

CHAPTER 2: Research Methods

Chapter Outline

Basic Terms and Definitions

- Independent and Dependent Variables
- Functional Relationships
- Stimulus and Response
- Overt and Covert Behavior
- Appetitive and Aversive Stimuli
- Establishing Operations: Deprivation and Satiation
- Contiguity and Contingency

Measurement of Behavior

- Behavioral Definitions
- Recording Methods
- Assessing Reliability

Research Designs

- Descriptive Research
- Experimental Research

Use of Animals in Behavioral Research

Explanation of Opening Scenario

As noted later in the chapter, this scenario illustrates one of the drawbacks with basing decisions on the results of statistical analysis, which is that results that are significant for a group of individuals are not necessarily applicable to an individual.

Dr. Dee Assignment (See Chapter 1 in this manual for a sample set of instructions.)

I. *Dear Dr. Dee,*

When my fiancée's old boyfriend arrived back in town last month, I noticed a significant decrease in the frequency with which she called me. I'm absolutely certain she's having an affair with him. What do you think?

Aren't-I-clever!

II. *Dear Dr. Dee,*

I keep telling my boyfriend to "shape up," but it doesn't seem to be doing much good. What am I doing wrong?

Ms. Rather Vague

Relevant concepts:

- I. The writer's evidence is based on a simple comparison design which is insufficient for determining cause-and-effect relationships (73-74). There could be several other reasons for the sudden drop-off in phone calls from his fiancée at that point in time apart from the fact that her old boyfriend has returned to town.
- II. What does "shape up" mean? If the writer wishes to suggest improvements to her boyfriend's behavior, she should use more objective, less ambiguous descriptions of the behaviors she is concerned about. (59)

Internet Resources

APA Guidelines for Ethics in Research: <http://www.apa.org/science/anguide.html>

These are the American Psychological Association guidelines for ethical conduct in the care and use of animals.

Animal behavior and welfare sites:

<http://grants.nih.gov/grants/olaw/olaw.htm>

This site is from the Office of Laboratory Animal Welfare, associated with the National Institutes of Health in the United States. The site provides links about laws and policies associated with animal research.

<http://www.uoguelph.ca/csaw/links/>

This site is from the Centre for the Study of Animal Welfare at the University of Guelph and provides many links about animal welfare in Canada, and more generally.

Suggested Readings

Barlow, D. H., & Hersen, M. (1984). *Single-case experimental designs: Strategies for studying behavior change* (2nd ed.). New York: Pergamon.

Kazdin, A. E. (2008). *Behavior modification in applied settings* (6th ed.). Pacific Grove, CA: Brooks/Cole.

Kazdin, A.E. (2010). *Single-case research designs: Methods for clinical and applied settings*. New York, NY: Oxford University Press.

Miller, L. K. (1997). *Principles of everyday behavior analysis* (3rd ed.). Pacific Grove, CA: Brooks/Cole.

Mukerjee, M. (1997, February). Trends in animal research. *Scientific American*, 272, 86–93.

Sidman, M. (1960). *Tactics of scientific research: Evaluating experimental data in psychology*. New York: Basic Books.

Skinner, B. F. (1956). A case history in scientific method. *American Psychologist*, 11, 221–233.

Answers to Quick Quiz Items**Quick Quiz A**

1. independent; dependent
2. effect; cause
3. functional; environmental; behavior

Quick Quiz B

1. stimulus; response
2. stimulus; stimuli
3. stimulus
4. aversive; overt
5. covert
6. appetitive
7. covert; overt; overt; covert

Quick Quiz C

1. establishing operation
2. increase; deprivation
3. contiguity
4. temporal contiguity
5. spatial contiguity
6. contingency
7. contingent

Quick Quiz D

1. objective; unambiguous
2. intensity
3. speed; duration; latency
4. topography
5. latency
6. rate
7. interval; time-sample
8. cumulative recorder; no; fast (high rate); slow (low rate)
9. b (number of words written per hour)
10. 75%; inadequate

Quick Quiz E

1. naturalistic observation; case studies
2. bias
3. difficult
4. generalized

Quick Quiz F

1. independent; dependent
2. randomly; experimental; treatment; control
3. comparative
4. (1) requires large numbers of subjects; (2) typically focuses on average performance and ignores individual performance; (3) result only assessed at the end of the experiment.

Quick Quiz G

1. baseline; treatment
2. does not; functional
3. ABAB; baseline; treatment
4. behavior must return to the same level as in the first baseline.
5. permanent
6. ethical

Quick Quiz H

1. time; persons; settings; behaviors
2. withdraw
3. permanent; unethical

Quick Quiz I

1. criterion; altered
2. gradual
3. match
4. reverses

Quick Quiz J

1. genetic; learning
2. experimental
3. unethical
4. (1) animals are different from people; hence, the studies with animals may not be useful, (2) it is morally wrong to conduct studies on animals

Answers to Study Question Items: See short-answer test items in the test bank.

Test Bank for Chapter 2

Basic Terms and Definitions:

Variables

1. A(n) _____ is any characteristic of a person, place or thing that can change over time or across situations.
 - a) stimulus
 - b) response
 - c) operation
 - d) variable> D 52
2. Temperature, height, and hair color are all
 - a) behaviors.
 - b) operations.
 - c) variables.
 - d) both a and b> C 52

Independent and Dependent Variables

3. The _____ variable is that factor that varies across the different conditions in an experiment.
 - a) dependent
 - b) independent
 - c) extraneous
 - d) nondependent> B 53
4. The _____ variable is the outcome that is measured in an experiment.
 - a) dependent
 - b) independent
 - c) extraneous
 - d) confounding> A 53

5. Cause is to effect as _____ variable is to _____ variable.
- extraneous; dependent
 - dependent; extraneous
 - dependent; independent
 - independent; dependent
- > D 53
6. The outcome or effect in an experiment is the _____ variable.
- independent
 - dependent
 - extraneous
 - confounding
- > B 53 QZ
7. In an experiment concerning the effect of food deprivation on activity level, food deprivation is the _____ variable.
- dependent
 - confounding
 - independent
 - extraneous
- > C 53 MD
8. In an experiment concerning the effect of food deprivation on activity level, activity level is the _____ variable.
- dependent
 - confounding
 - independent
 - extraneous
- > A 53
9. In an experiment concerning the effects of time-out on noncompliant behavior, _____ is the independent variable.
- noncompliant behavior
 - time-out
 - compliant behavior
 - the child
- > B 53
10. Suppose you are experimenting with the effects of sleep deprivation on memory. In this case, sleep deprivation is a(n)
- extraneous variable.
 - dependent variable.
 - independent variable.
 - mediating variable.
- > C 53
11. In an experiment concerning the effects of reward on compliance in children, _____ is the dependent variable.
- the child
 - lack of reward
 - compliant behavior
 - reward
- > C 53

