Janeiro were most helpful and people in Kuala Lampur were least helpful. From these findings, we know that
A. everyone in Rio de Janeiro is more helpful than everyone in Kuala Lampur.
B. there are more people in Rio de Janeiro than in Kuala Lampur.
C. any one individual we choose in Rio de Janeiro will be helpful.
D. none of these

Level: Conceptual

47. *(p. 43)* Research that focuses on describing the unique characteristics of individuals is referred to as the
A. applied method.
B. idiographic approach.
C. Diagnostic and Statistical Manual.
D. functional approach.

Level: Factual

48. *(p. 43-44)* A researcher asks a sample of 200 individuals to complete a questionnaire. She then computes statistics to describe how individuals respond in general to the questions. This researcher's approach is
A. idiographic and quantitative.
B. idiographic and qualitative.
C. nomothetic and quantitative.
D. nomothetic and qualitative.

Level: Applied

49. *(p. 44)* Which of the following characterizes the majority of the research conducted in psychology?
A. quantitative research using the nomothetic approach
B. quantitative research using the idiographic approach
C. qualitative research using the nomothetic approach
D. qualitative research using the idiographic approach

Level: Factual

50. *(p. 44)* When research consists of verbal summaries of "naturally occurring, ordinary events in natural settings" the research is
A. more likely to be qualitative research than quantitative research.
B. more likely to be quantitative research than qualitative research.
C. equally likely to be qualitative or quantitative research.
D. unlikely to be either qualitative or quantitative research.

Level: Factual

51. *(p. 44)* Researchers interviewed 29 youth (ages 17-24) who live on the streets of Toronto about their experiences with suicide. When the researchers read transcripts of the interviews, they noticed themes of isolation and rejection. This is an example of _____ research.
A. idiographic
B. correlational
C. qualitative
D. explanatory

Level: Applied

52. *(p. 45)* A correlational study is uniquely useful for meeting which of the following goals of the scientific method?
A. description
B. prediction
C. explanation
D. application

Level: Factual

53. *(p. 45)* A correlation exists when
A. two hypotheses are shown to support the same theory.
B. two independent variables are confounded.
C. two measures of the same people, events, or things vary together.
D. a measurement is both reliable and valid.

Level: Factual

54. *(p. 45)* Research has indicated that amount of undergraduate research activity predicts measures of later success in the profession of psychology. For this prediction to be possible, undergraduate research activity and later success must be
A. circular.
B. qualitative.
C. causal.
D. correlated.

Level: Applied

55. *(p. 45)* Correlations are valuable because they allow psychologists to
A. create change in people's lives.
B. make predictions based on the way two variables covary.
C. describe, predict, and understand the causes of psychological phenomena.
D. all of these

Level: Conceptual

56. *(p. 45)* When researchers observe a correlation between two variables, such as between the amount of time spent studying and test scores, they know that
A. the first variable causes the second variable.
B. the second variable causes the first variable.
C. both (A) and (B)
D. neither (A) nor (B)

Level: Conceptual

57. *(p. 45)* Which of the following statements best describes the relationship between correlation and causation?
A. Correlation does not imply causation.
B. Correlation directly implies a causal inference.
C. Correlation and causation refer to the same thing.
D. Correlation is confounded with causation.

Level: Conceptual

58. *(p. 45-46)* Researchers have shown that teacher evaluations based on brief viewings of videotapes made by students who were not enrolled in a course correlate well with end-of-the-semester teacher evaluations made by students enrolled in the class. The researchers suggest that the relationship occurs because people can make relatively accurate judgments of affective behavior (e.g., likableness) very quickly because doing so is adaptive. Based on the correlational evidence alone, the researchers' explanation for their findings can best be considered
A. speculative.
B. qualitative.
C. a causal inference.
D. a confirmed hypothesis.

Level: Conceptual

59. *(p. 45-46)* The research goal of "prediction" is most associated with _____ research, and the research goal of "explanation" is most associated with _____ research.
A. applied; basic
B. correlational; experimental
C. multimethod; single method
D. nomothetic; idiographic

Level: Conceptual

60. *(p. 46)* Researchers demonstrated a relationship between the extent to which people in large cities help strangers and the degree of cultural embeddedness in the city (i.e., concern for family and in-group members). As cultural embeddedness increased, people were less likely to help strangers. This relationship indicates that
A. concern for family and in-group members causes people to avoid helping strangers.
B. helping strangers causes a decrease in cultural embeddedness.
C. both (A) and (B)
D. neither (A) nor (B)

Level: Conceptual

61. *(p. 46)* Psychologists use _____ to identify the causes of a phenomenon.
A. correlations
B. quantitative research
C. controlled experiments
D. operational definitions

Level: Factual

62. *(p. 47)* A(n) _____ is a statement about the cause of an event or behavior.
A. experiment
B. causal inference
C. construct
D. correlation

Level: Factual

63. *(p. 47)* Which of the following is *not* one of the conditions for making a causal inference?
A. covariation of events
B. a time-order relationship
C. confounding of variables
D. elimination of plausible alternative causes

Level: Factual

64. *(p. 48)* When two potentially effective independent variables are allowed to covary simultaneously, a _____ has occurred.
A. confounding
B. correlation
C. dependency
D. causal inference

Level: Factual

65. *(p. 48)* A researcher wanted to compare the relative effectiveness of two techniques for reducing anxiety: a drug and a relaxation exercise. The researcher gave the experimental group both the drug and the relaxation exercise. The control group was given neither the drug nor the exercise. The difference between the drug and the relaxation exercise cannot be compared in this experiment because the experiment involves a
A. redundant relationship.
B. correlation.
C. causal inference.
D. confounding.

