

Instructor's Manual with Test Items
to accompany
Applied Behavior Analysis

Third Edition

John O. Cooper • Timothy E. Heron • William L. Heward

All, Ohio State University

Updated and Expanded for 3rd Edition by



Janelle Allison, Behavior Development Solutions • Kim M. Kelly, Behavior Development Solutions • Nicole Davis, Northeastern University • Jonathan Kimball, Behavior Development Solutions • Stephen Eversole, Behavior Development Solutions

Originally Prepared by

Stephanie Peterson, Idaho State University • Renée K. Van Norman, University of Nevada-Las Vegas • Lloyd Peterson, Idaho State University • Shannon Crozier, University of Nevada-Las Vegas • Jessica E. Frieder, Idaho State University • Peter Molino, Idaho State University • Heath Ivers, Idaho State University • Shawn Quigley, Idaho State University • Megan Bryson, University of Nevada-Las Vegas • David Bicard, University of Memphis



Upper Saddle River, New Jersey
Columbus, Ohio

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Senior Analyst, Content Strategy: Rebecca Fox-Gieg

Content Producer: Janelle Rogers

Supplement Project Manager: Rajakumar Venkatesan, SPi Global

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Chapter 1: Definition and Characteristics of Applied Behavior Analysis

Chapter Summary

The word “science” is often used as a noun, conflated with its products—as in “What does science tell us?”—but those products are outcomes of the behavior of large numbers of inquisitive individuals who engage in a systematic approach for seeking and organizing information about the natural world. Science really has one overall goal: to achieve a thorough understanding of the phenomena under study, which, in the field of applied behavior analysis, is socially important behavior that is meaningfully associated with an individual’s quality of life.

Different types of scientific investigation yield different degrees of understanding that represent progressively greater ability to influence given phenomena. *Description* refers to a scientist collecting facts about entities or events, which can raise interesting questions and establish hypotheses for further study. *Prediction* is the outcome of more systematic observation when a scientist finds that two events often covary; when correlations are demonstrated in this manner, the probability of one event occurring can be more confidently predicted given the presence of the other event, although at this level the scientist cannot refer to the relationship between the two events as a causal one. When a scientist actually manipulates events, however, and shows that a change they make in one event (an “independent variable”) repeatedly results in some change in a second event (a target or “dependent variable”)—and when they have accounted for and reduced the likelihood that some other variable is responsible for that change—when, in other words, they have demonstrated a functional relationship between these variables, they have achieved experimental *control* of the phenomena being studied. Behavior analysts consider control to be the most desirable level of understanding because functional relations are the potential basis for developing applied techniques for behavior change. In this respect, behavior analysis is characterized by *pragmatism*, the philosophical position that the “truth” of scientific findings is to be judged by the extent to which they lead to effective action.

The pursuit of scientific understanding of natural phenomena—including behavior—is characterized by an overriding set of assumptions and values: determinism, empiricism, experimentation, replication, parsimony, and philosophic doubt. Determinism—the notion that the universe is a lawful and orderly place in which all events occur as the result of other events—is the assumption upon which scientific endeavors are predicated. Indeed, if events were not determined in a reasonably orderly fashion—if phenomena randomly occurred simply as a matter of chance—then there would be no basis for viable technologies of behavior change. The development of useful behavior change techniques, in other words, rests on the belief that all behavior is the result of specifiable conditions and that these conditions, once identified, can be managed in a way that will influence the future probability of behavior. Other qualities that guide success in science include thoroughness, curiosity, perseverance, diligence, ethics, and honesty.

John B. Watson—one of the first and best known individuals to identify as a “behaviorist” early in the 20th century—departed from psychology’s focus at the time on introspection and mental processes, and suggested that human behavior could be studied using the observational tactics of natural science. His behaviorism, which came to be known as S-R psychology—and also came to be known for fantastic claims—could not account for apparently “spontaneous” acts: for behavior, in other words, that lacked obvious antecedents. Numerous efforts to fill these explanatory gaps once again elevated mental states and constructs to causal status with respect to human behavior.

B. F. Skinner, in contrast, remained focused on environmental events and eventually showed, through what he called the experimental analysis of behavior (EAB), that much behavior is changed and maintained by the consequences it produces. Thus Skinner identified *operant behavior* and elaborated Watson’s formulation with a new paradigm called the three-term contingency (S-R-S), a model that remains the fundamental unit of study and focus of practice in the four domains of modern behavior analysis: behaviorism, the experimental analysis of behavior, applied behavior analysis (ABA), and behavior analytic practice. Skinner’s conceptual formulation of behaviorism—the philosophical domain of behavior analysis—is known as radical behaviorism because it maintains that thoughts and feelings (what he called “private events” that occur “inside the skin”) are simply less accessible forms of behavior that otherwise can be understood in the same terms and studied by the same means as overt behavior, without appealing to intervening hypothetical constructs.

One of the first studies to apply the principles of operant behavior to humans was published in 1949 by Fuller. The field of behavior analysis grew in the 1950's and 1960's as researchers replicated with humans in naturalistic settings the methods and principles that had been developed in laboratories with non-humans. The study regarded as the cornerstone of applied behavior analysis—in which the agents of behavior change were nurses rather than researchers—was conducted by Ayllon and Michael in 1959. The field continued to grow and formally came into its own in 1968 with the publication of the inaugural issue of *The Journal of Applied Behavior Analysis*, which included the now classic article “Some Current Dimensions of Applied Behavior Analysis” by Donald M. Baer, Montrose M. Wolf, and Todd Risley. With that article, Baer, Wolf, and Risley set forth what they considered to be the defining characteristics of the nascent domain of behavior analysis—that it is applied, behavioral, analytic, technological, conceptually systematic, effective, and capable of generalized outcomes—and these remain the standard today. Certainly, the field of applied behavior analysis possesses additional characteristics—it is accountable, public, doable, empowering, and optimistic, for example—but over many decades and myriad applications to matters of real-world consequence, from ADHD to zoo animal welfare, it has remained above all a science with the dual goals of understanding socially significant human behavior and improving people's quality of life.

Chapter Key Terms

applied behavior analysis (ABA)	explanatory fiction	parsimony
behaviorism	functional analysis	philosophic doubt
determinism	functional relation	pragmatism
empiricism	hypothetical construct	radical behaviorism
experiment	mentalism	replication
experimental analysis of behavior (EAB)	methodological behaviorism	science

Chapter Objectives

1. Identify the goals of behavior analysis as a science: description, prediction, and control.
2. Explain the philosophical assumptions underlying behavior analysis: selectionism, determinism, parsimony, and pragmatism.
3. Explain behavior from the perspective of radical behaviorism.
4. Describe how Skinner improved upon Watson's behaviorism.
5. State distinguishing features of mentalistic and environmental explanations of behavior.
6. Describe the different domains of behavior analytic practice—radical behaviorism, experimental analysis of behavior, applied behavior analysis, and professional practice guided by behavior analysis—and the role of translational research in bridging basic and applied research.
7. State and describe each of the dimensions of applied behavior analysis as discussed by Baer, Wolf, and Risley in 1968.

Chapter Focus Questions

1. What are the 3 basic levels of scientific practice and the different kinds of knowledge statements to which they can lead?
2. Describe the two ways in which the term “functional analysis” is used in the field of behavior analysis.
3. Explain the overarching “attitudes of science” (i.e., foundational assumptions of scientific practice) and their importance).
4. Describe the 4 primary domains of contemporary behavior analysis? What is translational research?
5. What are key historical landmarks in the evolution of behavior analysis since the early 20th century?

6. Baer, Wolf, and Risley (1968) identified 7 defining dimensions of applied behavior analysis; name 4 additional characteristics of the practice of behavior analysis.
7. Describe and compare, with reference to examples, the two main goals of behavior analysis, as set forth in the definition of the field.

Chapter Suggested Reading

Ayllon, T., & Michael, J. (1959). The psychiatric nurse as a behavioral engineer. *Journal of the Experimental Analysis of Behavior*, 2, 323-334.

One of the guiding articles that provide the basis for the foundation of applied behavior analysis, this study employs the use of techniques based on reinforcement theory in a mental hospital. Psychiatric nurses implement a variety of procedures with patients.

Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, 1(1), 91-97.

This article provides the original 7 defining dimensions of applied behavior analysis that remain core tenets of the field today.

Baer, D. M., Wolf, M. M., & Risley, T. R. (1987). Some still-current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, 20(4), 313-327.

This article serves as a follow up to the authors' original work in 1968 in which the defining characteristics are reviewed and are argued as being functional within the contemporary field of applied behavior analysis. In addition, new tactics within the field are discussed.

Critchfield, T. S., & Reed, D. D. (2017). The fuzzy concept of applied behavior analysis research. *The Behavior Analyst*, 40(1), 123-159.

The authors discuss the historical context from which Baer, Wolf, and Risley proffered the 7 dimensions of applied behavior analysis, and persuasively argue that potentially important behavior analytic research goes unpublished—or gets published in journals tangential to the field—because the 7 dimensions may be employed too rigidly as a standard.

Fuller, P. R. (1949). Operant conditioning of a vegetative human organism. *The American Journal of Psychology*, 62, 587-590.

This study is one of the first to report the human application of the principles of operant behavior. An individual with disabilities learns to make a physical response through operant conditioning. Note that it employs labels that were particular to the time period and that are considered offensive today. As mentioned in Chapter 1, the study was replicated by Boyle & Greer (1983).

Kimball, J. W. (2002). Behavior-analytic instruction for children with autism: Philosophy matters. *Focus on Autism and Other Developmental Disabilities*, 17(2), 66-75.

The author offers a primer on empiricism, pragmatism, and selectionism, which comprise the epistemological underpinnings of behavior analysis and the foundation for the three-term contingency, as an antidote to the conflation by many educators of “ABA” with discrete trial instruction.

Mace, F. C. & Critchfield, T. S. (2010). Translational research in behavior analysis: Historical traditions and imperative for the future. *Journal of the Experimental Analysis of Behavior*, 93(3), 293-312.

The authors make a case that collaboration between basic and applied researchers, synthesizing their questions, literatures, and methods, can be mutually beneficial, lead to more effective problem-solving, and state that such innovation may result in greater acceptance of behavior analysis.

Moore, J. & Cooper, J. O. (2003). Some proposed relations among the domains of behavior analysis. *The Behavior Analyst*, 26(1), 69-84.

A cogent discussion of domains of behavior analytic endeavors and how they can and do inform each other.

Risley, T. R. (1997). Montrose M. Wolf: The origin of the dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, 30(2), 377-381.

This piece highlights the work and life of Montrose Wolf and the origins of the defining characteristics of applied behavior analysis.

Skinner, B. F. (1938/1966). *The behavior of organisms: An experimental analysis*. Appleton-Century. (Copyright renewed in 1966 by the B. F. Skinner Foundation, Cambridge, MA).

This book summarizes nearly ten years of Skinner's research, spanning his years of graduate school through his three years as a member of the Society of Fellows. Skinner defines his basic unit of behavior, the operant, proposes basic datum, and describes his research agenda.

Skinner, B. F. (1945). The operational analysis of psychological terms. *Psychological Review*, 52(5), 270-277.

An important essay that tackles the challenge for behavioral science of talking about private events.

Skinner, B. F. (1948). *Walden two*. Macmillan.

Skinner extends his works in this novel by applying the principles of behavior analysis to a fictional community. The book illustrates a community that is minimally consuming and polluting, egalitarian in the division of work, communal in raising of children, and possessing an educational system that teaches patience and the ability to handle destructive emotions.

Skinner, B. F. (1969). *Beyond freedom and dignity*. Knopf.

This book still serves as a controversial piece in which Skinner makes his ultimate statement about humankind and society. He argues that we must reexamine and refine our traditional concepts of freedom and dignity, and that the radical behaviorist approach offers a new understanding of and solutions to human problems.

Skinner, B. F. (1978). Why I am not a cognitive psychologist. In B. F. Skinner, *Reflections on behaviorism and society* (pp. 97-112). Prentice Hall. (Original work published in 1977).

In this essay Skinner demonstrates that mentalistic terms can be traced to environmental events, and argues that explanatory fictions impede analysis of, and effective intervention for, behavior.

Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis*, 11(2), 203-214.

Philosophical issues that surfaced in early articles in *JABA* are reviewed. In addition, the stated purpose of *JABA* is revisited, and the issues of social validity are further explored and illustrations are presented.

Chapter 2: Basic Concepts and Principles

Chapter Summary

Behavior analysts study behavior – the activity of living organisms. Although the study of behavior includes single responses, applied behavior analysts are interested in larger sets of *socially significant* behavior referred to as response classes; the sum of response classes an individual can perform at any given point in their development is their behavioral repertoire. A response class comprises a set of actions that may vary in topography (form) and that all have essentially the same effect on the environment. The environment refers to the physical setting and circumstances that comprise the context for a response; responses can only be studied and understood with respect to their environment.

When behavior analysts talk about stimuli they are not referring to all the static elements that constitute an environment but rather to stimulus events within a given setting that enter into an active relationship with some form of response. Stimulus events can be discussed in terms of their physical, temporal, and functional features (where function refers to their effect on members of a response class). A group of stimuli that share common features along some or all of these dimensions make up a stimulus class. Stimulus changes that occur in time before a response are called antecedent events (or just antecedents); those changes that temporally occur immediately following a response are called consequences. Antecedents and consequences may have one or two effects on behavior: (a) an immediate but temporary increase or decrease in the frequency of a type of response within the given setting, and/or (b) a delayed but relatively permanent effect on the future probability of a given type of response when similar stimulus conditions are present.

The two main classes of behavior are called “respondent” and “operant.” Respondent behavior is “phylogenetic”: it is genetically-based, reflexive, and shared by all intact members of a species because over the course of the species’ evolution it increased the likelihood of an individual organism’s surviving to the point of reproduction. In technical terms, respondent behavior is said to be “elicited” by antecedent stimuli; such a response may be unlearned (unconditioned) such as blinking when dust hits the eye or salivating in the presence of appetizing food, or it may occur in the presence of previously neutral stimuli with which the unconditioned stimulus has been paired on a number of successive occasions. The latter type of response was demonstrated in Pavlov’s famous classical conditioning experiments in which dogs, after experiencing so-called stimulus-stimulus pairing procedures, salivated upon hearing the sound of a bell (the conditioned stimulus). Operant behavior, in contrast, is “ontogenic”: it is part of an individual’s repertoire because over the course of their lifetime it has resulted in effective and adaptive changes in their immediate environment; in other words, an operant repertoire is learned behavior, selected by its history of consequences.

Operant conditioning—the ongoing development of an individual’s unique repertoire as they interact with their environment—is characterized by *automaticity*: consequences exert selective effects on an individual’s behavior irrespective of that person’s awareness of, or ability to describe, the response-consequence relationship. Behavior analysts distinguish between the manner in which such consequences may be delivered: (a) they may be dispensed by another person (e.g., teachers praise correct answers to math problems), in which case they are *socially mediated*, or (b) they may come about as a direct result of an individual’s action upon the environment (e.g., you press on the accelerator and the car speeds up), in which case they are *automatic*. Note that “automaticity” refers to the selective effect of the relevant consequences, while “automatic” refers to their mode of delivery.