12. In an experiment on the effectiveness of different mosquito repellents on reducing mosquito bites, the different repellents constitute the
- extraneous variable.
 - confounding variable.
 - dependent variable.
 - independent variable.
- > D 53 WWW

Functional Relationships

13. The relationship between changes in an independent variable and changes in a dependent variable is known as a(n) _____ relationship.
- operational
 - variable
 - mechanistic
 - functional
- > D 54
14. If a certain diet affects the extent to which one is likely to acquire a certain disease, then there is a(n) _____ relationship between the diet and the disease.
- operational
 - mechanistic
 - functional
 - independent
- > C 54 FN
15. A cause-and-effect relationship could also be called a(n) _____ relationship
- independent
 - functional
 - derivative
 - mechanistic
- > B 54
16. Suppose that every time Randy watches a horror movie, he has a nightmare that same evening. Also suppose that he never has a nightmare except when he watches a horror movie. This example demonstrates a(n) _____ between watching horror movies and having nightmares.
- spurious relationship
 - functional relationship
 - establishing operation
 - operational relationship
- > B 54 QZ
17. Mosquito repellents that contain the chemical agent DEET are significantly more effective than those that do not contain DEET. In other words, there is a _____ relationship between the presence of DEET and the number of mosquito bites.
- formational
 - nonformational
 - functional
 - nonfunctional
- > C 54

Stimulus and Response

18. According to the text, a stimulus is any event that can
- potentially influence behavior.
 - be transformed into a behavior.
 - be measured.
 - be detected.
- > A 54
19. A flashing light, a loud bang, and a bad smell are all
- stimuluses.
 - stimuli.
 - stimulis.
 - responses.
- > B 54
20. The sound of a door slam causes your cat to jump off the couch. The sound of the door slam is a
- stimuli.
 - stimulus.
 - stimulis.
 - response.
- > B 54
21. A _____ is a specific instance of behavior.
- stimulus
 - releaser
 - response
 - operation
- > C 54
22. With respect to a rat's behavior of pressing a lever for food, a single lever press is an example of a(n)
- operation.
 - stimulus.
 - independent variable.
 - response.
- > D 54
23. Jan winks at Tyler. The wink is an example of a(n) _____ by Jan and a _____ for Tyler.
- response; stimulus
 - stimulus; response
 - operation; dependent variable
 - response; response
- > A 54

Overt and Covert Behavior

24. The term _____ behavior refers to any behavior that has the potential for being directly observed by another individual.
- covert
 - dependent
 - overt
 - independent
- > C 55

25. The push-ups that I did this morning are best described as an example of a(n)
- a) extraneous behavior.
 - b) impulsive behavior.
 - c) covert behavior.
 - d) overt behavior.
- > D 55 QZ
26. The term _____ behavior refers to any behavior that can only be subjectively perceived by the person performing the behavior.
- a) covert
 - b) extraneous
 - c) overt
 - d) implosive
- > A 55
27. The dream I had last night is best described as an example of a(n)
- a) extraneous behavior.
 - b) establishing operation.
 - c) covert behavior.
 - d) overt behavior.
- > C 55
28. Whenever Mehmed listens to a lecture by Dr. Dull, he begins to daydream. From Mehmed's perspective, the daydreaming is a(n) _____ while the lecture by Dr. Dull is a _____.
- a) overt response; covert response
 - b) stimulus; covert response
 - c) overt response; stimulus
 - d) covert response; stimulus
- > D 55 WWW
29. Overt behavior is to _____ as covert behavior is to _____.
- a) talking; daydreaming
 - b) thinking; acting
 - c) establishing; reacting
 - d) dreaming; thinking
- > A 55

Appetitive and Aversive Stimuli

30. A(n) _____ stimulus is one that an organism will move toward.
- a) functional
 - b) aversive
 - c) appetitive
 - d) aversive
- > C 55
31. A(n) _____ stimulus is one that an animal will move away from.
- a) functional
 - b) aversive
 - c) appetitive
 - d) imperative
- > B 55

32. Pleasant is to _____ as unpleasant is to _____.
- functional; imperative
 - imperative; aversive
 - aversive; appetitive
 - appetitive; aversive
- > D 55
33. For most children, a bee sting is to _____ as candy is to _____.
- aversive; imperative
 - appetitive; aversive
 - aversive; appetitive
 - aversive; appetitive
- > C 55
34. If someone goes “looking for a fight,” then fighting must be a(n) _____ stimulus for that individual.
- aversive
 - appositive
 - appetitive
 - nonfunctional
- > C 55

Establishing Operations: Deprivation and Satiation

35. Depriving an animal of food is an example of a(n)
- functional operation.
 - establishing operation.
 - establishing response.
 - stimulus operation.
- > B 57
36. A procedure that alters the appetitiveness or aversiveness of a stimulus is called a(n)
- establishing procedure.
 - establishing operation.
 - consequence strengthening procedure.
 - consequence strengthening operation.
- > B 57
37. When Jared ate too much cake one day, he became quite sick. Afterwards, he could no longer eat cake. The act of eating too much cake obviously functioned as a(n) _____ with respect to the subsequent likelihood of again eating cake.
- establishing response
 - dependent variable
 - extraneous operation
 - establishing operation
- > D 57 MD
38. Joanna does not feed her dog during the day so as to ensure that he will eat all of his dinner that evening. This is an example of
- shaping.
 - negative punishment.
 - extinction.
 - an establishing operation.
- > D 57 FN