Level: Applied

66. *(p. 48)* A researcher is interested in testing the effectiveness of using "clickers" for question-and-answer sessions during lectures. He asks students in the morning section of his course to use clickers to respond to in-class questions. Students in the afternoon section write answers to questions in their notebook. He compares the students' average test performance for the two sections. The researcher will not be able to interpret the results because his study is flawed due to
A. his limited ability to generalize his results to other students and courses.
B. the confounding of class section (morning, afternoon) and response method (clicker, notebook).
C. his failure to manipulate an independent variable.
D. the correlation between response method (clicker, notebook) and test performance.

Level: Applied

67. *(p. 49)* When scientists conduct research they seek to
A. use only real-world settings.
B. use only laboratory settings.
C. describe the findings only for people and circumstances who participated in their study.
D. generalize their findings beyond the people and circumstances used in their study.

Level: Factual

68. *(p. 49)* Research that is conducted with the goals of understanding phenomena and testing a theory is referred to as _____ research.
A. correlational
B. applied
C. basic
D. idiographic

Level: Factual

69. *(p. 49)* The widespread application of psychological principles in our everyday life is possible because of _____ in the past.
A. basic research
B. time-order relationships
C. parsimony
D. intervening variables

Level: Conceptual

70. *(p. 49)* Which of the following statements about research in psychology is *true*?
A. All research in psychology involves experiments.
B. Psychologists view basic research and applied research as complementary.
C. Researchers observe correlations between variables to make causal inferences about behavior.
D. all of these

Level: Conceptual

71. *(p. 50-51)* A(n) _____ is a logically organized set of propositions that serves to define events, describe relationships among events, and explain the occurrence of events.
A. theory
B. intervening variable
C. hypothesis
D. causal inference

Level: Factual

72. *(p. 51)* The major function of a theory in psychology is to
A. organize empirical knowledge and guide research.
B. derive explanations that are independent of the results of experiments.
C. formulate definitive explanations for empirical findings.
D. develop quantitative and qualitative predictions for the results of future experiments.

Level: Factual

73. *(p. 51)* Theorists propose _____ variables to connect independent and dependent variables and explain why these variables are connected.
A. hypothetical
B. operational
C. confounding
D. intervening

Level: Factual

74. *(p. 51-52)* A researcher manipulates the amount of time participants view a list of words (1 *vs.* 4 minutes), and measures the number of words the participants are able to write down 10 minutes later. The researcher suggests that in-between the presentation time and the later recall of the words, the words are in participants' memory. The construct of "memory" in this example represents
A. an operational definition.
B. an intervening variable.
C. the researcher's independent variable.
D. the researcher's dependent variable.

Level: Applied

75. *(p. 52)* Of the following, the best description of "intervening variables" in psychology is that
A. there are very few intervening variables in psychology.
B. they are obstacles in successful theory construction and testing.
C. they are constructs that unite a wide variety of apparently dissimilar variables.
D. they rarely are of use when psychologists try to explain why variables are related.

Level: Conceptual

76. *(p. 50, 53)* The greater the scope of a theory, the more complex it is likely to be. Complexity is
A. a serious obstacle to testing a theory.
B. a necessary characteristic of psychological theories given the nature and range of phenomena psychologists try to understand.
C. (A) and (B)
D. none of these

Level: Conceptual

77. *(p. 53)* A theory that predicts children will develop abstract reasoning by age 12 is more _____ than a theory that predicts the development of abstract reasoning by ages 12 to 20.
A. general
B. precise
C. hypothetical
D. parsimonious

Level: Factual

78. *(p. 53)* When constructing and evaluating a theory, scientists follow a guideline that places a premium on identifying the simplest of alternative explanations of a phenomenon. This guideline is called the
A. test of empirical verification.
B. law of least error.
C. precision of prediction.
D. rule of parsimony.

Level: Factual

79. *(p. 53)* The most rigorous test of a scientific theory involves
A. precision of prediction.
B. generalization.
C. falsification.
D. the rule of parsimony.

Level: Factual

80. *(p. 53-54)* A researcher conducted two experiments to test a theory. One experiment was designed to confirm a hypothesis of the theory and the second experiment was designed to falsify the hypothesis. From the perspective of theory construction and testing,
A. the theory is precise and parsimonious.
B. the theory is neither precise nor parsimonious.
C. the first experiment is more informative.
D. the second experiment is more informative.

Level: Factual