Operant conditioning may result in one of two effects on the future probability of a given class of behavior: (a) it could become more likely to occur under similar conditions, which effect is called *reinforcement*, or (b) it could become less likely to occur under similar conditions, which effect is called *punishment*. It is important to note that the processes of reinforcement and punishment are defined functionally, which is to say without reference to their form and strictly by their effect upon future rates of a given response. Finally, reinforcement and punishment—the “up or down” direction of behavior change that occurs as a result of a given consequence—are further defined by the “in or out” direction of that consequence: if a consequence is presented, it is referred to as a positive event; if it is withdrawn, it is a negative event (note that these terms are directional and have nothing to do with valence).

To put it all together, “positive reinforcement” occurs when a behavior is followed by the presentation of a stimulus event and the future frequency of the behavior *increases* under similar environmental conditions. “Negative reinforcement” occurs when a behavior is followed by the removal of a stimulus event and the future frequency of the behavior *increases* under similar environmental conditions. Positive punishment occurs when a behavior is followed by the presentation of a stimulus event and the future frequency of the behavior *decreases* under similar environmental conditions. Negative punishment occurs when a behavior is followed by the removal of a stimulus event and the future frequency of the behavior *decreases* under similar environmental conditions. These are basic principles of behavior: they are descriptions of functional relation(s) between behavior and one or more of its associated environmental events, and they apply (i.e., have generality) across species, settings, and response classes.

Note that consequences – either positive or negative – only affect (a) the probability of future behavior, (b) under similar stimulus conditions. Together, these elements—(1) the specific antecedent stimuli that are present when the response is either reinforced or punished, (2) the type of response, and (3) given consequences—are known as the “three-term contingency,” which is the basic unit of analysis in the study and influence of operant behavior. Note that we can only claim that particular consequences functioned to change the probability of a response if we observe it to occur more or less frequently on subsequent occasions when similar antecedent stimuli are present. If the rate of behavior does indeed change under similar conditions—and not under others—that response class is called a discriminated operant, and is said to be under stimulus control. Consequences are properly said to select response classes—not individuals/organisms. Reinforcing or punishing consequences are most effective when they are immediate. To the extent that a given consequence functions to affect a given response class, it will select any behavior that precedes it, whether or not a behavior change tactic is being practiced (automaticity). Behavior change tactics are the methods derived from one or more basic principles of behavior, analyzed with respect to the three-term contingency, and utilized by applied behavior analysts.

Behavior analysis boils down to a few simple principles, but it is hardly a simplistic view of behavior. First, no two individuals will experience the selective action of consequences in identical ways under identical circumstances, and second, the principles interact in myriad ways. The scientific study of operant behavior is still relatively young, and it is helping us to understand such complexities as lengthy response chains, verbal behavior, motivating operations, and histories of reinforcement.

Chapter Key Terms

antecedent	habituation	reinforcer
automatic reinforcement	higher-order conditioning	repertoire
automaticity of reinforcement	history of reinforcement	respondent behavior
aversive stimulus	joint control	respondent conditioning
behavior	motivating operation	respondent extinction
behavior change tactic	negative punishment	response
conditioned punisher	negative reinforcement	response class
conditioned reflex	neutral stimulus	rule-governed behavior
conditioned reinforcer	ontogeny	selectionism
conditioned stimulus	operant behavior	socially mediated contingency
consequence	operant conditioning	stimulus
contingency	phylogeny	stimulus class
contingency-shaped behavior	positive punishment	stimulus control
contingent	positive reinforcement	stimulus-stimulus pairing
deprivation	principle of behavior	three-term contingency
discriminated operant	punisher	unconditioned punisher
discriminative stimulus (S^D)	punishment	unconditioned reinforcer
environment	reflex	unconditioned stimulus
extinction	reinforcement	

Chapter Objectives

1. Define and provide examples of behavior, response, and response class.
2. Define and provide examples of stimulus and stimulus class.
3. Define and provide examples of respondent and operant conditioning.
4. Define and provide examples of positive and negative reinforcement contingencies.
5. Define and provide examples of positive and negative punishment contingencies.
6. Define and provide examples of automatic and socially mediated contingencies.
7. Define and provide examples of unconditioned, conditioned, and generalized reinforcers and punishers.
8. Define and provide examples of operant extinction.
9. Define and provide examples of stimulus control.
10. Define and provide examples of discrimination, generalization, and maintenance.
11. Define and provide examples of motivating operations.
12. Define and provide examples of rule-governed and contingency-shaped behavior.

Chapter Focus Questions

1. Why is it important to distinguish between the terms behavior, response, response class, and repertoire?
2. Compare and contrast defining features and key characteristics of respondent and operant behavior.
3. What does it mean to say behavior has a function?
4. What is the difference between automatic and socially mediated reinforcement?
5. What is the difference between the “automaticity of reinforcement” and “automatic reinforcement”?
6. Define and, with reference to the selective action of consequences, give examples of the behavioral effects of both positive and negative reinforcement and punishment.
7. What is a behavior principle and how is it similar or different than a behavior change tactic?
8. What is the three-term contingency and why is it described as the “basic unit of analysis in the analysis of operant behavior”?
9. What is a discriminated operant and how is it related to stimulus control?
10. What, with reference to specific examples, is the difference between rule-governed behavior and contingency-shaped behavior?
11. Apart from the complexity of behavior itself, what are some other factors that complicate the analysis of human behavior?

Chapter Suggested Readings

Baron, A. & Galizio, M. (2005). Positive and negative reinforcement: Should the distinction be preserved? *The Behavior Analyst*, 28(2), 85-98.

This conceptual article discusses the “confusion” surrounding the distinction between positive and negative reinforcement. The article presents an outline of the initial argument presented in Michael’s 1975 paper.

Critchfield, T. S. (2014). Ten rules for discussing behavior analysis. *Behavior Analysis in Practice*, 7(2), 141-142.

Critchfield, T.S. (2017). Requiem for the Dead Man test? *The Behavior Analyst*, 40(2), 539-548.

Critchfield, T. S. (2017). Normative emotional responses to behavior analysis jargon or how not to use words to win friends and influence people. *Behavior Analysis in Practice*, 10(2), 97-106.

Thomas Critchfield, who wrote chapter 20 on emergent learning, is one of the most eloquent and engaging thinkers and writers active in the field of behavior analysis today. In a chapter laden with technical terms, this trio of articles provides a reminder to employ those terms with humility and sensitivity to the audience.

Flora, S.R. (2004). *The power of reinforcement*. State University of New York Press.

This book offers readers an in-depth discussion on the role of reinforcement in everyday activities – from education to illness. It also addresses several of the “myths and misconceptions” of reinforcement.

Holland, J. G., & Skinner, B. F. (1961). *The analysis of behavior: A program for self-instruction*. McGraw-Hill.

This unique and remarkable text is a model of programmed instruction, in which the reader/student works through a spiraling series of quizzes that provide immediate feedback on topics from basic principles of behavior (e.g., reinforcement, shaping, stimulus control) to self-control and the interpretation of personality. One fun feature is that the instructional content is only on the recto (right-hand page), so that the reader moves from the beginning to the end of the book, then literally turns it upside down and works back to the front again.

Michael, J. (1975). Positive and negative reinforcement: A distinction that is no longer necessary; or a better way to talk about bad things. *Behaviorism*, 3(1), 33- 44.

This conceptual article presents a discussion about the distinction between positive and negative reinforcement. It presents two main issues: (a) the confusion surrounding negative reinforcement and punishment and (b) changing stimulus conditions versus a presentation-removal distinction.

Michael, J. L. (1993). *Concepts and principles of behavior analysis (revised)*. Association for Behavior Analysis.

This book presents a comprehensive outline of the basic principles of behavior. It includes a detailed presentation of topics such as: stimulus; response; reflexes; conditioning; experimental arrangements; motivating operations; and verbal behavior.

Pryor, K. (1984). *Don't shoot the dog! The new art of teaching and training*. Simon & Shuster.

This trade paperback presents “real world” descriptions of the effects of positive reinforcement across species (e.g., dogs, dolphins, and humans). A detailed description of how to set up training environments for just about any behavior is included. This book includes methods for changing undesirable behavior and shaping desirable behavior.

Skinner, B. F. (1953). *Science and human behavior*. Free Press.

In this book Skinner examines human behavior and culture from a behavioral perspective and makes the case for the study of behavior with the methods of natural science.

Skinner, B. F. (1974). *About behaviorism*. Knopf.

Skinner wrote this book for a general audience 20 years after writing *Science and human behavior*, to define and defend the scientific analysis of behavior and its resulting conclusions of the nature of behavior. He does so by responding to 20 critiques or questions about the science and its subject matter.

Skinner, B. F. (1981). Selection by consequences. *Science*, 213(4507), 501-504.

In this cogent essay Skinner begins by acknowledging natural selection—via the contingencies of survival—as the theory that provides the accepted account for the evolution of species over generations, and makes the elegant argument that in addition, another type of selection—via contingencies of reinforcement—accounts for the development of human behavior over the course of a lifetime.

Wyatt, W. J. (2001). *B.F. Skinner from A to Z: Brief quotations on everything from Approval to Zen*. Hurricane, Third Millennium Press.

If you are wondering what Skinner had to say in his many published works about topics such as self-control, thinking, and purpose - this text presents citations to Skinner's works on these topics and more. Wyatt compiled over 145 pages of Skinner references in an A – Z format covering everything from aggression to Zoosemantics.

Chapter 3: Selecting and Defining Target Behaviors

Chapter Summary

Behavior analytic practice requires assessment to guide the identification of target behaviors and the development of interventions. Behavioral assessments are comprised of a variety of direct, indirect, and empirical methods. Assessment begins with a broad scope and uses the information gathered to sharpen the focus. Through screening, prioritizing problems and goals, selecting target behaviors, monitoring progress, and following up, assessment guides all aspects of behavior change programming.

Behavior analysts obtain assessment data through record review, interviews, checklists and rating scales, direct observation, tests, functional analysis, and reinforcer/punisher preference assessments. Each of these methods provides a different source of information; and when combined may provide a more complete understanding of the impact of environmental variables on a person's behavior.

Applied behavior analysis focuses on socially significant behavior change, thus behaviors identified for change must contribute to the quality of a person's daily life. Determining the extent to which a behavior is socially significant is based on the relevance of the behavior, the extent to which it provides additional access to reinforcement, the impact it has on other behaviors, and the age appropriateness. Additionally, for behaviors selected for reduction, an alternative behavior must be identified to replace it.

Typically, more than one behavior is of interest or concern. When multiple behaviors are identified, they must be prioritized for intervention. This can be done by rating each behavior on key factors related to the behavior: relative danger, frequency, length of existence, potential for reinforcement, relevance for future skill development and independent functioning, degree to which it generates negative attention from others, likelihood of being successfully reduced, and the cost of intervening on the behavior.

Once a target behavior has been identified, it must be carefully and completely defined in observable and measurable terms. A good definition is objective, clear, and differentiates what is an example of the target behavior from what is not. Well-written target behavior definitions are necessary in order to accurately and reliably measure behavior and to aggregate, compare, and interpret data. Well-written definitions are also necessary to guide ongoing program decisions, apply interventions consistently and accurately, and provide accountability.

Prior to intervention, the extent to which the target behavior should change must be detailed. The criteria must reflect the social significance of the behavior. Such socially-valid criteria can be established by using the performance of individuals determined to be highly competent as a standard or by experimentally manipulating different levels of performance to determine optimal results.

Chapter Key Terms

ABC recording	ecological assessment	reactivity
anecdotal observation	function-based definition	relevance of behavior rule
behavior checklist	habilitation	social validity
behavioral assessment	normalization	target behavior
behavioral cusp	pivotal behavior	topography-based definition

Chapter Objectives

1. Explain the role of assessment in applied behavior analysis.
2. Describe indirect, direct, and empirical methods for obtaining assessment information.
3. Explain the importance of social validity in regard to selecting target behavior.

4. Describe procedures for assessing the social significance of potential target behaviors.
5. Describe criteria for identifying and prioritizing target behaviors for behavior change.
6. Define behavior in observable and measurable terms.
7. Explain the process for setting criteria for behavior change.

Chapter Focus Questions

1. Why is assessment a critical component of applied behavior analysis?
2. What factors should be considered when determining which behaviors should be targeted for intervention (i.e., established, strengthened, or weakened)?
3. Why is it important to use observable and measurable terms to describe behavior and intervention outcomes?

Chapter Suggested Readings

Johnston, J. M., Pennypacker, H. S. & Green, G. (2019). *Strategies and tactics of behavior research and practice*. (4th ed.). Routledge.

This is a “must have” book for those conducting research and practicing behavior analysis. Part One of the text addresses targeting behavior in practice and research.

Chapter Activities

1. Three potential target behaviors have been identified for Jackson, a 5-year-old boy with developmental disabilities. The three behaviors are: a) When walking to the bus with his teacher, Jackson will run across the street towards the bus to touch the wheels; b) When eating lunch, Jackson will chew with his mouth open, allowing some food to fall out of his mouth; and c) When playing in the sandbox at recess, Jackson will grab toys from other children and scream when they resist or try to reclaim the toy. Use the worksheet in Figure 3.9 (p. 66) to prioritize these behaviors for treatment.
2. Think of two different behaviors in which a child or adult that you know regularly engage. For each behavior, write a function-based definition and topography-based definition. Compare and contrast your definitions.

Chapter 4: Measuring Behavior

Chapter Summary

Measurement is the process of applying quantitative labels to observed properties of events using a standard set of rules. Scientists use measurement to operationalize empiricism. Applied behavior analysts measure behavior to answer questions about the existence and nature of functional relations between socially significant behavior and environmental variables. Practitioners use measurement to evaluate the effectiveness of interventions and to guide decisions regarding treatment.

There are three dimensional qualities of behavior: repeatability, temporal extent, and temporal locus. Measures of repeatability include count, rate, and celeration. Temporal extent is measured by duration. Measures of temporal locus include latency and interresponse time. Derivative measures that combine two forms of data are frequently used in applied behavior analysis, including percentage and trials-to-criterion. Topography and magnitude provide useful information about behavior parameters though they are not fundamental dimensional qualities.

Behavior can be measured through direct methods, or through reviewing the permanent product produced by the behavior. Event recording, timing, and time sampling may be utilized individually or in combination, to measure directly observed behavior. Event recording encompasses a variety of procedures for detecting and recording the number of times a behavior is observed. Timing procedures use different timing devices (e.g., stopwatch) and procedures to measure duration, response latency, and interresponse time. Time sampling refers to a variety of methods for observing and recording behavior during intervals or at specific moments in time. Time sampling procedures include whole-interval, partial-interval, momentary, and planned activity check. If each instance of a behavior produces the same product, and that product is only produced by the behavior, these products can be recorded to measure the behavior. There are numerous low-tech and high-tech tools that may aid in data collection and analysis. High-tech options include digital devices, computer hardware, mobile apps, or software. Selection of the measurement method and tools should be based on behavior change goals, ease of behavior observation, measurement time and locale, and availability and skills of the recorder.

Chapter Key Terms

artifact	interresponse time (IRT)	planned activity check (PLACHECK)
celeration	latency	rate
count	magnitude	repeatability
discrete trial	measurement	temporal extent
duration	measurement by permanent product	temporal locus
event recording	momentary time sampling	time sampling
free operant	partial-interval recording	topography
frequency	percentage	trials-to-criterion
		whole-interval recording

Chapter Objectives

1. Describe the purpose of measurement in applied behavior analysis.
2. List and describe the measurable dimensions of behavior.
3. Describe the different procedures for measuring behavior.
4. Describe scenarios for which measuring behavior by permanent products would be appropriate, and those for which such procedures would not be appropriate.
5. Describe the advantages and disadvantages of low-tech and high-tech measurement tools.
6. Select the appropriate measurement procedure given the dimensions of the behavior and the logistics of observing and recording.