39. If Sara drinks her fill of water, she will then become _____ on water.
- a) deprived
 - b) sanitized
 - c) satiated
 - d) saturated
- > C 57
40. Too much is to very little as _____ is to _____.
- a) starvation; deprivation
 - b) deprivation; starvation
 - c) satiation; deprivation
 - d) deprivation; satiation
- > C 57
41. Deprivation usually _____ the _____ of an event.
- a) decreases; appetitiveness
 - b) increases; appetitiveness
 - c) decreases; aversiveness
 - d) increases; imperativeness
- > B 57
42. After eating a dozen hot dogs in one sitting, chances are that you would feel quite
- a) deprived.
 - b) satiated.
 - c) satiated.
 - d) deviated.
- > C 57 QZ
43. Satiation usually _____ the _____ of an event.
- a) decreases; appetitiveness
 - b) decreases; aversiveness
 - c) decreases; imperativeness
 - d) increases; appetitiveness
- > A 57

Contiguity and Contingency

44. Closeness is to _____ as prediction is to _____.
- a) functionality; contiguity
 - b) contingency; functionality
 - c) contingency; contiguity
 - d) contiguity; contingency
- > D 58
45. Prediction is to nearness as
- a) contingent is to noncontingent.
 - b) noncontingent is to contingent.
 - c) contiguous is to contingent.
 - d) contingent is to contiguous.
- > D 58

46. The term _____ refers to events occurring close together in time.
- a) temporal contiguity
 - b) spatial contiguity
 - c) temporal contingency
 - d) spatial contingency
- > A 58
47. The term _____ refers to events occurring in close physical proximity to each other
- a) temporal contiguity
 - b) spatial contiguity
 - c) temporal contingency
 - d) spatial contingency
- > B 58
48. In a residence, students are often most likely to date those who live in units that are relatively near to their own. In other words, _____ seems to be an important factor in the formation of relationships.
- a) spatial contiguity
 - b) temporal contiguity
 - c) temporal contingency
 - d) spatial contingency
- > A 58
49. At the sound of the starter's pistol, the sprinters quickly start running. Thus, the sound of the pistol and the start of running are
- a) temporally conjunctive.
 - b) spatially contiguous.
 - c) temporally contiguous.
 - d) spatially contingent.
- > C 58
50. A chair and a table are side by side. This means that they are
- a) temporally contingent.
 - b) temporally contiguous.
 - c) spatially contingent.
 - d) spatially contiguous.
- > D 58 WWW
51. The term _____ refers to a predictive relationship between two events.
- a) covariance
 - b) contiguity
 - c) contingency
 - d) correlation
- > C 58
52. Debbie suffers from insomnia whenever she drinks coffee during the evening. Another way of saying this is that her insomnia is _____ upon coffee drinking.
- a) spatially contiguous
 - b) contingent
 - c) covariable
 - d) functionally contiguous
- > B 58 FN

53. If there exists a causal relationship between event A and outcome B, then
- a) A is contingent on B.
 - b) B is contingent on A.
 - c) A is spatially contiguous with B.
 - d) B is spatially contiguous with A.
- > B 58

Measurement of Behavior

Behavioral Definitions

54. A good behavioral definition should refer to some _____ aspect of the behavior
- a) subjective
 - b) salient
 - c) abstract
 - d) observable
- > D 59
55. A good behavioral definition should be
- a) objective and ambiguous.
 - b) subjective and abstract.
 - c) objective and unambiguous.
 - d) unambiguous and abstract.
- > C 59
56. Which of the following would constitute the most important aspect of a good behavioral definition of shyness?
- a) avoidance of groups of individuals
 - b) feelings of shyness
 - c) thoughts of shyness
 - d) both b and c
- > A 59

Recording Methods

57. A(n) _____ measure of behavior is the frequency with which a behavior occurs in a set period of time.
- a) duration
 - b) interval
 - c) latency
 - d) rate
- > D 60
58. A useful device for measuring the _____ of a behavior is a cumulative recorder.
- a) topography
 - b) rate
 - c) latency
 - d) intensity
- > B 60
59. Rate of response is a favorite measure of behavior for some researchers because it is
- a) a very salient measure of behavior.
 - b) a very sensitive measure of behavior.
 - c) a very robust measure of behavior.
 - d) a very subjective measure of behavior.
- > B 60

60. If I wish to measure the effect of slight changes in caffeine level on a rat's behavior, I would need a sensitive measure of behavior. I should consider using a(n) _____ measure of response.
- interval
 - latency
 - rate
 - topography
- > C 60
61. If I wish to test the effects of minor sleep deprivation on a rat's behavior, it would probably be wise to use a _____ measure of behavior, because it is very sensitive.
- duration
 - rate
 - speed
 - topographical
- > B 60 WWW
62. On a cumulative record, a _____ indicates a _____ of response.
- flat line; high rate
 - steep line; low rate
 - shallow line; high rate
 - none of these
- > D 60
63. On a cumulative record, a _____ indicates a _____ of response.
- flat line; lack of
 - steep line; low rate
 - shallow line; high rate
 - all of these
- > A 60 QZ
64. On a cumulative record, a _____ indicates a _____ of response.
- flat line; high rate
 - steep line; high rate
 - shallow line; low rate
 - both b and c
- > D 60 MD
65. On a cumulative record, a _____ indicates a _____ of response.
- flat line; high rate
 - steep line; lack of
 - shallow line; low rate
 - both b and c.
- > C 60 FN
66. On a cumulative record, a _____ line indicates a period of _____ responding.
- vertical; no
 - shallow; rapid
 - steep; slow
 - horizontal; no
- > D 60 WWW

67. The _____ of a behavior is its force or magnitude.
- topography
 - latency
 - intensity
 - rate
- > C 61
68. The loudness of my voice when I am in a stressful situation would be a(n) _____ measure of my stress level.
- topography
 - latency
 - duration
 - intensity
- > D 61
69. The number of hours that I clean house each week is a _____ measure of behavior, while the length of time that I procrastinate before starting to clean house on a particular evening is a _____ measure of behavior.
- latency; speed
 - duration; latency
 - speed; latency
 - duration; speed
- > B 61-63
70. The amount of time that I spend driving my car each week is an example of a _____ measure of behavior.
- speed
 - duration
 - latency
 - rate
- > B 62 WWW
71. Jonah's piano teacher is trying to get him to shorten the time it takes to play a Beethoven sonata. The appropriate behavioral measure is therefore
- duration.
 - latency.
 - topography.
 - speed.
- > D 62
72. In assessing a person's sleep patterns, you include a measure of how long it takes before the person falls asleep after he or she goes to bed. This would be regarded as a(n) _____ measure of their sleep behavior.
- speed
 - intensity
 - topography
 - latency
- > D 63 FN
73. The length of time it takes me to finish cleaning my apartment, from start to finish, is a _____ measure of behavior.
- duration
 - latency
 - speed
 - interval
- > C 63

74. The amount of time it takes before I get out of bed in the morning is an example of ____; the amount of time it takes me to finish shaving is an example of ____.
- latency; speed
 - duration; latency
 - speed; duration
 - latency; duration
- > A 62-63 QZ
75. As I watch television for four hours one evening, I make a record of whether there occurred at least one example of sexual humor during each half hour segment. This is an example of a(n) ____ method of recording.
- time sample
 - duration
 - interval
 - rate
- > C 63
76. Laura is concerned that her little daughter is watching too much television, and would therefore like to measure the occurrence of this behavior. Given that Laura has a lot of other things to do each evening, her best bet would be to use
- a rate measure.
 - interval recording.
 - time sample recording.
 - a topographical procedure.
- > C 64 WWW
77. As I watch television for a four hour stretch one evening, I record the *number* of aggressive incidents that occur during *each* one hour period. I am taking a(n) ____ measure of the behavior.
- time sample
 - interval
 - rate
 - duration
- > C 60-64
78. At the end of every 30 minute period, Sarah records whether her baby had cried at least once during that 30 minute period. She is using the method of ____ to assess the baby's tendency to cry.
- duration recording
 - interval recording
 - time sample recording
 - latency recording
- > B 64
79. In an interval recording procedure, instances of noncompliant behavior are recorded within 4 of the 12 intervals; no instances of noncompliant behavior are recorded within 8 of the 12 intervals. As a result, the level of noncompliant behavior is calculated as
- 33.3%.
 - 50%.
 - 66.7%.
 - This cannot be calculated without knowing the number of noncompliant behaviors within each interval.
- > A 64 MD

80. The number of incidents of swearing occurring in each of ten 5-minute intervals is 2, 4, 0, 1, 1, 3, 2, 2, 5, 0. Using an *interval* recording procedure, the overall level of swearing is calculated as
- a) 2.0.
 - b) 20.
 - c) 8.
 - d) 80%.
- > D 63
81. In a series of twenty intervals, John bites his nails the following number of times: 2, 0, 1, 2, 0, 1, 1, 1, 0, 1, 0, 2, 1, 1, 1, 2, 2, 1, 1, 0. Using an *interval* recording procedure, the overall level of nailbiting is calculated as
- a) 1.0.
 - b) 20.
 - c) 100%.
 - d) 75%.
- > D 63 FN
82. I watch television for several one hour periods randomly dispersed throughout the month. Each time I watch it, I also make a note of whether at least one murder was depicted during that period of time. This is best described as a(n) _____ method of determining the overall depiction of homicide on television.
- a) time sample
 - b) duration
 - c) interval
 - d) rate
- > A 64
83. The judges at a high diving competition are mostly concerned with the _____ of the behavior.
- a) intensity
 - b) rate
 - c) duration
 - d) topography
- > D 64
84. Learning how to write neatly is an example of a change in
- a) rate.
 - b) speed.
 - c) latency.
 - d) topography.
- > D 64
85. The topography of a behavior is
- a) physical intensity of the behavior.
 - b) physical form of the behavior.
 - c) amount of time it takes to complete a behavioral episode.
 - d) amount of time it takes to begin a behavioral episode.
- > B 64
86. In a dance competition, the judges are mostly concerned with the _____ of the behavior.
- a) topography
 - b) latency
 - c) duration
 - d) intensity
- > A 64

87. If a dog trainer determines whether a dog is correctly performing a complicated trick by examining the physical form of the behavior, she is measuring the behavior's _____, but if she records the number of times the dog makes a mistake, then she is measuring _____.
- a) topography; intensity
 - b) intensity; rate
 - c) topography; error rate
 - d) interval; error rate
- > C 64
88. A restaurant manager keeps track of the number of incorrect orders sent back to the kitchen. This is similar to the method of measurement known as
- a) fault ratio.
 - b) error rate.
 - c) interval recording.
 - d) topography.
- > B 64

Assessing Reliability

89. Which of the following is an acceptable rate of interobserver reliability?
- a) 10%
 - b) 25%
 - c) 50%
 - d) 80%
- > D 65
90. Two researchers have watched the same video in order to determine if incidents of aggression occurred during various intervals of time during a single day in a daycare. One researcher saw incidents of aggression in 8 out of 10 intervals, and the second researcher saw incidents of aggression in 7 out of 10 intervals. They disagreed on 1 out of the 10 intervals. What is being measured in this example?
- a) fault ratio
 - b) error rate
 - c) interobserver reliability
 - d) topography
- > C 65

Research Designs

Descriptive Research

91. The _____ methods of research do not involve the manipulation of variables.
- a) single-subject
 - b) experimental
 - c) control group
 - d) descriptive
- > D 66
92. Bird-watching is most similar to what type of research?
- a) case study
 - b) naturalistic observation
 - c) descriptive research
 - d) both b and c
- > D 66

93. Innate patterns of behavior in animals are often studied using the
- a) naturalistic observation approach.
 - b) case study approach.
 - c) control group design.
 - d) single-subject design.
- > A 66
94. Two commonly used descriptive research methods are
- a) single-subject designs and case studies.
 - b) case studies and naturalistic observation.
 - c) naturalistic observation and single-subject designs.
 - d) control group designs and single-subject designs.
- > B 66-68
95. A rare type of psychiatric disorder is most likely to be studied using the
- a) naturalistic observation approach.
 - b) case study approach.
 - c) control group design.
 - d) comparative design.
- > B 68
96. The intensive examination of a person's life both prior to and after they have experienced an unpredictable traumatic event is an example of the
- a) naturalistic approach.
 - b) case study approach.
 - c) simple comparison design.
 - d) reversal design.
- > B 68
97. Problems with the descriptive research approach include
- a) the possibility of oversimplifying the behavior pattern.
 - b) inability to determine cause and effect relationships.
 - c) the need for sophisticated statistical analysis of the results.
 - d) both b and c
- > B 66-68