Chapter Focus Questions

1. What is the purpose of measurement in applied behavior analysis?
2. What are the measurable dimensions of behavior?
3. What are the different procedures for measuring behavior?
4. What are some tools for measuring behavior and when would each be beneficial?
5. How does a behavior analyst select the appropriate procedure for measuring behavior?

Chapter Suggested Reading

Gardenier, N. C., MacDonald, R., & Green, G. (2004). Comparison of direct observational methods for measuring stereotypic behavior in children with autism spectrum disorders. *Research in Developmental Disabilities, 25*(2), 99-118.

This article compares momentary time sampling to partial interval recording when measuring stereotypic behaviors in children with autism between 2 and 5 years of age. The results showed that the partial interval recording was more accurate in its measurement while momentary time sampling led to over-estimations of the target response.

Hoge, R. D. (1985). The validity of direct observation measures of pupil classroom behavior. *Review of Educational Research, 55*(4), 469-483.

This article compares different direct observation measurement systems. The techniques described in this article are molar (broad), molecular (specific) measures, and molecular-composite (categorization of specifics). Hoge discusses the validity of these measures and the implications of using them.

Johnston, J. M., Pennypacker, H. S. & Green, G. (2019). *Strategies and tactics of behavior research and practice*. (4th ed.). Routledge.

This is a “must have” book for those conducting research and practicing in behavior analysis. Part Two of the text addresses methods to measure target behaviors.

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

The *Assessment* section of this text provides readers with a thorough discussion of measurement in behavior analytic practice.

Sanson-Fisher, R. W., Poole, A. D., & Dunn, J. (1980). An empirical method for determining an appropriate interval length for recording behavior. *Journal of Applied Behavior Analysis, 13*(3), 493-500.

This article discusses the effects of varying interval lengths when recording data on behavior. It suggests that interval length should be individualized for each study; that is, for the most accurate data it is what the investigator is interested in measuring that should dictate the length of the intervals

Skrtic, T. M., & Sepler, H. J. (1982). Simplifying continuous monitoring of multiple-response/multiple-subject classroom interactions. *Journal of Applied Behavior Analysis, 15*(1), 183-187.

In this investigation the authors used a frequency-within-interval measurement system to code 18 different target responses. The system proved to be reliable, easy to use, and adaptable to different situations.

Thomas, C., Holmberg, M., & Baer, D. M. (1974). A brief report on a comparison of time-sampling procedures. *Journal of Applied Behavior Analysis, 7*(4), 623-626.

This report discusses the accuracy of different time-sampling measurement systems (i.e., ongoing, contiguous, alternating, and sequential time-sampling methods).

Chapter Activities

1. In class, show a clip of an organism engaging in a behavior. Break the class into groups, with each group using a different method to measure the behavior. Include both direct and indirect measurement systems. Discuss the pros and cons of the different systems for each behavior being targeted.
2. Provide students with completed, raw data sheets and have them summarize (calculate) percentages, cumulative numbers, percentage of intervals, and rate per minute/per second.
3. Assign students an article from the *Journal of Applied Behavior Analysis (JABA)* and have each student identify the (a) measurable dimension of the target behavior, and (b) the measurement system. Have students write a brief statement critically evaluating the appropriateness of the selected measurement system. Students should be reminded to base their critique on the material presented in Chapter 4.

Chapter 5: Improving and Assessing the Quality of Behavioral Measurement

Chapter Summary

For behavior data to be useful they must be valid, accurate, and reliable. Measurement validity exists when it is focused on a relevant dimension of a socially significant behavior and is obtained under conditions and during times most relevant to the reasons for measuring the behavior. Measurement is accurate when the observed values of an event match the true values of that event. Measurement is reliable when the same values are generated across repeated measurement of the same event.

A variety of factors can threaten the validity, reliability, and/or accuracy of measurement. Threats to measurement validity include indirect measurement, ill-suited behavioral dimensions, and measurement artifacts. Threats to measurement accuracy and reliability include human error, poorly designed measurement systems, inadequate observer training, observer drift, observer expectations, measurement bias, and reactivity.

Measuring the accuracy of data can help researchers and practitioners determine the usefulness of data for decision making, detect measurement errors, and communicate the trustworthiness of data. Accuracy is measured by comparing the observed measures to their true values. True values of behaviors can be universally accepted, established conditionally by context, or may have to be determined through processes that differ from the measurement of the target behavior. Reliability of data is a measure of the degree to which observers are consistently applying a valid and accurate system. It is assessed using natural or contrived permanent products.

Interobserver agreement (IOA) is the most common indicator of measurement quality in ABA. IOA is the degree to which two or more observers report the same observed values after measuring the same events. A variety of techniques exist for calculating IOA depending upon the recording method being used. The techniques vary in their complexity, stringency, and conservativeness. In order to minimize overestimation of agreement, more stringent and conservative methods of IOA calculation should be used. IOA should be collected and reported for all phases of a study. Reporting of IOA can also be combined with indices of accuracy and reliability to provide a more detailed assessment of the quality of the data.

Chapter Key Terms

accuracy	interval-by-interval IOA	reliability
believability	mean count-per-interval IOA	scored-interval IOA
calibration	mean duration-per-occurrence IOA	total count IOA
continuous measurement	measurement bias	total duration IOA
direct measurement	naïve observer	trial-by-trial IOA
discontinuous measurement	observed value	true value
exact count-per-interval IOA	observer drift	unscored-interval IOA
indirect measurement	observer reactivity	validity
interobserver agreement (IOA)		

Chapter Objectives

1. Identify and describe the elements of useful scientific measurement.
2. Identify threats to measurement validity.
3. Describe various threats to the accuracy and reliability of measurement.
4. Identify and explain ways to assess the accuracy and reliability of behavioral measurement.
5. Identify and explain how to assess interobserver agreement (IOA) for a variety of data sets.

Chapter Focus Questions

1. What is the relative importance of validity, accuracy, and reliability of behavioral measurement?
2. What threatens measurement validity?
3. What are the three greatest threats to the accuracy and reliability of behavioral measurement?
4. What procedures can be used to minimize the threats to the accuracy and reliability of behavioral measurement?
5. Why do behavior analysts obtain and report interobserver agreement?
6. What are the criteria for obtaining valid IOA measures?
7. What are the methods for calculating IOA and how do they differ?

Chapter Suggested Readings

Artman, K., Wolery, M., & Yoder, P. (2012). Embracing our visual inspection and analysis tradition. *Remedial and Special Education*, 33(2), 71-77.

The benefits of graphing IOA data on the same graphic display as primary measures of behavior are described in this article.

Bailey, J. S. & Burch, M. R. (2002). *Research methods in applied behavior analysis* (2nd ed.). Routledge.

This book offers the readers a step-by-step, “how-to” conduct research in applied behavior analysis, including quality measurement of behavior.

Johnston, J. M., Pennypacker, H. S. & Green, G. (2019). *Strategies and tactics of behavior research and practice*. (4th ed.). Routledge.

Chapter 8 of this essential text is focused on how to evaluate measurement.

Mudford, O. C., Taylor, S. A., & Martin, N. T. (2009). Continuous recording and interobserver agreement algorithms reported in the *Journal of Applied Behavior Analysis* (1995–2005). *Journal of Applied Behavior Analysis*, 42(1), 165-169.

This article provides a review of ten issues of JABA to discover the prevalence of different methods for calculating IOA when continuous recording was used.

Chapter Activities

1. Provide students with multiple data sets. Have them identify the appropriate methods and calculate IOA using the various methods described in Chapter 5.
2. Provide students with a variety of measurement instruments and have students calibrate each instrument to true values.
3. Provide students with a clip of a person engaging in a particular behavior, in addition to a written case describing the behavior, the method to measure that behavior, and need for measurement. Have each group discuss the potential threats to validity, independently observe and record behavioral data, and calculate IOA for the given scenario.

Chapter 6: Constructing and Interpreting Graphic Displays of Behavioral Data

Chapter Summary

The data behavior analysts acquire through direct and repeated measurement of behavior are displayed in order to conduct visual analyses. Simple graphs visually display relationships among and between behaviors and relevant environmental variables. Through the visual analysis of graphic displays of behavioral data, applied behavior analysts are able to answer questions related to the meaningfulness of behavior change, and make treatment or experimental decisions.

Graphic displays and visual analysis of behavioral data have several benefits over other displays of behavioral data. Plotting data immediately following an observation period provides the practitioner with an ongoing and progressive record of participant behavior. Graphs are a simple and easily analyzable format for practitioners. Visual analysis of behavioral data is relatively easy to learn, is less time consuming, and does not rely on mathematical or statistical assumptions. Graphic displays and visual analyses help filter out the effects of weak variables and often allow for the identification of robust interventions. In addition, graphic displays of behavioral data encourage behavior analysts to draw their own conclusions based on patterns of behavior over time rather than relying on statistical manipulations. The visual representation of their own behavior may also serve as feedback for the individual whose behavior is being graphed.

There are several types of graphs used to display behavioral data in applied behavior analysis. The visual format selected depends on the type of raw data collected and the primary purpose of the evaluation. Commonly used graphic displays include equal-interval line graphs, bar graphs, cumulative records, ratio charts, and scatterplots. Line graphs are the format most commonly used by behavior analysts. The basic parts of a properly constructed line graph include accurately labeled vertical and horizontal axes, clearly placed and connected data points, appropriately placed condition lines and labels, and a descriptive figure caption. In addition, there is The Standard Celeration Chart, a six-cycle ratio scale which provides a standardized form of charting and assessing frequency of behavior across time.

Conducting visual analysis of graphed data enables behavior analysts to determine if socially significant behavior change has occurred, and if the independent variable is responsible for that change. Prior to visually analyzing data, behavior analysts should ensure that displays are constructed without distortion of the data. The process for conducting visual analyses includes assessment of: 1) the number of data points, 2) the variability of the data, 3) the level of performance, and 4) the direction and slope of the trend of the data within a condition. The significance of change in trend, level, and/or variability between conditions can be determined through a visual analysis.

Chapter Key Terms

bar graph	graph	ratio scale
cumulative record	independent variable	scatterplot
cumulative recorder	level	split-middle line of progress
data	line graph	Standard Celeration Chart
data path	local response rate	trend
dependent variable	overall response rate	variability
equal-interval scale	precision teaching	visual analysis

Chapter Objectives

1. State the purpose and list the benefits of graphic displays of behavioral data.
2. List and describe the types of graphs used in applied behavior analysis.
3. Given a set of behavioral data, select the appropriate data display to communicate quantitative relations.

4. Given an unlabeled line graph, provide the correct labels.
5. Describe the purpose of ratio charts.
6. List the elements of the Standard Celeration Chart.
7. Describe the proper use of a cumulative record.
8. Describe the proper use of a scatterplot.
9. Given a set of behavioral data, select, construct, and label the most appropriate graphic display.
10. Given a graphic display of behavioral data, evaluate the number of data points, variability, level, and trends.

Chapter Focus Questions

1. What are the benefits of graphic displays and visual analysis of behavioral data?
2. What are the fundamental properties of behavior change over time?
3. What are the different visual formats for the graphic display of behavioral data? What are the relative strengths and limitations of each visual format?
4. What are the basic parts of a properly constructed line graph?
5. How are an equal-interval line graph and a ratio scale similar and how do they differ?
6. What is the Standard Celeration Chart, and when is it useful?
7. What is the purpose of visual analysis?
8. How is a visual analysis of behavioral data conducted?

Chapter Suggested Readings

Bailey, J. S. & Burch, M. R. (2002). *Research methods in applied behavior analysis* (2nd ed.). Routledge.

Step 10 of this book includes guidelines for the design of graphs used in applied behavior analysis. The chapter outlines the guidelines for creating a graph suitable for publication in the *Journal of Applied Behavior Analysis*.

Deochand, N., Costello, M. S., & Fuqua, R. W. (2015). Phase-change lines, scale breaks, and trend lines using Excel 2013. *Journal of Applied Behavior Analysis*, 48(2), 478-493.

This is the latest article to provide task analyses for graphing using Microsoft Excel, including additional elements such as phase-change lines, scale breaks, and trend lines.

Deochand, N., Costello, M. S., & Fuqua, R. W. (2017). Chart goals for behavior analysis. *Behavior Analysis: Research and Practice*, 17(1), 101-102.

This article provides an evaluation of inconsistent charting in behavior analytic studies, and suggestions on how to mitigate such inconsistencies.

Fisher, W. W., Kelley, M. E., & Lomas, J. E. (2003). Visual aids and structured criteria for improving visual inspection and interpretation of single-case designs. *Journal of Applied Behavior Analysis*, 36(3), 387-406.

This article presents strategies to improve the accuracy of visual inspection and interpretation of single-case experimental designs. The article includes a discussion surrounding the accuracy of different methods, training to improve the accuracy of visual analysis, and a description of how to train large groups in the interpretation of single-case designs.

Gunter, P. L., Miller, K. A., Venn, M. L., Thomas, K., & House, S. (2000). Self-graphing to success: Computerized data management. *Teaching Exceptional Children*, 35(2), 30-34.

This article explains the process of teaching children how to graph their goals and achievements using the computer. The article references literature on the effects of self-monitoring on student behavior.

Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*, 71(2), 165–179.

This article presents the defining features and quality indicators for single-subject research. The authors present a discussion on the important role of single-subject experimental research designs as a method to conduct educational research.

Johnston, J. M., Pennypacker, H. S., & Green, G. (2019). *Strategies and tactics of behavior research and practice*. (4th ed.). Routledge.

This classic text is a “must have” for behavioral researchers. The authors include an in-depth and detailed description of constructing and interpreting graphic displays of behavioral data.

Kennedy, C. H. (2005). *Single-case designs for educational research*. Pearson.

This book provides readers with a comprehensive look at the use and application of single-subject research, including graphic displays of data. This text is a must read for individuals interested in conducting research in applied, educational settings.

Michael, J. (1974). Statistical inference for individual organism research: Mixed blessing or curse? *Journal of Applied Behavior Analysis*, 7(4), 647 – 653.

This brief, classic article discusses the potential, harmful effects of over utilizing descriptive and inferential statistics in the analysis and interpretation of behavioral data. Michael discusses the importance and influence of graphic displays of behavioral data on the behavior of the researcher.

Mitteer, D. R., Greer, B. D., Fisher, W. W., & Cohrs, V. L. (2018). Teaching behavior technicians to create publication quality, single-case design graphs in graphpad prism 7. *Journal of Applied Behavior Analysis*, 51(4), 998-1010.

As part of an evaluation of training using video modeling, this article provides features of publication quality graphic displays of data.

Parsonson, B. S. (2003). Visual analysis of graphs: Seeing is believing. In K. S. Budd & T. Stokes (Eds.), *A small matter of proof: The legacy of Donald M. Baer* (pp. 35 – 51). Context Press.

This chapter offers readers insight into visual analysis of graphed data. The chapter includes discussion of fine-grained visual analysis, statistical analysis, and stimuli that control visual analysis. The chapter offers applied behavior analysis future directions for visual analysis.