Experimental Research

98. The main advantage of experimental research over descriptive research is the ability to
- a) discover salient variables.
 - b) apply statistical procedures to the results.
 - c) discover cause and effect relationships.
 - d) study the influence of dependent variables.
- > C 69
99. The _____ research approach is distinguished by the _____ of variables.
- a) experimental; manipulation
 - b) experimental; systematic observation
 - c) descriptive; elimination
 - d) descriptive; manipulation
- > A 69-70

98. If we wish to discover functional relationships, we are likely to use the _____ research approach.
- a) descriptive
 - b) experimental
 - c) naturalistic
 - d) deterministic
- > B 69-70

Control Group Designs

99. A common control procedure in a control group design is
- a) random assignment of subjects to groups.
 - b) alternating assignment of subjects to groups.
 - c) recording a 1 week baseline period.
 - d) recording a 2 week baseline period.
- > A 70
100. In a simple control group experiment on the effects of food deprivation on activity level, the control group would
- a) show increased activity level.
 - b) show decreased activity level.
 - c) be subjected to food deprivation.
 - d) eat normally.
- > D 70
101. In a simple control group experiment on the effects of punishment on response suppression in rats, the experimental group would
- a) show decreased responding.
 - b) show increased responding.
 - c) be subjected to punishment.
 - d) not be subjected to punishment.
- > C 70 QZ
102. In a 3 x 4 factorial control group design, there are
- a) 3 treatment groups and 4 control groups.
 - b) 3 dependent variables and 4 independent variables.
 - c) two independent variables.
 - d) two dependent variables.
- > C 70
103. In a 2 x 2 factorial control group design, there are
- a) 2 treatment groups.
 - b) 2 independent variables and 2 dependent variables.
 - c) 2 independent variables.
 - d) 2 dependent variables.
- > C 70
104. A new teaching method is being tested on students. Three age groups of students will receive either the new method, or a standard (control) method. If the new method is only effective on the youngest age group of students, you would say that there is _____ between the effects of the drug and the effects of age.
- a) no relationship
 - b) an interaction
 - c) a partial effect
 - d) a control effect
- > B 70

105. A(n) _____ is a type of control group design in which the species of animals within the study constitutes one of the independent variables.
- a) evolutionary design
 - b) comparative design
 - c) no-treatment design
 - d) 2 x 2 design
- > B 71
106. In which of the following studies would you expect to find a control group?
- a) case study
 - b) comparative design
 - c) factorial design
 - d) naturalistic observation
- > C 71
107. In which of the following designs would you NOT expect to have random assignment to groups?
- a) simple comparison design
 - b) factorial design
 - c) comparative design
 - d) none of these
- > C 71
108. Limitations of control group designs include
- a) the need for a large number of subjects.
 - b) an overly strong focus on individual results.
 - c) an inability to measure interaction effects.
 - d) all of these
- > A 72
109. Limitations of control group designs include
- a) little attention given to the behavior of individual subjects.
 - b) the need for a large number of subjects.
 - c) results are often interpreted only at the end of the study.
 - d) all of these
- > D 72
110. Control group designs are useful for studying
- a) the behavior of one individual.
 - b) the average effect of a variable on a large number of individuals.
 - c) changing patterns of behavior throughout an experiment.
 - d) both a and c
- > B 72
111. Which of the following designs requires the largest number of subjects?
- a) simple comparison design
 - b) control group design
 - c) reversal design
 - d) multiple baseline design
- > B 72 WWW

Single-Subject Designs

112. Single-subject designs are research designs that require
- a) random assignment of subjects to groups.
 - b) sophisticated statistical analysis.
 - c) only one or a few subjects.
 - d) both b and c
- > C 73
113. Advantages of single-subject designs include
- a) monitoring of the subject's behavior throughout the experiment.
 - b) large numbers of subjects are not required to conduct an entire experiment.
 - c) they do not require sophisticated statistical analysis.
 - d) all of these
- > D 73

Simple Comparison Design

114. In a simple comparison design, one compares the level of behavior in a(n) _____ with the level of the behavior in a _____.
- a) experimental group; control group
 - b) control group; baseline group
 - c) baseline group; treatment group
 - d) baseline condition; treatment condition
- > D 73-75
115. We measure a child's homework completion during a week in which he is consistently rewarded for doing his homework versus the following week when he is completely ignored while doing his homework. This is an example of a _____ design.
- a) reversal
 - b) simple comparison
 - c) multiple-baseline across time
 - d) changing-criterion
- > B 73-75
116. The baseline of a behavior is the
- a) normal frequency of that behavior following an intervention.
 - b) enhanced frequency of that behavior following an intervention.
 - c) normal frequency of that behavior prior to an intervention.
 - d) suppressed frequency of that behavior prior to an intervention.
- > C 73-75
117. Murielle has been feeling a lot better these past few weeks after she started avoiding caffeine. The procedure that Murielle has used to test the effects of caffeine is most similar to the _____ design, which is _____ for drawing firm conclusions about the effects of caffeine.
- a) simple comparison; inadequate
 - b) reversal; inadequate
 - c) multiple-baseline; excellent
 - d) simple comparison; excellent
- > A 73-75 MD

118. The problem with a simple comparison design is that
- a) it doesn't fully control for the influence of other variables.
 - b) it is insufficient for demonstrating a clear functional relationship.
 - c) the independent variable cannot be manipulated.
 - d) both a and b
- > D 75

Reversal (ABAB) Design

119. A(n) _____ design involves repeated alternations between a baseline condition and a treatment condition.
- a) multiple baseline
 - b) ABAB
 - c) changing-criterion
 - d) both b and c
- > B 75-78

120. A reversal design is sometimes also called an
- a) AB design
 - b) ABA design
 - c) ABAB design
 - d) both b and c
- > D 75-78

121. If I want to convince someone that his habit of watching exciting television shows each evening is causing his insomnia, it would be best to use which type of experimental design?
- a) changing-criterion
 - b) reversal
 - c) multiple-baseline across persons
 - d) simple comparison
- > B 75-78 QZ

122. For a reversal design to clearly demonstrate the effectiveness of a certain treatment, the behavior must
- a) return to its original baseline level during the second baseline phase.
 - b) remain at the treatment level during the second baseline phase.
 - c) remain at the baseline level during the treatment phase.
 - d) both b and c
- > A 75-78 FN