Chapter Activities

1. Have students construct a reversal design line graph on Excel using the following data set:

	Baseline	Intervention	Baseline	Intervention
Hits per minute (rate)	5	10	10	5
	10	5	15	2
	15	0	20	0

2. Go to <https://psych.athabascau.ca/html/387/OpenModules/Lindsley/> and complete the online Precision Teaching learning module.

Chapter 7: Analyzing Behavior Change: Basic Assumptions and Strategies

Chapter Summary

The understanding of human behavior stems from the uncovering of functional relationships between behavior and the environment. Although precise measurement of behavior shows change over time, experimental analyses are critical to determining how a given behavior functions in relation to specific environmental events.

Scientific investigations provide three levels of understanding: description, prediction, and control. The goal of experimental analyses in applied behavior analysis is to understand socially significant behaviors. Experimental analyses are conducted to investigate the changes in behavior in relation to environmental events manipulated by the experimenter. Experimental control is demonstrated when a predictable change in the dependent variable (behavior of interest) can be reliably produced by the experimenter making systematic changes in the independent variable (environmental event).

Applied behavior analysts are interested in the behavior of individual organisms and primarily utilize within-subject (or single-case) methods of analysis with repeated measures over time. In behavior analytic research, suspected determinants of variability are isolated, then experimentally manipulated to better understand their role in variable responding. Determinism is a major assumption of behavior analysis.

Single-case research designs are the most commonly used designs in applied behavior analysis. Components of behavior analytic experiments include the research question, at least one dependent variable, precise manipulation of the independent variable, careful observation and measurement, and ongoing visual inspection of resulting data patterns. Behavior analysts employ steady state strategy (i.e., ensuring stable responding in any given condition, before introducing changes to that condition) and baseline logic in the evaluation of behavior change over time. Baseline logic includes three elements: prediction, verification, and replication. Baseline levels of responding are established as an objective basis for evaluating the effects of the independent variable. The heart of baseline logic is the inductive proposition known as “affirmation of the consequent”—in this case, the notion that if an independent variable “A” influences behavior then its presentation will lead to a change, “B,” in behavior. A successful experimental design leads to increasing confidence in the effect of the independent variable each time it confirms a given “if A-then-B” relationship.

Chapter Objectives

1. Define and give examples of the basic assumptions underlying the analysis of behavior.
2. List and describe the three levels of scientific understanding.
3. Outline how experiments should be conducted to control for various threats to internal validity.
4. Compare and contrast the role of variability in single-case versus group research designs.
5. List and define the essential components of experiments in applied behavior analysis research.
6. Write a specific research question given a behavioral phenomenon of interest.
7. List and define the three elements of baseline logic.
8. Discuss the value of establishing a steady baseline in applied behavior analysis.
9. Outline guidelines for establishing a steady baseline in applied behavior analysis research.
10. Identify four types of baseline data patterns.
11. Discuss how single-case research employs the inductive logic known as “affirmation of the consequent.”
12. Systematically manipulate independent variables and analyze their effects on treatment. (Application)

Chapter Focus Questions

1. What are the basic assumptions underlying the analysis of behavior and give examples of each?
2. What are the levels of scientific understanding and give examples of each?
3. What is a functional relation and how is it demonstrated in behavior analytic research?
4. Explain internal and external validity and their relation to confounding variables.
5. Explain what "Behavior is determined" means and why it's important.
6. Given various graphs, explain if and how they support prediction, verification, and replication.
7. What are the essential components of experiments in applied behavior analysis research?
8. Give examples of plausible independent and dependent variables that might go together.

Chapter Key Terms

A-B design	experimental design	replication
affirmation of the consequent	external validity	single-case designs
ascending baseline	extraneous variable	stable baseline
baseline	independent variable	steady state responding
baseline logic	internal validity	steady state strategy
confounding variable	parametric analysis	variable baseline
dependent variable	practice effects	verification
descending baseline	prediction	
experimental control	research question	

Chapter Suggested Readings

Johnston, J. M., Pennypacker, H. S., & Green, G. (2019). *Strategies and tactics of behavior research and practice (4th ed.)*. Routledge.

This book is a “must have” for individuals interested in conducting single-case research.

Johnston, J. M. & Pennypacker, H. S. (1993). *Readings for strategies and tactics of behavior research (2nd ed.)*. Erlbaum.

Readers should consider using this text as a companion to *Strategies and Tactics of Behavior Research* for an in-depth understanding of research methods used in behavior analysis.

Kazdin, A. E. (1982). *Single case research designs: Methods for clinical and applied settings*. Oxford University Press.

This text offers readers a detailed description of the various research tactics employed in behavior analysis research. Readers should consider this book as a companion to this textbook (*Applied Behavior Analysis, 3rd edition*).

Kennedy, C. H. (2005). *Single-case designs for educational research*. Allyon and Bacon.

This book provides readers a comprehensive look at the use and application of single-subject research design specifically targeted for educational research questions. This text is a must read for individuals interested in conducting research in applied, educational settings.

Ledford, J. R., & Gast, D. L. (Eds.). (2018). *Single case research methodology: Applications in special education and behavioral sciences*. Routledge.

This text describes the various research tactics employed largely in special education contexts.

Sidman, M, (1960/1988). Tactics of scientific research: Evaluating experimental data in psychology. Basic Books/Authors Cooperative (reprinted).

This classic text is a must read for any individual interested in behavioral research.

Chapter Activity

1. Review "Excel Graphing ABA Style" by Ryan Sain at <https://www.youtube.com/watch?reload=9&v=FcjV8YODnU4> and create a graph using the data from the table below.

	Baseline	Intervention	Baseline
Hits per minute (rate)	5	10	10
	10	5	15
	15	0	20

Chapter 8: Reversal and Multielement Designs

Chapter Summary

This chapter focuses on two experimental tactics commonly used in applied behavior analysis research: the reversal design and the multielement design. Minimally, the reversal design entails three conditions: A (non-intervention baseline); B (treatment); A (a repeat of the non-intervention condition). A functional relation is demonstrated when an abrupt change occurs with the onset of treatment and then reverts back to the initial condition with the onset of the second non-intervention condition. This design is strengthened considerably when the B (treatment) condition is reintroduced and the level once again approximates the initial B (treatment) condition.

The B-A-B design is used when it is impractical or unethical to employ an A-B-A or A-B-A-B design. Introducing the B condition first is not ideal experimentally because doing so removes the opportunity to obtain a baseline measure. By not introducing the A condition first, the experimenter forfeits the opportunity to obtain a baseline measure known to be free from the influence of the intervention. For this reason, the B-A-B, experimentally, is less preferred than the A-B-A design. A sequence effect occurs when an intervention condition influences behavior in a subsequent condition, thus resulting in a threat to internal validity.

With the multielement design, two or more conditions (e.g., one baseline condition and two interventions conditions) are rapidly alternated. The two data series are plotted on the same graph with each series representing its own baseline or intervention condition. A functional relation is demonstrated when the target behavior is consistently at a different level under the one condition than it is under the other condition. A two-phase version of this design begins with only a baseline condition, followed by subsequent alternating treatment conditions.

The adapted alternating treatments design similarly begins with a baseline condition, but then applies two different teaching interventions to two topographically different but equivalent sets of skills. Other variations include a three-phase design, wherein a baseline condition is followed by alternating treatment conditions, which is then followed by the best (i.e., most effective) condition or the participant's choice condition.

A concurrent chains (or concurrent schedule) design has two or more interventions running simultaneously. The participant selects under which contingencies they will operate. Dependent measures reflect the amount of engagement in one condition versus the other(s). Consistently more engagement in one condition provides evidence of that condition being preferred.

Chapter Objectives

1. Analyze the effects of a variety of independent variables using the reversal design, multielement design, and their variants.
2. Select the appropriate experimental tactic based on the research question of interest and the appropriateness of the design.
3. Discuss how the reversal design and the multielement design and their variations incorporate the elements of baseline logic (prediction, verification, and replication).
4. State and describe advantages and disadvantages in using the reversal design and multielement designs.
5. Identify practical and ethical considerations in using the reversal design and multielement designs.

Chapter Focus Questions

1. Describe the three phases of an A-B-A reversal design.
2. Discuss why reintroducing the B condition is the preferred tactic in demonstrating a functional relationship between the independent and dependent variables.
3. Describe how an A-B-A reversal design incorporates baseline logic (prediction, verification, and replication).
4. Discuss why a B-A-B design might be considered a preferable tactic in applied research.
5. Identify a limitation that might impact the analysis of a reversal design.
6. Identify the social, educational, and ethical issues of using a reversal design.
7. State the practical advantages of using a noncontingent reinforcement (NCR) reversal technique.
8. State four strengths of the A-B-A-B reversal design.
9. Discuss two limitations of the A-B-A-B reversal design.
10. Draw a graphic representation of an A-B-A and an A-B-A-B reversal design.
11. State a rationale for using either a DRO or DRI/DRA reversal technique.
12. Describe the characteristics of a multielement design.
13. Describe how the multielement design incorporates baseline logic (prediction, verification, and replication).
14. Discuss how the presence and degree of experimental control is determined when employing a multielement design.
15. Describe variations of the multielement design.
16. Describe advantages of the multielement design.
17. Describe possible limitations of the multielement design.
18. Discuss the distinguishing features of an adapted alternating treatments design and the circumstances under which it is to be used.
19. Draw a graphic representation of a multielement design. (Hint: Attend carefully to the plotting of data points with respect to sessions.)
20. Discuss circumstances under which single-, two-, and three-phase designs are useful.
21. Given graphs illustrating reversal and multielement designs, identify the presence or absence of a functional relationship.

Chapter Key Terms

A-B-A design	irreversibility
A-B-A-B design	multielement design
adapted alternating treatments design	multiple treatment interference
alternating treatments design	multiple treatment reversal design
B-A-B design	noncontingent reinforcement (NCR) reversal technique
concurrent chains (schedule) design	reversal design
DRI/DRA reversal technique	sequence effects
DRO reversal technique	withdrawal design

Chapter Suggested Reading

Johnston, J. M., Pennypacker, H. S., & Green, G. (2019). *Strategies and tactics of behavior research and practice (4th ed.)*. Routledge.

This book is a “must have” for individuals interested in conducting single-case research.

Johnston, J. M. & Pennypacker, H. S. (1993). *Readings for strategies and tactics of behavior research (2nd ed.)*. Erlbaum.

Readers should consider using this text as a companion to *Strategies and Tactics of Behavior Research* for an in-depth understanding of research methods used in behavior analysis.

Kazdin, A. E. (1982). *Single case research designs: Methods for clinical and applied settings*. Oxford University Press.

This text offers readers a detailed description of the various research tactics employed in behavior analysis research. Readers should consider this book as a companion to this textbook (*Applied Behavior Analysis, 3rd Edition*).

Kennedy, C. H. (2005). *Single-case designs for educational research*. Allyn and Bacon.

This book provides readers a comprehensive look at the use and application of single-subject research design specifically targeted for educational research questions. This text is a must read for individuals interested in conducting research in applied, educational settings.

Richards, S. B., Taylor, R., Ramasamy, R., Richards, R. Y. (1998). *Single-subject research: Application in educational and clinical settings*. Wadsworth Publishing.

This textbook provides information on the basic concepts and issues in applied behavior analysis research.

Chapter 9: Multiple Baseline and Changing Criterion Designs

Chapter Summary

This chapter describes multiple baseline and changing criterion designs. In a multiple baseline design, data are collected during simultaneous baseline conditions for two or more behaviors. After stable responding has been achieved, the independent variable is applied to one of the behaviors while baseline conditions are maintained for the other behaviors. After change has been observed in the first behavior, the independent variable is applied sequentially to each behavior in the design. Experimental control is demonstrated when behavior change corresponds with the onset of the independent variable for each behavior. Three basic types of multiple baseline designs are (a) multiple baseline across different behaviors of the same individual, (b) multiple baseline across the same behavior of different individuals, and (c) multiple baseline of the same behavior of one individual across different settings.

Variations of the multiple baseline design include a multiple probe design, a delayed multiple baseline design, and a nonconcurrent multiple baseline design. Multiple probe designs begin with the standard baseline conditions for all behaviors. Once stability is achieved, intermittent measures are taken at the beginning of the experiment and thereafter each time a subject has mastered one of the behaviors or sequential skills. This design is useful for evaluating the effect of instruction on skill sequences when it is unlikely that the skill will improve without instruction, in addition to situations where a prolonged baseline could have negative effects. For delayed multiple baseline designs, baseline conditions for subsequent behaviors begin at some point following the onset of baseline measurement for earlier behaviors. Each subsequent baseline condition must start prior to earlier behaviors beginning intervention in order for experimental control to be demonstrated. This design may be used when a planned reversal is no longer possible, resources are limited, or a new behavior or participant becomes available. Nonconcurrent multiple baseline designs, the weakest variation, consist of multiple A-B designs with different participants and periods of time. The varying baseline conditions of the nonconcurrent multiple baseline design inhibit the verification element of baseline logic from being met by this design.

In order for experimental control to be achieved through use of a multiple baseline design, behaviors of interest must be functionally independent and share a reasonable likelihood of responding to the independent variable. Behaviors must also be measured concurrently and interventions cannot be applied to the next behavior until the previous behavior change has been established. There should be a significant difference in the length of baseline conditions between the different behaviors and the independent variable should first be applied to the behavior demonstrating the greatest level of stable responding in baseline.

Advantages of the multiple baseline design include: 1) withdrawing a potentially effective intervention is not required, 2) the pattern is similar to typical practices of many teachers and clinicians, 3) generalization of behavior change is monitored, and 4) the ease of conceptualization and implementation. Limitations of the design include: 1) potential false negatives if behaviors are not functionally independent, 2) weaker demonstrations of experimental control, 3) evaluates the independent variable's general effectiveness rather than an analysis of the behaviors selected for study, and 4) requires considerable time and resources.

Changing criterion designs can be used to evaluate the effects of a treatment on the gradual or stepwise improvement of a behavior already in the individual's repertoire. After a stable baseline has been observed, the first intervention phase begins. Reinforcement is typically contingent upon performance at a specified level. The design entails a series of intervention phases, each requiring improved performance. Experimental control is demonstrated when behavior conforms to the criterion changes. Range-bound changing criterion designs include low and high criterion points, between which responding may fall during each phase. Two advantages of this design are that it does not require withdrawal of a seemingly effective treatment and that it enables experimental analysis within the context of a gradually improving behavior. Two limitations of the design are that the target behavior must already be in the subject's repertoire and that the necessary features of the design may impede the natural learning rate.

Chapter Key Terms

changing criterion design	multiple baseline design
delayed multiple baseline design	multiple probe design
multiple baseline across behaviors design	nonconcurrent multiple baseline design
multiple baseline across settings design	range-bound changing criterion design
multiple baseline across subjects design	

Chapter Objectives

1. Describe how the multiple baseline is arranged and how experimental control is achieved.
2. Describe the differences between the basic types of multiple baseline designs and the variations of multiple baseline designs.
3. Describe how the changing criterion design is arranged and how experimental control is achieved.
4. State the advantages and limitations of multiple baseline designs and changing criterion designs.
5. Discuss the practical and ethical considerations when using multiple baseline designs and changing criterion designs.
6. Given a hypothetical scenario, select the appropriate experimental design and variation.

Chapter Focus Questions

1. What are the features of the multiple baseline design?
2. What are the features of the changing criterion design?
3. How is experimental control achieved with the multiple baseline and changing criterion designs?
4. What are the variations of the multiple baseline and changing criterion designs?
5. What are the practical and ethical considerations when selecting a multiple baseline or changing criterion design?

Chapter Suggested Readings

Bailey, J. S., & Burch, M. R. (2002). *Research methods in applied behavior analysis* (2nd ed.). Routledge.

This book offers the readers a step-by-step, “how-to” conduct research in applied behavior analysis.

Johnston, J. M., Pennypacker, H. S., & Green, G. (2019). *Strategies and tactics of behavior research and practice*. (4th ed.). Routledge.

This book is a “must have” for individuals interested in conducting single-subject research, in addition to those using single-subject design as part of behavior analytic practice.

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

This text offers readers a detailed description of the various research tactics employed in behavior analysis research. Readers should consider this book as a companion to this textbook (*Applied Behavior Analysis*).

Kennedy, C. H. (2005). *Single-case designs for educational research*. Pearson.

This book provides readers with a comprehensive look at the use and application of single-subject research design specifically targeted for educational research questions. This text is a must read for individuals interested in conducting research in applied, educational settings.

Sidman, M, (1960/1988). *Tactics of scientific research: Evaluating experimental data in psychology*. Basic Books/Boston: Authors Cooperative (reprinted).

This classic text is a “must read” for any individual interested in behavioral research.

Chapter 10: Planning and Evaluating Applied Behavior Analysis Research

Chapter Summary

This chapter supplements the information of previous chapters and discusses considerations that should be addressed when designing, replicating, and evaluating behavioral research. The main ideas presented are (a) the importance of the individual subject, (b) the value of a flexible experimental design, and (c) the importance of identifying and controlling the variables that contribute to the internal, external, and social validity of research.

Behavioral research focuses on individual subjects to identify effective interventions for behaviors that are socially important. The strength of single-subject experimental research is the convincing demonstration of a functional relationship between the behavior and the intervention. Between group research designs, while appropriate in many situations, present the average performances of subjects and do not reveal any information about the performance of individual subjects. Additionally, group designs strive to cancel out individual variability through statistical manipulation. Given that the most valuable information about an intervention is its effect on the behavior of individuals, the systematic and strategic control of variability in single subject designs is more likely to uncover important information about the effects of treatment procedures.

Flexibility in experimental design is important because it allows the researcher to address questions of interest using the most appropriate design or design combinations. A good research design is one that manipulates the relevant variables in a manner that produces data to convincingly answer the research question(s). Often, this may require a combination of analytic tactics. Effective designs rely on continual analysis of data from individual subjects as the basis for evaluation.

The validity and reliability of a research study are measured by examining the internal, social, and external validity of its treatment and outcomes. *Internal validity* refers to the extent to which an experiment shows convincingly that changes in the behavior are a result of the independent variable. Designs with a high degree of internal validity demonstrate a reliable intervention effect and minimize the possibility that the effect was due to factors other than the independent variable. Treatment integrity and procedural reliability are two measures of internal validity and refer to the extent to which the independent variable was implemented as planned. *Social validity* refers to the social significance of the target behavior, the acceptability of the intervention procedures, and the social importance of the outcomes. Assessment of social validity typically includes evaluation of consumer opinion as well as expert evaluation, normative comparisons, standardized tests, and real-world application of learned skills in the natural environment. *External validity* refers to the degree to which a functional relationship found in a given experiment will hold under different circumstances, such as in other settings, with other populations, and with other behaviors. In applied behavior analysis external validity or research generality is assessed through direct and systematic replication of experiments.

The chapter concludes with a discussion of the importance of evaluating applied behavior analysis research to establish the quality and value of the results. Evaluation of research should include consideration of all aspects of the experiment, from the technological description, to the interpretation of the findings. As importantly, the conceptual framework of the study should be evaluated for its scientific merit. Although all conceptual criteria for quality are important, it is unlikely and unnecessary that each experiment meet all the standards to be considered worthwhile.

Chapter Key Terms

add-in component analysis
component analysis
direct replication
double-blind control
drop-out component analysis

placebo control
procedural fidelity
replication
social validity
systematic replication

treatment drift
treatment integrity
treatment package
Type I error
Type II error

Chapter Objectives

1. Explain the importance of the individual subject in behavioral research.
2. Identify and describe the fundamental concerns with between group experimental designs.
3. Explain the importance of flexibility when designing single subject experiments.
4. Identify potential sources of confounding variables in experimental designs and systems for evaluating and increasing internal validity.
5. Define the three components of and design systems for evaluating social validity.
6. Define scientific generality and identify and design systems for monitoring external validity.
7. Explain the importance of evaluating applied behavior analysis research in the areas of internal validity, social validity, external validity, and scientific and theoretical significance.

Chapter Focus Questions

1. Why is the individual subject of central importance in applied behavior analysis?
2. Why is it important for researchers to be flexible when designing research experiments?
3. How does assessment of internal validity contribute to the strength of a research experiment?
4. Why is social validity important in research?
5. How does evaluating the external validity of a study contribute to the field of applied behavior analysis?
6. How does evaluation of behavioral research strengthen the field of applied behavior analysis?

Chapter Suggested Readings

Readings: Single Subject Research

Bailey, J. S., & Burch, M. R. (2018). *Research methods in applied behavior analysis (2nd ed.)*. Routledge.

This book offers the readers a step-by-step, “how-to” conduct research in applied behavior analysis and submit it for publication. The text covers organizing, implementing, and evaluating research studies.

Ledford, J. R., & Gast, D. L. (Eds.). (2018). *Single case research methodology: applications in special education and behavioral sciences (3rd ed.)*. Routledge.

This is a thorough, user-friendly book that provides a comprehensive overview of single subject research methodology. A variety of single case research studies across a wide range of participants and community settings are presented making this book relevant to multiple disciplines.

Johnston, J. M., Pennypacker, H. S., & Green, G. (2020). *Strategies and tactics of behavioral research and practice (4th ed.)*. Routledge.

This book describes effective methods for measuring and evaluating changes in behavior and provides a rationale for different designs and procedures. The text explains the strengths and weaknesses of methodological alternatives so that behavioral researchers can make the best decisions in various circumstances.

Kazdin, A. E. (2010). *Single case research designs: Methods for clinical and applied settings (2nd Ed.)*. Oxford University Press.

This text offers readers a detailed description of the various research tactics employed in behavior analysis research. The second edition focuses on evaluating interventions across a broader range of research areas in various disciplines in addition to interventions in behavior analysis.

Sidman, M. (1988). *Tactics of scientific research : evaluating experimental data in psychology*. Authors Cooperative.

This is a classic text that describes the step-by-step planning of experiments and the need for constant attention to trends of incoming data that may necessitate adjusting research methodology.

Issues in Replication: The Replication Crisis

Laraway, S., Snyckerski, S., Pradhan, S., and Huitema, E. (2019). An overview of scientific reproducibility: Consideration of relevant issues for behavior science/analysis. *Perspectives on Behavior Science*, 42(1), 33–57. <https://doi.org/10.1007/s40614-019-00193-3>

This article reviews the issue related to failures in the replicability of studies in the biomedical, behavioral, and social sciences. Suggestions for improving replicability in studies in behavioral science and behavior analysis is offered.

Tincani, M., & Travers, J. (2019). Replication Research, Publication Bias, and Applied Behavior Analysis. *Perspectives on Behavior Science*, 42(1), 59–75. <https://doi.org/10.1007/s40614-019-00191-5>

The authors argue that the “replication crisis” and the contingencies of publication bias that led to the crisis also operate on applied behavior analysis (ABA) researchers who use single-case research designs (SCRD). The authors offer suggestions to counter this bias including establishing journal standards for publishing non-effect studies.

Perone, M. (2019). How I learned to stop worrying and love replication failures. *Perspectives on Behavioral Science*, 42(1), 91–108. <https://doi.org/10.1007/s40614-018-0153-x>

This paper argues that failures to replicate exposes flaws in our understanding of a phenomena under study. We should accept the contradictory findings as valid and pursue an experimental analysis of the possible reasons in order to advance our science.

Internal Validity

Petursdottir, A. I., & Carr, J. E. (2018). Applying the taxonomy of validity threats from mainstream research design to single-case experiments in applied behavior analysis. *Behavior Analysis in Practice* 11(3), 228–240. <https://doi.org/10.1007/s40617-018-00294-6>

In this paper, the authors discuss the application of a taxonomy of threats to experimental validity used with group designs to single-case experimental research. The authors hope this translation will result in more careful research designs and an increased ability to communicate outside our field using common vocabulary.

Chapter Activities

Evaluating Single Subject Research

Set up: Individually, in pairs, or in small groups. Each group can evaluate the article on all four dimensions, or separate groups can evaluate one dimension each.

Article:

Iannaccone, J. A., Hagopian, L. P., Javed, N., Borrero, J. C., & Zarcone, J. R. (2019). Rules and statements of reinforcer loss in differential reinforcement of other behavior. *Behavior Analysis in Practice*, 13(1), 81–89. <https://doi.org/10.1007/s40617-019-00352-7>

Evaluate the single subject study by Iannaccone et al., (2019) for quality requirements in the key areas of internal validity, social validity, external validity, and scientific and theoretical significance. Refer to pages 241-247 in Chapter 10.

1. Describe the strengths and weaknesses of the study’s internal validity
 - a. Were the data valid and accurate measures of the target behaviors? (see table on p. 242)
 - b. Are the data graphed without distortion and is the target behavior stable in each phase?
 - c. Were the baseline conditions meaningful in relation to the target behavior, setting, and research question?

- d. What type of experimental reasoning does the design allow?
- e. Does a visual analysis and interpretation of the data support a functional relationship?
2. Describe and evaluate the methods the study used to address social validity.
3. Describe whether and how external validity was addressed in the research.
4. Evaluate the research's theoretical significance and conceptual sense.

Feedback Key for Evaluating Single Subject Research Activity using Iannaccone et al., 2019

1. Internal Validity

a. *Were the data valid and accurate measures of the target behaviors?*

Weaknesses: Dependent variable was "problem behavior" that was described individually for each participant.

- ✓ Most of the definitions lacked clarity and precision. Kicking objects and throwing objects had clear distance measures.
- ✓ There were no examples or nonexamples provided.
- ✓ Some behaviors may not lend themselves as readily to a frequency count/RPM, such as self-scratching or skin picking
- ✓ No description of training on data collection.
- ✓ Sessions were implemented in a padded session room or allergy friendly bedroom limiting statements that can be made about the intervention and its effects in more natural settings.
- ✓ No accuracy or reliability of the data were reported.

Strengths:

- ✓ Concomitant behaviors were measured.
- ✓ IOA data per subject and in each condition were collected and averaged in the 90% range. IOA data were collected for between 30 and 42 percent of the sessions.
- ✓ Notes that computers with data collection software were used to collect data throughout the study – automation increases data integrity.
- ✓ Sessions appeared to occur close enough in time; there were no zero session days noted.
- ✓ Treatment integrity was evaluated during 30-42 percent of the sessions. Correct responding was operationally defined, and data were collected on the correct reinforcer delivery, rule delivery, and SRL loss delivery. Fidelity ranged from 97-100 percent.

Cannot Assess: contingencies operating on the observer, DV reactivity to measurement system.

b. *Are the data graphed without distortion and is the target behavior stable in each phase?*

- ✓ Sessions make it difficult to know how many days passed from the beginning to the end of the research and how many sessions occurred per day.
- ✓ Baseline for Seth was quite variable as was the rule DRO in the final condition. These data suggest something else may be occurring. Less convincing data in this case (study notes that behaviors were maintained by to functions).

c. *Were the baseline conditions meaningful in relation to the target behavior, setting and research question?*

- ✓ Baseline sessions were held in the same room as the intervention. Access to the preferred reinforcer was delivered contingent upon the occurrence of the target behavior. Baseline contingencies replicated function of the behavior.

d. *What type of experimental reasoning does the design allow?*

- ✓ These conditions were evaluated using a multielement design across treatment phases. Visual cues were used to discriminate between the conditions.
- ✓ Experimental tactic – rapidly demonstrate differential effects across conditions.
- ✓ Would have been stronger if the "effective" intervention was implemented as the only treatment following the last comparison condition.
- ✓ Replicated across three subjects.
- ✓ Component analysis: Rule versus Rule with SRL comparison as well.

- e. ***Does a visual analysis and interpretation of the data support a functional relationship?***
- ✓ Jude's graphs showed the most convincing effect with no overlapping data points in the last phase.
 - ✓ Jeffery had a stable baseline across the phases, but some variability in the treatment data with overlapping data points.
 - ✓ Seth's data had the greatest variability and was the least convincing. In the last phase the Rule with DRO + SRL was consistently low and remained at or near zero for the last three sessions which added some confidence in interpreting the effect.
2. **Social Validity:** Evaluate the methods the study used to address social validity.
- ✓ The study assessed the appropriateness or acceptability of the various treatment procedures using a survey employing a 5-point Likert scale. The Rule with DRO + SRL was the most preferred treatment and the most successful. The target behavior nor the social importance of the outcome were assessed.
3. **External Validity:** Describe whether and how external validity was addressed in the research.
- ✓ One of the purposes of the study was to replicate a previous intervention study with subjects who had severe problem behaviors.
 - ✓ Only one subject's data replicated the effects observed in the original study.
 - ✓ The other two subjects showed the greatest reduction in behavior using the novel procedures - Rule with DRO + SRL.
 - ✓ All three participants had the lowest rate of problem behavior in the novel treatment condition (Rule with DRO + SRL)
 - ✓ The results supported previous evidence regarding verbal stimuli enhancing the efficacy of a DRO (replication of principle in other research from the novel intervention).
4. **Theoretical Significance and Conceptual Sense:** Evaluate the research's theoretical significance and conceptual sense.
- ✓ The article did not show a technical drift towards an emphasis on client cures.
 - ✓ "This adds to the evidence that verbal stimuli describing contingencies, presented either as antecedents or consequences, can enhance the efficacy of DRO procedures, conceivably by facilitating schedule control via verbal mediation" (p. 87).
 - ✓ "The current study adds unique information to the literature on DRO by reporting the effects of DRO on nontargeted behaviors (i.e., other behaviors). An increase in other behaviors was observed during DRO conditions as compared to baseline for two of three participants, which could suggest that DRO adventitiously reinforces one or multiple nontargeted behaviors, resulting in a positive reinforcement procedure" (p. 87).

Chapter 11: Positive Reinforcement

Chapter Summary

Positive reinforcement occurs when a behavior is followed by the presentation of a stimulus which increases the future occurrence of the behavior. The stimulus that is presented following the behavior is the positive reinforcer. Reinforcement works best when the reinforcer is presented contingent upon and immediately after the response. A commonly held misconception regarding reinforcement is that it involves circular reasoning. Reinforcement is not a circular concept because the two components of the response-consequence relation can be separated. Further, the consequence can be manipulated to determine if it increases the frequency of the behavior it follows.

Antecedent stimuli (i.e., discriminative stimuli and motivating operations) are integral to the efficacy of reinforcement, which leads to the discriminated operant (the four-term contingency, $EO \rightarrow S^D \rightarrow R \rightarrow S^{R+}$). Motivation is key to the efficacy of a particular reinforcer at a specific point in time. That is, the reinforcer will only be effective if the learner wants or is willing to work for it. One is also more likely to engage in a behavior when in the presence of stimuli with which reinforcement has been provided.