123. In a reversal design, the level of behavior in the first A phase needs to be _____ the level of behavior in the second A phase in order to prove that the treatment is effective.
- a) greater than
 - b) less than
 - c) the same as
 - d) either a or b
- > C 75-78

124. A reversal design that is conducted across four different subjects
- a) constitutes four separate experiments.
 - b) constitutes only one experiment.
 - c) constitutes two separate experiments.
 - d) is inadequate in the absence of a control group.
- > A 75-78 MD

125. Dr. Alvarez is treating Marcus for a behavioral problem. First, she records a baseline level of the behavior for several days. The rate of the behavior is quite high. Next, she implements a behavior modification program based on punishment. When that approach has little success in reducing the behavior, she tries a second program based on reinforcement. The second treatment appears to work and the behavior is dramatically reduced. She then goes back to baseline and the behavior reverts back to pre-treatment levels. When Dr. Alvarez once again implements the second treatment method, the behavior goes away. This is an example of
- an ABBAB design.
 - an ABCAC design.
 - an unsuccessful simple comparison design.
 - a multiple baseline design.
- > B 75-78
126. A reversal design may be inappropriate when
- the behavior is expected to change quickly.
 - the change in behavior may be irreversible.
 - both a and b
 - neither a nor b
- > B 75-78
127. In treating a child for a tendency to attack other children, the most ethically problematic design to test the effectiveness of treatment would be a(n) _____ design.
- multiple-baseline across behaviors
 - multiple-baseline across settings
 - simple comparison
 - ABAB
- > D 75-78
128. Which would be the most ethically problematic design for assessing a treatment procedure that seems to suppress Bob's tendency to attack other patients on the ward?
- ABAB
 - simple comparison
 - multiple-baseline across persons
 - multiple-baseline across behaviors
- > A 75-78 WWW

Multiple-Baseline Designs

129. In a multiple baseline design, the treatment is implemented at different points in times across different
- behaviors.
 - situations.
 - persons.
 - all of these
- > D 79
130. Ivan creates a treatment program to alter his family's tendency to swear at him. He first applies the program to his sister, then to his mother, and finally to his father. What type of research design is he employing to measure his family's improvement?
- multiple-baseline across behaviors
 - multiple-baseline across persons
 - reversal design across settings
 - reversal design across behaviors
- > B 79

131. If you were testing a behavioral treatment for eliminating a severe addiction in a small group of patients, the most appropriate and ethical design would be a(n) _____ design.
- multiple-baseline across persons
 - control group
 - ABAB
 - ABA
- > A 79
132. Jonathan decides to reduce his tendency to crack his knuckles, first at home and then at school. What type of research design is he employing to measure his improvement?
- multiple-baseline across behaviors
 - multiple-baseline across settings
 - reversal design across settings
 - reversal design across behaviors
- > B 79
133. Bruce decides to first reduce his tendency to smack his lips, then his tendency to spit on the road, and then finally his tendency to swear. What type of research design is he employing to measure his improvement?
- multiple-baseline across behaviors
 - multiple-baseline across settings
 - simple comparison design
 - changing-criterion design
- > A 79

Changing-Criterion Design

134. In a changing-criterion design, one looks to see whether the behavior
- matches a particular standard that is being systematically altered.
 - fluctuates between alternating baseline and treatment conditions.
 - changes as the treatment is applied to some other behavior.
 - is in some manner irreversible.
- > A 81
135. What single-subject design can establish the existence of a cause-and-effect relationship, and does not require a reversal to baseline?
- simple comparison design
 - multiple baseline across persons
 - changing-criterion
 - both b and c
- > D 81 MD
136. If the intent of your program is to gradually increase the amount of weight you lift each day, the most appropriate design for measuring your improvement would probably be a _____ design.
- multiple-baseline
 - simple comparison
 - changing-criterion
 - reversal
- > C 81
137. The most appropriate design for slowly increasing the amount of running that you do each day would be a
- changing-criterion
 - simple comparison
 - multiple-baseline
 - reversal
- > A 81

138. A _____ design is most appropriate for situations in which a behavior is expected to change gradually.
- multiple-baseline across persons
 - reversal
 - simple comparison
 - changing-criterion
- > D 81 QZ
139. Youcef sets up an exercise program in which he will try to gradually increase the number of push-ups he does each day. The most appropriate design for assessing the effectiveness of his program would be a
- multiple-baseline design.
 - changing-criterion design.
 - reversal design.
 - simple comparison design.
- > B 81 WWW

Use of Animals in Behavioral Research

140. Advantages of using animals in behavioral research include the ability to
- control genetic differences.
 - control learning history.
 - control the experimental environment.
 - all of these
- > D 84-87
141. Advantages of using animals in behavioral research include the ability to
- control the experimental environment.
 - control learning history.
 - carry out experiments that could not ethically be conducted on humans.
 - all of these
- > D 84-87
142. Criticisms of the use of animals in psychological research include:
- Learning history is more difficult to control in animals than in humans.
 - Animals are too different from humans for the research to be of much relevance.
 - neither a nor b
 - both a and b
- > B 84-87
143. According to the text, the most fundamental criticism of animal research is that
- it is difficult to assess the animals' learning history.
 - research with animals has little or no applicability to humans.
 - it is morally wrong.
 - both a and b
- > C 84-87 MD

And Furthermore: The Ethics of Food Deprivation

144. During conditioning experiments involving food rewards, pigeons are often food deprived to the point where they are at
- 80-85% of their free-feeding weight.
 - 90-95% of their natural weight.
 - 80-85% of their natural weight.
 - 90-95% of their free-feeding weight.
- > A 86

145. To ensure that pigeons are strongly motivated to respond for food, they are generally
- food deprived for at least 12 hours prior to each session.
 - kept at starvation level.
 - kept at 80-85% of their free-feeding weight.
 - both b and c
- > C 86
146. Regarding the extent to which food deprivation of pigeons is ethical versus unethical,
- their deprived weights are actually close to their natural weights.
 - food restriction appears to increase an animal's sensitivity to pain.
 - a certain degree of food restriction is actually healthy.
 - both a and c
- > D 86 QZ
147. Regarding the extent to which food deprivation of pigeons is ethical versus unethical,
- their deprived weights are much less than their natural weights.
 - food restriction is a natural state of affairs for most pigeons.
 - food restriction is typically unhealthy.
 - both a and c
- > B 86

Fill-in-the-Blank Items

Most of these items are taken from or are very similar to the end-of-chapter test items in the text; the items at the end that are marked WWW are posted on the student resource website.