Several characteristics are associated with the process of reinforcement. The automaticity of reinforcement refers to the fact that an individual does not need to know about or be aware of a reinforcement contingency for it to be effective. Reinforcement is arbitrary; it does not have to be intentional or specifically reserved for certain target behaviors. Any behavior can be selected for increase via the process of reinforcement, including both adaptive and maladaptive behaviors. Automaticity of reinforcement should not be confused with automatic reinforcement. Automatic reinforcement means a reinforcing consequence occurs without social mediation.

Reinforcing stimuli are organized via specific classifications and behavior analyst have specific procedures aimed at identifying potential reinforcers for use with learners. Reinforcers are classified as unconditioned (those that do not require a learning history to acquire reinforcing properties) or conditioned (those that acquired reinforcing properties via pairing with other reinforcers). Reinforcers may also be classified by their formal properties - edible, sensory, tangible, activity, or social. Methods to identify potential reinforcers are called stimulus preference assessments. They include simply asking the individual/others about preferred items and activities, as well as more systematic approaches. Trial-based assessments include single-stimulus, paired stimulus, and multiple-stimulus with and without replacement. Reinforcer assessments are different from preference assessments, as they directly assess the reinforcement efficacy of a stimulus with a target behavior.

In addition to their use as a major component of behavior analytic interventions, reinforcement procedures have proven to be a valuable alternative to escape extinction as a control condition when evaluating reinforcement-based interventions. Some of these procedures include noncontingent reinforcement, differential reinforcement of other behavior, and differential reinforcement of alternative behavior. There are nine guidelines practitioners should consider when using reinforcement whether in the context of a specific intervention or to demonstrate experimental control.

Chapter Key Terms

automatic reinforcement
conditioned reinforcer
generalized conditioned reinforcer
positive reinforcement
positive reinforcer
Premack principle

reinforcer assessment
response-deprivation hypothesis
rule-governed behavior
socially mediated contingencies
stimulus preference assessment
unconditioned reinforcer

Chapter Objectives

1. Define and provide examples of positive reinforcement.
2. Define and provide examples of conditioned and unconditioned reinforcement.
3. Describe and provide examples of the operant conditioning paradigm (i.e., the three-term and four-term contingencies).
4. Describe the preference assessment methods used to identify potential reinforcers.
5. Describe the parameters and schedules of reinforcement used to identify reinforcers.
6. Define and give examples of the Premack principle.
7. Describe the response-deprivation hypothesis and give examples of its application.
8. Identify control procedures for positive reinforcement.
9. Describe how to effectively use positive reinforcement.
10. Explain how the concept of reinforcement is non-circular.

Chapter Focus Questions

1. What is positive reinforcement and what are different types of positive reinforcers?
2. What are the three- and four-term contingencies and how do they relate to the concept of positive reinforcement?
3. How can positive reinforcers be identified for individuals?
4. Once identified, how can positive reinforcement be implemented most effectively?

Chapter Suggested Readings

Ahearn, W. H., Clark, K. M., DeBar, R., & Florentino, C. (2005). On the role of preference in response competition. *Journal of Applied Behavior Analysis*, 38(2), 247-250.

This study evaluated highly preferred items that matched and did not match the hypothesized sensory consequences maintaining stereotypy. Results indicated the items effectively competed with stereotypy regardless of the sensory properties.

Call, N. A., Trosclair-Lasserre, N. M., Findley, A. J., Reavis, A. R., & Shillingsburg, M. A. (2012). Correspondence between single versus daily preference assessment outcomes and reinforcement efficacy under progressive-ratio schedules. *Journal of Applied Behavior Analysis*, 45(4), 763-77.

This study used PR schedules to compare the correspondence between outcomes from a single administration of the paired stimulus preference assessment vs. daily MSWO preference assessments and stimulus reinforcement efficacy. The results indicated the preference assessments equally predicted reinforcement efficacy. However, the paired stimulus preference assessment was more consistent with identifying the most effective reinforcer.

Fisher, W. W., Piazza, C. C., Bowman, L. G., Hagopian, L. P., Owens, J. C., & Slevin, I. (1992). A comparison of two approaches for identifying reinforcers for persons with severe and profound disabilities. *Journal of Applied Behavior Analysis*, 25(2), 491-498.

This study described how to conduct a forced-choice preference assessment (aka paired stimulus and paired choice preference assessment) and compared its utility to single-stimulus presentation assessments. This is the seminal study for the forced-choice preference assessment.

DeLeon, I. G., Fisher, W. W., Rodriguez-Catter, V., Maglieri, K., Herman, K., & Marhefka, J. M. (2001). Examination of relative reinforcement effects of stimuli identified through pretreatment and daily brief preference assessments. *Journal of Applied Behavior Analysis*, 34(4), 463-473.

This study compared the reinforcement efficacy of preferred stimuli identified via an initial paired-choice preference assessment (aka paired stimulus and forced-choice) to stimuli identified during daily MSWO assessments. Results indicated that when the two assessments yielded different results, the stimuli identified via the brief, daily MSWO assessments were more effective reinforcers.

Northup, J., George, T., Jones, K., Broussard, C., & Vollmer, T. R. (1996). A comparison of reinforcer assessment methods: The utility of verbal and pictorial choice procedures. *Journal of Applied Behavior Analysis*, 29(2), 201-212.

This study compared the reinforcement efficacy of preferred stimuli identified via a verbal stimulus choice method to those identified via a pictorial stimulus choice method. Results indicated the verbal method was fairly inaccurate in identifying effective reinforcers. However, the pictorial stimulus choice assessment reliably predicted stimuli as reinforcers.

McCadam, D. B., Klatt, K. P., Koffarnus, M., Dicesare, A., Solberg, K., Welch, C., & Murphy, S. (2005). The effects of establishing operations on preferences for tangible items. *Journal of Applied Behavior Analysis*, 38(1), 107-110.

This study demonstrated the effects of motivating operations on the outcomes of paired-stimulus preference assessments.

Paramore, N. W., & Higbee, T. S. (2005). An evaluation of a brief multiple-stimulus preference assessment with adolescents with emotional-behavioral disorders in an educational setting. *Journal of Applied Behavior Analysis*, 38(3), 399-403.

This study illustrated the application of a brief MSWO administered to adolescents with emotional and behavioral problems.

Parsons, M. B., & Reid, D. H. (1990). Assessing food preferences among persons with profound mental retardation: Providing opportunities to make choices. *Journal of Applied Behavior Analysis*, 23(2), 183-195.

This early study addressed the difficulties with using caregiver reports to identify potential reinforcers. Results indicated the paired-choice preference assessment was more effective at identifying functional reinforcers than caregiver reports.

Roane, H. S., Lerman, D. C., & Vorndran, C. M. (2001). Assessing reinforcers under progressive schedule requirements. *Journal of Applied Behavior Analysis*, 34(2), 145-166.

This study demonstrated the utility of progressive ratio schedule requirements for identifying reinforcers for individuals with disabilities.

Thompson, R. H., & Iwata, B. A. (2005). A review of reinforcement control procedures. *Journal of Applied Behavior Analysis*, 38(2), 257-278.

This article discusses the various types of reinforcement schedules used as the control condition when evaluating reinforcement procedures.

Verriden, A. L., & Roscoe, E. M. (2016). A comparison of preference-assessment methods. *Journal of Applied Behavior Analysis*, 49(2), 265-285.

The first part of this study measured preference stability across administrations of the paired stimulus, MSWO, free-operant, and response restriction preference assessments. Results indicated greater stability across the paired stimulus and MSWO administrations and lower stability across the free operant and response-restriction assessment methods. The free operant assessment was also associated with lower levels of problem behavior. The investigators evaluated the potential implications regarding preference assessment stability in a second experiment. They compared the reinforcer assessment results of stimuli initially identified as highly preferred and more immediately identified. The results indicated that initially and immediately identified stimuli were equally effective reinforcers. The overall results of the study suggest that fluctuations in stimulus preference do not necessarily impact reinforcer efficacy in applied practice.

Wacker, D. P., Wiggins, B., Fowler, M., & Berg, W. K. (1988). Training students with profound or multiple handicaps to make requests via microswitches. *Journal of Applied Behavior Analysis*, 21(4), 331-343.

This study evaluated the utility of a microswitch when assessing the preferences of individuals with significant disabilities across a series of three experiments.

Whitehouse, C. M., Vollmer, T. R., & Colbert, B. (2014). Evaluating the use of computerized stimulus preference assessments in foster care. *Journal of Applied Behavior Analysis*, 47(3), 470-484.

Over the course of three experiments, this study compared the correspondence of results from preference questionnaires to computerized paired stimulus preference assessments and evaluated the reinforcement efficacy of stimuli indicated as highly preferred during the preference assessments with children in foster care. Results indicated the children engaged more often with items identified as highly preferred during competing stimulus arrangements. Highly preferred items also functioned as reinforcers for math problem completion. The discussion of these results has implications for the use of preference assessments in foster care.

Chapter Activity

Students will practice administering different preference assessments to each other. Provide toys, edibles, etc. for students to use as stimuli. Print data sheets for the students to practice collecting relevant data during the assessments. Students will graph their results or put their results in a table for interpretation. Students should practice the following preference assessments:

- a) Single-stimulus presentation
- b) Paired stimulus
- c) Multiple stimulus without replacement
- d) Multiple stimulus with replacement.
- e) Free operant assessment

Chapter 12: Negative Reinforcement

Chapter Summary

Negative reinforcement can be thought of as a complementary process to positive reinforcement. With positive reinforcement, responding increases as a result of the presentation of a stimulus following behavior. Whereas with negative reinforcement, responding increases due to the termination of a stimulus following behavior. Within this chapter, negative reinforcement is further contrasted with the processes of positive reinforcement and punishment.

The process of negative reinforcement may appear simple according to its definition. As one might notice, the definition of negative reinforcement directly aligns with the escape contingency. However, avoidance contingencies are also applicable to negative reinforcement. With avoidance, responding prevents or delays the presentation of an aversive stimulus. That is, with the avoidance contingency, it is possible for the aversive stimulus to never be present. This characteristic of the avoidance paradigm does not follow an A-B-C arrangement. The potential absence of a clear antecedent appears to be conceptually inconsistent with the framework for operant behavior.

Negative reinforcement is characterized by the presence of contextual features and/or antecedent events that create an EO for their removal. The removal of these events plays a necessary role in negative reinforcement. This is illustrated with examples involving the strengthening of both adaptive and problem behavior.

Strategies aimed at addressing problem behavior maintained by negative reinforcement include the use of extinction and differential negative reinforcement. While the focus tends to be on the behavior of students/clients, negative reinforcement contingencies also exerts control over the behavior of teachers/caregivers and their interactions with the students/clients. In addition to the direct effects of negative reinforcement on teacher/caregiver behavior, one must also consider ethical issues that may arise when using negative reinforcement. These issues are primarily related to the use of an aversive condition as an EO and the potential severity of the condition that is necessary to occasion the target behavior. Another concern is related to the potential side effects of negative reinforcement, such as the occurrence of emotional behaviors similar to those associated with the use of punishment procedures.

Chapter Key Terms

avoidance contingency	free-operant avoidance
conditioned negative reinforcer	negative reinforcement
discriminated avoidance	unconditioned negative reinforcer
escape contingency	

Chapter Objectives

1. Define and provide examples of negative reinforcement.
2. Identify and use negative reinforcers.
3. Differentiate between escape and avoidance contingencies.
4. State the role of derived relational responding related to clinical problems involving avoidance.
5. Explain the role of the antecedent within negative reinforcement.
6. Describe the appropriate parameters and schedules of negative reinforcement.
7. Explain the effect of negative reinforcement on the behavior of the behavior change agent (e.g., teacher/caregiver).
8. State and plan for the possible unwanted effects of and ethical issues in the use of negative reinforcement.

Chapter Focus Questions

1. What is negative reinforcement and how is it similar to and different from positive reinforcement?
2. What are the four components of a negative reinforcement contingency?
3. How is negative reinforcement similar to and different from punishment?
4. How are escape and avoidance contingencies different?
5. Explain the Two-Factor Theory of avoidance.
6. What are the characteristics of negative reinforcement, and how can it be used most effectively to promote learning?
7. What are some novel examples of how negative reinforcement can be used to produce therapeutic effects for individuals?
8. How can negative reinforcement produce undesirable, problem behaviors?
9. What are the ethical issues involved in negative reinforcement?

Chapter Suggested Readings

Cipani, E. C. (1995). Be aware of negative reinforcement. *Teaching Exceptional Children*, 27(4), 36-40.

This paper summarizes the concept of negative reinforcement and provides suggestions for determining whether problem behavior is maintained by negative reinforcement or teacher attention. The author also provides suggestions for making tasks less aversive to students.

Cipani, E., & Spooner, F. (1997). Treating problem behaviors maintained by negative reinforcement. *Research in Developmental Disabilities*, 18(5), 329-342.

This paper discusses four interventions for problem behaviors maintained by negative reinforcement: (a) functional communication training, (b) behavioral momentum, (c) differential reinforcement of an alternative escape behavior, and (d) errorless learning.

DePaolo, J., Gravina, N. E., & Harvey, C. (2019). Using a behavioral intervention to improve performance of a women's college lacrosse team. *Behavior Analysis in Practice*, 12(2), 407-411.

This study evaluated the use of prompting and negative reinforcement (a reduction in the number of required sprints at the end of practice) to increase "name passes" (saying the name of the person who should catch the ball at least 1 s before the catch) among a team of collegiate women's lacrosse players. Results indicated that "name passes" improved among the lacrosse players.

Harper, J. M., Iwata, B. A., & Camp, E. M. (2013). Assessment and treatment of social avoidance. *Journal of Applied Behavior Analysis*, 46(1), 147-160.

This study evaluated a series of interventions aimed at attenuating the aversive characteristics of social interaction with three participants who engaged in escape (from social interaction) maintained problem behavior. Vicarious reinforcement consisted of providing praise and a preferred edible contingent on the participants social initiations with the therapist. Conditioning of social interaction consisted of noncontingent deliveries of leisure and edible items. Stimulus fading consisted of gradually and systematically introducing proximity, verbal attention, and physical attention to the participant. Differential reinforcement of alternative behavior plus extinction (DRA+EXT) included delivering praise and an edible contingent on appropriate interactions and extinction for problem behavior. Results indicated that only the DRA+EXT intervention was consistently effective at increasing social interactions and reducing problem behavior.

Hineline, P. N. (1977). Negative reinforcement and avoidance. In W. K. Honig & J. E. R. Staddon (Eds.), *Handbook of operant behavior* (pp. 364-414). Prentice Hall.

This chapter on negative reinforcement provides an in-depth discussion of basic research on negative reinforcement.

Iwata, B. A. (1987). Negative reinforcement in applied behavior analysis: An emerging technology. *Journal of Applied Behavior Analysis*, 20(4), 361-378.

The article provides an in-depth discussion of applied research on negative reinforcement.

Thompson, R. H., Bruzek, J. L., & Cotnoir-Bichelman, N. (2011). The role of negative reinforcement in infant caregiving: An experimental simulation. *Journal of Applied Behavior Analysis*, 44(2), 295-304.

This study demonstrated the role of negative reinforcement in infant caregiving via a simulation activity. Undergraduate students acted as caregivers for a “crying” baby doll. Results indicated the simulated caregiving behaviors (i.e., rocking, feeding, and playing) were negatively reinforced via termination of the baby’s crying.

Zarcone, J. R., Crosland, K., Fisher, W. W., Worsdell, A. S., & Herman, K. (1999). A brief method for conducting a negative-reinforcement assessment. *Research in Developmental Disabilities*, 20(2), 107-124.