- Any characteristic of a person, place, or thing that can change can be called a(n) _____.
> variable
- In a classical conditioning experiment, one group of dogs first hears a tone and then receives food, while another group of dogs receives food and then hears a tone. Following this, the researcher measures how much the dogs in each group salivate when they simply hear the tone. In this experiment, the order in which tone and food are presented is the _____ variable, while the amount of salivation to the tone is the _____ variable.
> independent; dependent
- Each time it rains, I see an increased number of umbrellas on the street. There appears to be a(n) _____ relationship between the weather and the appearance of umbrellas.
> functional
- A knife and spoon are placed side by side in a dinner setting creating spatial _____ between the two utensils.
> contiguity
- You have just eaten a very large pizza. It is likely that the reward value of eating a pizza has now (increased/decreased) _____ as a function of _____.
> decreased; satiation
- Robbie is afraid of spiders while Naseem finds them interesting. A spider is a(n) _____ stimulus to Robbie, and a(n) _____ stimulus to Naseem.
> aversive; appetitive

7. Number of cigarettes smoked each week is a(n) _____ measure of smoking.
> rate
8. Using a(n) _____ recording procedure, a school psychologist drops into a classroom for a 10-minute period four times each day and notes whether some type of disruption occurs during the time that he is there.
> time-sampling
9. An ABCAC design is a type of _____ design.
> reversal
10. The reversal design is also known as a(n) _____ design.
> ABAB
11. After Trish told Jennifer that Lorne was the most popular guy in school, Jennifer became extremely interested in him. Trish's statement about Lorne apparently functioned as a(n) _____ that increased Lorne's value as a(n) _____ stimulus.
> establishing operation; appetitive
12. On a cumulative recorder, a gradually sloping line indicates a(n) _____ rate of response while a steep line indicates a(n) _____ rate of response. By contrast, a(n) _____ line indicates no response.
> low; high; flat
13. The amount of time it takes Zak to read a chapter is a(n) _____ measure of behavior, while the amount of time it took him to begin reading the chapter is a(n) _____ measure of behavior. By contrast, the total amount of time he spends reading each day is a(n) _____ measure of behavior.
> speed; latency; duration
14. I wish to test a new drug which I believe will permanently remove the symptoms of a rare neurological disorder. Unfortunately, only three patients who suffer from the disorder have volunteered to take the drug. What would be a useful type of design to demonstrate the effectiveness of this drug? _____
> multiple-baseline (across persons) design
15. Being quite addicted to computer games, Jules decides to implement a program to gradually reduce the amount of time that he spends playing these games. A useful design for determining if his program is successful would be a(n) _____ design.
> changing-criterion
16. We easily associate a table and a chair because there is often close spatial _____ between the two items.
> contiguity WWW
17. The number of fish caught each hour during a fishing trip each week would constitute a(n) _____ measure of catching fish.
> rate WWW
18. Nina loves beans; Jana hates beans. Beans are a(n) _____ stimulus to Nina, and a(n) _____ stimulus to Jana.
> appetitive; aversive WWW

Short-Answer Items

Most of these items are end-of-chapter study questions from the text; those marked WWW are additional items from the student resource website.

1. Distinguish between independent and dependent variables. What is a functional relationship?

The *independent variable* is that aspect of an experiment that systematically varies across the different conditions in the experiment. The *dependent variable* is that aspect of an experiment that is allowed to freely vary to see if it is affected by changes in the independent variable. A *functional relationship* is the relationship between changes in an independent variable and changes in a dependent variable. (52-54)

2. Define stimulus and response. Differentiate between the terms *stimulus* and *stimuli*.

A *stimulus* is any event that can potentially influence behavior, while a *response* is a particular instance of a behavior. The term *stimuli* is the plural form of *stimulus*. (54)

3. Distinguish between overt and covert behavior. Distinguish between appetitive and aversive stimuli.

Overt behavior is behavior that has the potential for being directly observed by an individual other than the one performing the behavior. *Covert behavior* is behavior that can be subjectively perceived only by the person performing the behavior. An *appetitive stimulus* is an event that an organism will seek out. An *aversive stimulus* is an event that an organism will avoid. (55-56)

4. Define establishing operation. Name and describe two types of establishing operations.

An *establishing operation* is a procedure that affects the appetitiveness or aversiveness of a stimulus. Deprivation and satiation are two types of establishing operations. *Deprivation* is the prolonged absence of an event that tends to increase the appetitiveness of that event. *Satiation* is the prolonged exposure to (or consumption of) an event which tends to decrease the appetitiveness of that event. (57)

5. Distinguish between contiguity and contingency. Name and define two types of contiguity.

Contiguity means closeness or nearness. A *contingency* is a dependent relationship between two events; that is, the occurrence of one event is dependent on another. *Temporal contiguity* is the extent to which events occur close together in time. *Spatial contiguity* is the extent to which events are situated close to each other in space. (57-58)

6. Define rate of response. Why is rate of response a particularly favored measure of behavior among radical behaviorists (include an example)?

Rate of response is the frequency with which a response occurs in a certain period of time. Rate is a very sensitive measure of behavior, and is thus highly favored by some behaviorists (especially radical behaviorists). (Plus example.) (60)

7. How does one distinguish a high rate of response versus a low rate of response versus a period of no response on a cumulative record?

A steep line indicates a high rate of response, a shallow line indicates a low rate of response, and a flat line indicates a period of time with no response. (60-61)

8. Define speed, duration, and latency measures of behavior, and give a clear example of each.

Speed is the amount of time required to perform a complete episode of a behavior from start to finish. *Duration* is the length of time that an individual repeatedly or continuously performs a certain behavior. The *latency* of a behavior is the length of time required for the behavior to begin. (Plus examples.) (61-63)

9. Define the intensity and topography of a behavior, and give a clear example of each.

The *intensity* of a behavior is the force or magnitude of the behavior. *Topography* is the exact physical form of the behavior. (Plus examples.) (61, 64)

10. Define interval recording and time sample recording, and give a clear example of each. Specify how the overall measure of behavior is calculated.