This study evaluated a methodology for identifying stimuli that might serve as negative reinforcers with children.

Chapter Activity

Practice diagraming real-life examples of negative reinforcement (both escape and avoidance contingencies) with students. You can make the activity fun by bringing in cartoons or memes that illustrate the principle of negative reinforcement. Begin by modeling the activity with the students and slowly fade out the modeling until students are engaging in the activity independently. Next, instruct the students to generate their own examples, either from sources they find or by illustrating examples from their own lives. This can help students begin to see the behavioral principles in action all around them.

Chapter 13: Schedules of Reinforcement

Chapter Summary

A schedule of reinforcement is a rule that establishes the probability that a specific occurrence of a behavior will produce reinforcement. Two basic schedules of reinforcement - continuous reinforcement and extinction - provide the boundaries for all other possible schedules. With continuous reinforcement (CRF), a behavior is reinforced every time it occurs. The other schedule of reinforcement is called extinction (EXT) because no occurrence of the behavior is reinforced.

Between continuous reinforcement and extinction, a variety of schedules exist whereby some instances of a behavior are reinforced, and other occurrences of the same behavior are not reinforced. These specific environmental arrangements are called intermittent schedules of reinforcement (INT).

Basic intermittent schedules include ratio or interval arrangements where reinforcement deliveries occur via a fixed or variable contingency. They combine to form four basic intermittent schedules of reinforcement – fixed ratio (FR), variable ratio (VR), fixed interval (FI), and variable interval (VI). Each of these schedules is associated with a unique response pattern. Variations of basic intermittent reinforcement schedules include differential reinforcement of rates of responding (DRH, DRL, DRD), lag schedules, and progressive schedules (progressive ratio and delay to reinforcement schedules).

The combination of two or more basic schedules of reinforcement make up a compound schedule. Compound schedules can occur simultaneously or successively and with or without discriminative stimuli. Reinforcement can also be contingent on the completion of individual components of the schedule or the entire combined schedule. The components of compound schedules vary along these parameters to form specific types of compound schedules. As with the basic intermittent reinforcement schedules, some types of compound schedules also yield unique response patterns.

Chapter Key Terms

adjunctive behavior	lag schedule
alternative schedule (alt)	limited hold
behavioral contrast	matching law
chained schedule (chain)	mixed schedule of reinforcement (mix)
compound schedule of reinforcement	multiple schedule (mult)
concurrent schedule (conc)	post-reinforcement pause
conjunctive schedule (conj)	progressive schedule of reinforcement
continuous reinforcement (CRF)	progressive-ratio (PR) schedule of reinforcement
differential reinforcement of diminishing rates (DRD)	ratio strain
differential reinforcement of high rates (DRH)	schedule of reinforcement
differential reinforcement of low rates (DRL)	schedule thinning
fixed interval (FI)	tandem schedule (tand)
fixed ratio (FR)	variable interval (VI)
intermittent schedule of reinforcement (INT)	variable ratio (VR)

Chapter Objectives

1. Define a schedule of reinforcement and the two boundaries associated with the basic schedules.
2. Define continuous reinforcement.
3. Define intermittent reinforcement and list the basic intermittent schedules.
4. Define ratio and interval schedules.
5. Compare and contrast fixed and variable ratio schedules.

6. Explain the phenomena of a post-reinforcement pause.
7. Explain and define variable interval schedules of reinforcement.
8. Define ratio strain and explain the variables associated with it.
9. Identify the four variations of basic intermittent schedules of reinforcement.
10. Define a lag schedule and discuss how it increases response variability.
11. Define a concurrent schedule of reinforcement.
12. Define a progressive-ratio schedule of reinforcement.
13. Define and identify two discriminative schedules of reinforcement.
14. Define and identify two non-discriminative schedules of reinforcement.

Chapter Focus Questions

1. What are the basic schedules of reinforcement? Provide a novel example of each schedule.
2. What is naturally occurring reinforcement and why is it important?
3. What are the effects and patterns associated with each basic schedules of reinforcement?
4. What are discriminative, and non-discriminative schedules of reinforcement?
5. Discuss the role of the matching law with concurrent schedules and the three types of interactions found with concurrent schedules.
6. Compare and contrast multiple and mixed schedule.
7. Compare and contrast alternative and conjunctive schedules.

Chapter Suggested Readings

Adami, S., Falcomata, T. S., Muething, C. S., & Hoffman, K. (2017). An evaluation of lag schedules of reinforcement during functional communication training: Effects on varied mand responding and challenging behavior. *Behavior Analysis in Practice*, 10(3), 209-213.

This study compared a Lag 0 and Lag 1 schedule during functional communication training with two males diagnosed with autism. The results of this study replicate earlier studies on lag schedules, as the participants engaged in a higher rate of varied mands during the Lag 1 compared to the Lag 0 schedule.

Boyle, M. A., Hoffmann, A. N., & Lambert, J. M. (2018). Behavioral contrast: Research and areas for investigation. *Journal of Applied Behavior Analysis*, 51(3), 702-718.

This article discusses behavioral contrast and reviews research on the topic.

Hagopian, L. P., Contrucci Kuhn, S. A., Long, E. S., & Rush, K. S. (2005). Schedule thinning following communication training: Using competing stimuli to enhance tolerance to decrements in reinforcer density. *Journal of Applied Behavior Analysis*, 38(2), 177-193.

This study demonstrated that the introduction of competing stimuli can help maintain low levels of problem behavior while reinforcement for alternative behaviors are thinned.

Heldt, J., & Schlinger, H. D., Jr. (2012). Increased variability in tacting under a lag 3 schedule of reinforcement. *Analysis of Verbal Behavior*, 28(1), 131-136.

Previous research had been conducted using Lag 1 schedules and showed an increase in variable responding that may not maintain once the intervention has been removed. The lack of maintenance effects is suspected due to the demonstrated decreases in variable responding during the baseline reversal phases of those studies. This study evaluated the effects of a Lag 3 schedule on response variability and its maintenance. The results indicated an

increase in variable responding and maintenance of response variation up to 3 weeks following the interventions removal.

Luczynski, K. C., & Hanley, G. P. (2010). Examining the generality of children's preference for contingent reinforcement via extension to different responses, reinforcers, and schedules. *Journal of Applied Behavior Analysis*, 43(3), 397-409.

This study replicated and extended the research on children's preference for contingent reinforcement. Previous studies used continuous reinforcement schedules (CRF) when evaluating contingent reinforcement. This study evaluated whether preferences for contingent reinforcement would persist with intermittent schedules of reinforcement (INT). The results replicated previous studies, as the children preferred the contingent CRF schedule to noncontingent reinforcement (NCR). The results also indicated that the children continued to prefer contingent reinforcement as it became intermittent. However, the children's preferences began to shift toward NCR as the intermittent schedule got leaner.

MacAleese, K. R., Ghezzi, P. M., & Rapp, J. T. (2015). Revisiting conjugate schedules. *Journal of the Experimental Analysis of Behavior*, 104(1), 63-73.

In a series of three experiments, this study demonstrated that college students' responding was sensitive to and came under the control of a variety of conjugate schedules.

Neef, N. A., Marckel, J., Ferreri, S., Jung, S., Nist, L., & Armstrong, N. (2004). Effects of modeling versus instructions on sensitivity to reinforcement schedules. *Journal of Applied Behavior Analysis*, 37(3), 267-281.

This study evaluated the effects of modeling versus instruction on choices between concurrently available reinforcement schedules. Responding established via modeling produced better sensitivity to subsequent reinforcement schedule changes.

Saini, V., Miller, S. A., & Fisher, W. W. (2016). Multiple schedules in practical application: Research trends and implications for future investigation. *Journal of Applied Behavior Analysis*, 49(2), 421-444.

This article reviews 31 studies on multiple schedules, summarizes the existing knowledge regarding its generality and efficacy, and discusses areas for future research. The authors also provide applied behavior analysts with best practice guidelines regarding the application of multiple schedules.

Saunders, R. R., McEntee, J. E., & Saunders, M. D. (2005). Interaction of reinforcement schedules, a behavioral prosthesis, and work-related behavior in adults with mental retardation. *Journal of Applied Behavior Analysis*, 38(2), 163-176.

This study demonstrated that an FR schedule was more effective when combined with a behavioral prosthesis than VI schedules at increasing on-task behavior and reducing problem behavior in vocational training.

Tiger, J. H., Hanley, G. P., & Heal, N. A. (2006). The effectiveness of and preschoolers' preferences for variations of multiple-schedule arrangements. *Journal of Applied Behavior Analysis*, 39(4), 475-488.

This study evaluated the effect of three schedules of reinforcement consisting of alternating periods of CRF and extinction on preschoolers' recruitment of adult attention and the children's preference for those schedules. Each schedule consisted of a different arrangement for the discriminative stimuli presentations, where S+ was the discriminative stimulus for positive reinforcement and S- represented the discriminative stimulus for extinction. The arrangements consisted of three combinations of the discriminative stimuli being present or absent: (a) S+ present/S- present, b) S+ present/S- absent, and c) S+ absent/S- absent. Results indicated the S+ present/S- present condition was similarly effective with the children. However, preferences for the S+ present/S- present condition and S+ present/S- absent conditions were roughly split. A correlational analysis suggested the children who responded more effectively in the presence of the S- preferred the S+ present/S- present condition. Children who responded less effectively in the presence of the S- preferred the S+ present/S- absent condition.

Chapter Activity

Instruct students to purchase a computer-based simulation exercise (e.g., Sniffy the Virtual Rat: The Shaping Game from http://www.wadsworth.com/psychology_d/special_features/sniffy.html) aimed at teaching students about the schedules of reinforcement and how to shape behavior. After the students have shaped lever pressing in Sniffy, instruct them to run various reinforcement schedules with Sniffy and observe the effects on his lever-pressing behavior. The students should print the cumulative record data from the sessions and submit these to the instructor.

Chapter 14: Positive Reinforcement

Chapter Summary

Punishment is viewed as a controversial procedure within our society. However, it is important to our survival as individuals and as a species. With punishment, a behavior is followed by a stimulus change that results in the behavior occurring less often in the future. Positive punishment involves the presentation of an aversive stimulus contingent on the behavior and negative punishment involves the removal of an aversive stimulus. This means the process of punishment directly teaches us not to repeat behaviors that will likely cause us harm.

As with reinforcement, there are unconditioned and conditioned punishers. Unconditioned punishers are stimuli that are inherently aversive. Conditioned punishers become aversive due to pairing with other punishers. Generalized conditioned punishers have been paired with a variety of punishers and function as punishers regardless of a specific MO. Also, like reinforcement, punishment is sensitive to antecedent stimulus conditions, i.e., the presence/absence of a discriminative stimulus for punishment (S^{Dp}).

When positive punishment procedures are used properly, they are likely to result in rapid, long-term suppression of problem behavior. However, there are negative side effects to using punishment, including the individual's engagement in emotional and aggressive behavior. One might react to receiving punishment by attempting to escape or avoid the punishment and the setting where the punishment is carried out. Modeling undesirable behavior can be an issue, such as when children who receive spankings imitate the hitting behavior displayed by their parents. Punishing agents may be at risk of overusing punishment procedures due to their punishing behavior being negatively reinforced. Further, actions that are often intended to be punishing (e.g., reprimands) may alternatively function as reinforcers.

Examples of positive punishment interventions include, reprimands, response blocking, response interruption and redirection (RIRD), contingent exercise, and overcorrection. Specific factors that influence the efficacy of punishment include their immediacy, intensity, schedule, and consistency. The presence of competing reinforcers impacts how effective a punisher is for a specific target behavior. Reinforcing an alternative behavior combined with punishment of the target behavior is likely to increase the efficacy of a punishment procedure.

Punishment procedures are particularly useful, a) with severe, dangerous behaviors that need to be quickly addressed, b) when reinforcement-based procedures have been unsuccessful in addressing the behavior, or c) when one is unable to identify or withhold the reinforcer for problem behavior. Strategies for enhancing the effectiveness of punishment include conducting punisher assessments, using high-quality and a variety of punishers, delivering punishment immediately and consistently, and combining punishment with reinforcement-based procedures. Ethical considerations when using punishment include the client's safe and humane treatment and the use of effective and the least restrictive procedures. Those within the field of applied behavior analysis believe that by recognizing, appreciating, and seeking knowledge about the role of punishment within our natural world we build a more complete and effective science of behaviorism. Punishment should never be used as a default behavior change strategy. Instead, measures should be taken to use less restrictive and less aversive strategies when possible.

Chapter Key Terms

behavioral contrast	punisher
conditioned punisher	punishment
discriminative stimulus for punishment	recovery from punishment
generalized conditioned punisher	response blocking
negative punishment	response interruption and redirection (RIRD)
overcorrection	restitutional overcorrection
positive practice overcorrection	unconditioned punisher
positive punishment	

Chapter Objectives

1. Define positive and negative punishment.
2. List and discuss the factors that influence the effectiveness of punishment.
3. List and describe the potential side effects of punishment.
4. List examples of positive punishment interventions and describe the respective procedures.
5. Discuss guidelines and considerations for using punishment.
6. Discuss ethical considerations regarding the use of punishment.
7. Discuss best practices guidelines regarding the use of punishment interventions.
8. Review behavior analytic perspectives on punishment as a behavior analytic technology.

Chapter Focus Questions

1. What is the difference between positive and negative punishment?
2. What is the three-term contingency for punishment and how is it related to the discriminative effects of punishment?
3. What is meant by recovery from punishment?
4. What factors influence the efficacy of punishment and how do they influence it?
5. How does positive reinforcement factor into the use of punishment procedures?
6. What are the potential side effects of punishment?
7. How might negative reinforcement contribute to the overuse of punishment?
8. How might a practitioner most effectively arrange a punishment schedule when the punisher cannot be delivered continuously throughout the course of the intervention?
9. How might a practitioner use a punishment-based intervention while also ensuring the client has access to safe, humane, and least restrictive treatments and while ensuring the client's right to effective treatment?

Chapter Suggested Readings

Anderson, J., & Le, D. D. (2011). Abatement of intractable vocal stereotypy using an overcorrection procedure. *Behavioral Interventions*, 26(2), 134-146.

This study evaluated the effects of a positive practice procedure on vocal stereotypy. The intervention consisting of overcorrection alone suppressed stereotypy to clinically significant levels. When overcorrection was combined with DRA, appropriate engagement with Legos was higher compared to a DRA alone condition.

Charlop, M. H., Burgio, L. D., Iwata, B. A., & Ivancic, M. T. (1988). Stimulus variation as a means of enhancing punishment effects. *Journal of Applied Behavior Analysis*, 21(1), 89-95.

This study shows that varying the stimuli used as punishers can increase the efficacy of punishment procedures.

DeRosa, N. M., Novak, M. D., Morley, A. J., & Roane, H. S. (2019). Comparing response blocking and response interruption/redirection on levels of motor stereotypy: Effects of data analysis procedures. *Journal of Applied Behavior Analysis*, 52(4), 1021-1033.

This study replicated previous research on response blocking and response interruption and redirection, as both interventions effectively reduced motor stereotype with participants. This study also extended the literature by showing the response blocking was more effective than response interruption and redirection when data analyses included total session times.