In *interval recording*, one measures whether or not a behavior occurs within a series of *continuous* intervals. In *time sample recording*, one measures whether or not a behavior occurs within a series of *discontinuous* intervals. (Plus examples.) The overall measure of behavior is calculated as the percentage of intervals within which the behavior occurred. (62-63)

11. How does one calculate the reliability of observations conducted with an interval recording procedure? Illustrate your answer with an example.

Two or more individuals independently observe the behavior. Interobserver reliability is then calculated as the number of intervals during which the observers agree divided by the total number of intervals that were observed. (Plus example.) (65)

12. Name and describe two types of descriptive research methods. What is a major limitation of descriptive research methods?

Naturalistic observation involves the systematic observation and recording of behavior in its natural environment. The *case study approach* involves the intensive examination of one or a few individuals.

Although descriptive research methods often provide detailed information about behavior, they usually do not allow us to draw firm conclusions about the causes of a behavior. (64-66; Note: For the second part of this question, some students might instead mention the problem of researcher bias which tends to stand out in the discussion of the case study approach.) (66-69)

13. Describe the simplest form of a control group design. How are subjects assigned to the different conditions, and why is this done?

In a *control group design*, subjects are assigned to either an experimental (or treatment) group and a control group. Subjects assigned to the experimental group are exposed to a certain manipulation or treatment while those assigned to the control group are not. Subjects are often *randomly* to each condition to ensure that different characteristics of the subjects are likely to be evenly distributed across the experimental and control conditions. (70)

14. What is a comparative design?

A comparative design is a type of control group design in which the species of animal used is one of the independent variables. It differs from other control group designs because there is no pure control group that does not receive any treatment. It is often used to test an evolutionary hypothesis regarding differences in selective pressures for a particular trait between species. (71)

15. What are three limitations of control group designs?

Control group designs have three main limitations. They require a large number of subjects, they focus on the average performance of all subjects (and thus ignore the performance of individuals), and results are often analyzed and interpreted only at the end of the experiment rather than throughout the study. (72)

16. What are single-subject designs? Describe a simple comparison design. In what sense is it a “flawed” design?

Single-subject designs are research designs that require only one or a few subjects to conduct an entire experiment.

In a simple comparison design, behavior in a baseline condition is compared to behavior in a treatment condition. A major problem with the simple comparison design is that it does not control for the possibility that some other event occurred at the same time that the treatment was implemented, and it was this other event that caused the change in the behavior. (73-75)

17. Describe a reversal design. What are three disadvantages with this type of design?

The *reversal design* is a type of single-subject design that involves repeated alternations between a baseline period and a treatment period.

The first disadvantage is that the behavior must revert to its original baseline frequency when the treatment is withdrawn; otherwise, it will be impossible to determine if the treatment has had an effect. Second, a reversal design would not be appropriate for assessing the effect of such an intervention that is intended to have permanent effects. Third, it may be ethically inappropriate to remove a treatment (during a reversal phase) once some improvement has been obtained. (75-78)

18. Describe a multiple-baseline design. What are two limitations of this type of design?

In a *multiple-baseline design*, a treatment is instituted at successive points in time for two or more persons, settings, or behaviors.

This design is limited in that we need to have more than one person, setting, or behavior to which the treatment can be applied. The treatment effect might also generalize across behaviors or settings prior to the treatment being instituted in those behaviors or settings, which would make it difficult to interpret treatment effectiveness. (79-81)

19. Describe a changing-criterion design. How can it be strengthened? For what types of situations is this design appropriate? WWW

In a *changing-criterion design*, the effect of the treatment is demonstrated by the extent to which the behavior matches a criterion that is systematically altered. It can be strengthened by including periods in which the criterion suddenly changes in the opposite direction. The design is most appropriate for situations in which the behavior is intended to change gradually. (81-82)

20. List four advantages and two disadvantages of using animals as subjects in behavioral research.

Two advantages of using animals in research are the ability to control their genetic make-up and their learning history. A third advantage to using animals as subjects is that researchers are often able to more strictly control the experimental environment for animals than for humans. A fourth reason for using animals in behavioral research has to do with the fact that some research cannot ethically be conducted with humans.

One criticism is that because animals are not humans, the findings from animal research necessarily have limited applicability to humans. Perhaps the most fundamental criticism of animal research is that it is morally wrong, and that animals have “rights” similar to humans. (84-86)

21. Give examples of rate, latency, and speed measures for the behavior of studying? WWW

A rate measure of studying could involve number of math problems solved, number of pages read, or number of pages of study notes taken per hour. A latency measure of studying could involve how long it takes one to begin studying each evening or how long it takes one to return to studying following a break (which may be a particular problem for some students). A speed measure of studying could be the time it takes one to complete, say, 5 math problems or to read 20 pages in the text. (61-63)

21. Imagine that you are carrying out a study, using a 2 x 2 factorial design that looks at the effect of a vitamin C supplement on hyperactive behavior in both male and female children. Specify the dependent and independent variables, and the number of groups needed. Create a table similar to Table 2.1 in the text that outlines the various experimental conditions. What would be an example of an interaction effect in such a study?

Hyperactivity is the dependent variable, while vitamin C and gender are the independent variables. There will be four groups of subjects needed. The design can be tabled as follows:

	<u>Male</u>	<u>Female</u>
Vitamin C	VCM	VCF
No Vitamin C	NVCM	NVCF

where VC =vitamin C; NVC=no vitamin C; M=male; F=female

An example of an interaction effect would be, for example, if vitamin C has an effect on female children only. (70-71)

22. Describe a two treatment reversal design involving the effect of drug X and drug Y on hyperactivity. Include a graph of some hypothetical results for such an experiment. What would be the specific label for your design (in terms of ABCs)? WWW

To use an example similar to that given in the text, following a baseline period, the drug X treatment is implemented. When this proves ineffective in reducing the level of hyperactivity, drug Y treatment is implemented. When this does prove effective, drug Y is later withdrawn in the return to baseline and then reinstated in the return to treatment. This would then be called an ABCAC design. The graph for this design would look similar to Figure 2.5 in the text. (But other designs are also possible. For example, one could conduct an ABCBCA design in which the two drugs are alternated back and forth between each other. This would be useful if both drugs are effective and we wish to determine whether one is more effective than the other. A graph for this study would, of course, have six different phases involving alternations between the two drugs and the two treatments). (76-77)