Fisher, W. W., Piazza, C. C., Bowman, L. G., Kurtz, P. F., Sherer, M. R., & Lachman, S. R. (1994). A preliminary evaluation of empirically derived consequences for the treatment of pica. *Journal of Applied Behavior Analysis*, 27(3), 447-457.

This study describes a procedure for identifying effective punishers for use in the treatment of behavior problems.

Giles, A. F., St. Peter, C. C., Pence, S. T., & Gibson, A. B. (2012). Preference for blocking or response redirection during stereotypy treatment. *Research in Developmental Disabilities*, 33(6), 1691-1700.

In addition to evaluating the effects of response blocking and response interruption and redirection on motor stereotypy this study also evaluated participant preferences for the procedures. Both interventions effectively reduced the motor stereotypy. However, the participants preferred response redirection over response blocking.

Hanley, G. P., Piazza, C. C., Fisher, W. W., & Maglieri, K. A. (2005). On the effectiveness of and preference for punishment and extinction components of function-based interventions. *Journal of Applied Behavior Analysis*, 38(1), 51-65.

This study demonstrated that the addition of punishment can increase the efficacy of functional communication training. The participants in the study also demonstrated a preference for the intervention containing punishment over the same intervention without the punishment component.

Lerman, D. C., & Iwata, B. A. (1996). A methodology for distinguishing between extinction and punishment effects associated with response blocking. *Journal of Applied Behavior Analysis*, 29(2), 231-233.

This study describes a method for distinguishing between whether behavior suppression effects are due to punishment or extinction.

Lerman, D. C., Iwata, B. A., Shore, B. A., & DeLeon, I. G. (1997). Effects of intermittent punishment on self-injurious behavior: An evaluation of schedule thinning. *Journal of Applied Behavior Analysis*, 30(2), 187-201.

This study evaluated the use of intermittent punishment on problem behavior. Previous research has indicated that fairly rich schedules of punishment are required to maintain problem behavior at low levels. In this study, schedule thinning resulted in low levels of problem behavior with some participants, even though intermittent punishment was in place. With other participants, however, lean schedules of punishment were not effective in maintaining low levels of problem behavior.

Lerman, D. C., & Toole, L. M. (2011). Developing function-based punishment procedures for problem behavior. In W. W. Fisher, C. C. Piazza & H. S. Roane (Eds.), *Handbook of applied behavior analysis* (pp. 348-369). The Guilford Press.

This chapter discusses a function-based approach to using punishment procedures. Within the chapter, the authors explain the meaning of the term function-based punishment. They also review punishment procedures, approaches for selecting punishment as an intervention, factors that influence punishment effects, and strategies for effectively using punishment.

Lerman, D. C., & Vorndran, C. M. (2002). On the status of knowledge for using punishment: Implications for treating behavior disorders. *Journal of Applied Behavior Analysis*, 35(4), 431-464.

This literature review summarizes basic and applied findings on punishment. It also stresses the importance of research on punishment, in an effort to develop effective, less intrusive behavior change strategies.

Verriden, A. L., & Roscoe, E. M. (2019). An evaluation of a punisher assessment for decreasing automatically reinforced problem behavior. *Journal of Applied Behavior Analysis*, 52(1), 205-226.

This study extended the research on the identification of effective punishers for decreasing problem behavior. Interviews were conducted with lead clinicians to identify socially acceptable punishers. The authors evaluated the punishing efficacy of those stimuli during an NCR and DRA with punishment intervention. Results indicated that punishment was a necessary component of the intervention. The specific stimulus that was identified as an effective punisher with each participant varied.

Chapter 15: Negative Punishment

Chapter Summary

Punishment is defined as a reduction in behavior due to a stimulus change following a behavior. With negative punishment, a stimulus is removed following the behavior resulting in future decreases in the behavior. The implementation of negative punishment by behavior analysts consists of two strategies: time-out from positive reinforcement and response cost. Time-out from positive reinforcement involves removing one's access to positive reinforcers or withdrawing one's opportunity to earn positive reinforcement for a specific period of time contingent on behavior. Response cost involves taking away previously earned reinforcers contingent on behavior.

Time-out procedures consists of either non-exclusion or exclusionary methods. With non-exclusion time-out, the individual remains within the physical setting. However, reinforcing aspects of the setting are altered so the individual loses access to specific reinforcers or loses the opportunity to earn them. Common forms of non-exclusion time-out include planned ignoring, terminate specific reinforcer contact, contingent observation, and partition/select space time-out. With exclusion time-out, the individual is physically separated from the reinforcement setting (the time-in environment). This is done in two ways: removing the individual from the time-in setting or removing the time-in setting from the individual. Desirable aspects of time-out include its ease of application, acceptability to practitioners, rapid suppression of the target behavior, and ability to be combined with other procedures.

Response cost can be thought of as a fine for the individual's engagement in problem behavior. It typically involves the loss of generalized conditioned reinforcers or the loss of time with a preferred activity. When implemented with generalized conditioned reinforcers, response cost may involve fines against an individual's previously earned reinforcers (e.g., loses a token that had been earned) or a fine against a stockpile of noncontingently earned reinforcers (e.g., loses a portion of recess time for each behavior). Desirable aspects of response cost include its efficacy, it is a least restrictive punishment procedure, its convenience, its ability to be combined with other procedures, and its social validity. The effective use of response cost involves stating the rules regarding which behaviors will be fined, when the fine will occur, and the amount of the fine. Further, when multiple behaviors are targeted with response cost, the amount of each fine should vary based on the severity of the target behavior. Fines should be large enough to suppress the problem behavior but not so large that they bankrupt the system.

As with all punishment procedures, the use of time-out and response cost should be considered after initially considering nonpunitive methods. A practitioner's effective implementation of either procedure should involve several considerations prior to, during, and after implementation. The effective use of time-out involves enriching the time-in environment, operationally defining the target behavior, determining which procedure to use and obtaining permission to use it, explaining the rules regarding the procedure, determining the length of the time-out interval, applying the procedure consistently, and establishing the exit criterion. Additionally, the practitioner should ensure the procedure complies with legal and ethical guidelines, evaluate its efficacy, and eventually terminate the time-out program. The effective use of response cost involves clearly stating the target behavior, as well as the timing and amount of fines. With bonus response cost, be sure there is a sufficient reinforcer reserve to keep up with reinforcer losses. Also, with response cost, one should be prepared to address unplanned outcomes, be careful to not overuse the procedure, and keep a record of acquired reinforcers and fines.

Chapter Key Terms

bonus response cost
contingent observation
exclusion time-out
negative punishment
nonexclusion time-out

partition or select space time-out
planned ignoring
response cost
terminate specific reinforcer contact
time-out from positive reinforcement (time-out)

Chapter Objectives

1. Define negative punishment.
2. Define time-out and three important factors related to time-out.
3. Define and provide examples of non-exclusion time-out.
4. Define and provide examples of exclusion time-out.
5. Describe the desirable aspects of time-out.
6. List the decisions a practitioner must make prior to, during, and after implementing time-out procedures.
7. Define response cost and list its desirable aspects.
8. Identify methods of implementing response cost.
9. List the undesirable aspects of response cost.

Chapter Focus Questions

1. What is negative punishment, and how is it related to positive punishment?
2. What are the different forms of time-out?
3. What are the four forms of non-exclusionary time-out? Describe each.
4. What are the two basic forms of exclusion time-out? Describe each.
5. Why is the use of hallway time-out not recommended?
6. What is meant by “time-in”?
7. What are some of the factors one should consider when designing a time-out program?
8. What is response cost? Give examples.
9. What are some factors one should consider when designing a response-cost program?

Chapter Suggested Readings

Capriotti, M. R., Brandt, B. C., Ricketts, E. J., Espil, F. M., & Woods, D. W. (2012). Comparing the effects of differential reinforcement of other behavior and response-cost contingencies on tics in youth with Tourette syndrome. *Journal of Applied Behavior Analysis*, 45(2), 251-263.

This study compared the effects of response cost (RC) and differential reinforcement of other behavior (DRO) on tics with four children with Tourette syndrome. Both DRO and RC were equally effective at reducing tics from baseline levels. Also, neither of the procedures produced subject-reported urge severity (a reflexive motivating operation), subject-reported stress level, or tic rebound.

Donaldson, J. M., & Vollmer, T. R. (2012). A procedure for thinning the schedule of time-out. *Journal of Applied Behavior Analysis*, 45(3), 625-630.

This study evaluated the efficacy of gradually thinning the time-out (i.e., contingent observation) schedule using variable ratio (VR) schedules with 3 young students who engaged in problem behavior. Two of the students' schedules were decreased to VR2 and the other to VR5. The results suggest that caregivers could implement the procedures with approximately 50% integrity and still get the desired behavior reductions.

Donaldson, J. M., & Vollmer, T. R. (2011). An evaluation and comparison of time-out procedures with and without release contingencies. *Journal of Applied Behavior Analysis*, 44(4), 693-705.

This study compared a fixed-duration time-out of 4 min with a release contingency time-out of 4 min where the child could leave after an absence of problem behavior for 30 s. Results indicated that both procedures were equally effective at reducing problem behavior. The release contingency did not eliminate problem behavior that occurred during time-out, suggesting there are no additional benefits of adding a release contingency to time-out procedures.

Eluri, Z., Andrade, I., Trevino, N., & Mahmoud, E. (2016). Assessment and treatment of problem behavior maintained by mand compliance. *Journal of Applied Behavior Analysis*, 49(2), 383-387.

In this study, the authors used a token response cost system to address problem behavior evoked by noncompliance with a child's mands. The child earned a token following compliance and lost a token following problem behavior. A discriminative stimulus signaled when the child's mands would be reinforced. The procedure effectively reduced problem behavior.

Hester, P. P., Hendrickson, J. M., & Gable, R. A. (2009). Forty years later—The value of praise, ignoring, and rules for preschoolers at risk for behavior disorders. *Education & Treatment of Children*, 32(4), 513-535.

This article discusses the effective use of planned ignoring and provides guidelines for using the procedure with children and in classrooms.

James, J. E. (1981). Behavioral self-control of stuttering using time-out from speaking. *Journal of Applied Behavior Analysis*, 14(1), 25-37.

This study shows how a time-out procedure was self-implemented to decrease the disfluent speech of an individual with a stuttering problem.

Jowett Hirst, E. S., Dozier, C. L., & Payne, S. W. (2016). Efficacy of and preference for reinforcement and response cost in token economies. *Journal of Applied Behavior Analysis*, 49(2), 329-345.

This study replicated previous research by showing that differential reinforcement and response cost are similarly effective in a group context and that individuals more often preferred the response cost option over differential reinforcement. This study extended the previous research, as the findings regarding efficacy and preference from previous studies also apply to the use of response cost with both groups and individuals.

Rappaport, M. D., Murphy, H. A., & Bailey, J. S. (1982). Ritalin vs. response cost in the control of hyperactive children: A within-subject comparison. *Journal of Applied Behavior Analysis*, 15(2), 205-216.

This study compared the effects of Ritalin and response cost on the suppression of off-task behavior with elementary-aged boys diagnosed with ADHD. Results indicated the response cost procedure was more effective in maintaining low levels of off-task behavior and therefore, increased on-task behaviors with the participants.

St. Peter, C. C., Byrd, J. D., Pence, S. T., & Foreman, A. P. (2016). Effects of treatment-integrity failures on a response-cost procedure. *Journal of Applied Behavior Analysis*, 49(2), 308-328.

This study examined the efficacy of response cost procedures implemented at varying levels of treatment integrity. Response cost was implemented with omission (failure to apply the response cost contingency following the problem behavior) and commission (applying response cost to the wrong behavior) errors at both 20% and 50%. When compared to its implementation with 100% integrity, omission errors suppressed problem behavior to a lesser extent. Commission errors continued to suppress problem behavior, but rates of the alternative behavior were also lower.

Watkins, N., & Rapp, J. T. (2014). Environmental enrichment and response cost: Immediate and subsequent effects on stereotypy. *Journal of Applied Behavior Analysis*, 47(1), 186-191.

This study evaluated the effects of response cost and environmental enrichment on stereotypy with five individuals. Environmental enrichment alone had no effect on behavior. The addition of response cost reduced stereotypy with all participants.

White, A. G., & Bailey, J. S. (1990). Reducing disruptive behaviors of elementary physical education students with Sit and Watch. *Journal of Applied Behavior Analysis*, 23(3), 353-359.

This study evaluated a time-out procedure called *Sit and Watch* with two elementary physical education classes. One class was a general education class of 30 students, and the other class was a special education class with 14 students. During the Sit and Watch procedure, students were removed from the activity to sit and watch it for a specific amount of time. The intervention decreased disruptive behavior with both groups and was acceptable to parents and school personnel.

Chapter 16: Motivating Operations

Chapter Summary

The term motivating operation (MO) is an all-inclusive term for an antecedent event with two main effects: a) it alters the efficacy of a specific stimulus as a reinforcer or punisher (value-altering effect), and b) it temporarily alters the frequency of behavior that has been reinforced or punished by that stimulus (behavior-altering effect). MOs are primarily classified according to the direction of their effect on the reinforcer/punisher. Establishing operations (EO) increase the reinforcement or punishment efficacy of a stimulus. Abolishing operations (AO) decrease reinforcer and punisher efficacy.

Motivating operations have both direct and indirect effects on behavior and stimuli. The behavior-altering effect of the MO directly evokes or abates the behavior. However, the MO indirectly affects an S^D 's ability to evoke and abate behavior. Additionally, the value-altering effect of the MO indirectly influences the efficacy of conditioned reinforcers and punishers. The manner in which MOs and S^D s interact with behavior and stimuli is integral to determining whether a specific antecedent is one or the other. S^D s evoke and abate behavior due to a historical correlation between their presence/absence and the differential availability of specific consequences. MOs evoke and abate behavior due to the relation between their presence/absence and the differential efficacy of the specific consequence.

In addition to the primary classifications of EO and AO, MOs are either unconditioned (UMO) or conditioned (CMO). Unconditioned motivating operations have value-altering effects that are unlearned. That is, UMOs are those with which the organism needs no prior learning history. Unconditioned motivating operations for humans include deprivation and satiation related to water, food, oxygen, activity, sleep, and sexual stimulation, in addition to changes in temperature and painful stimulation. Conditioned motivating operations have value-altering effects that are the result of the organism's learning history. There are three types of CMOs: surrogate (CMO-S), reflexive (CMO-R), and transitive (CMO-T). Surrogate CMOs acquire their effects via pairing with UMOs. Reflexive CMOs are those with which their own offset functions as a reinforcer. Transitive CMOs establish other stimuli as effective reinforcers or punishers.

The role of MOs within applied behavior analysis is significant, as the efficacy of various reinforcers depends on their presence. The behavior analyst's ability to effectively assess, treat, maintain, and generalize behavior is tied to the practitioner's ability to manipulate relevant MOs.

Chapter Key Terms

abative effect	MO unpairing
abolishing operation (AO)	reflexive conditioned motivating operation (CMO-R)
behavior-altering effect	reinforcer-abolishing effect
conditioned motivating operation (CMO)	reinforcer-establishing effect
establishing operation (EO)	surrogate conditioned motivating operation (CMO-S)
evocative effect	transitive conditioned motivating operation (CMO-T)
function-altering effect	unconditioned motivating operation (UMO)
motivating operation (MO)	value-altering effect

Chapter Objectives

1. Define and provide examples of motivating operation, establishing operation, and abolishing operation.
2. Define and provide examples of value altering effect, behavior altering effect, evocative effect, and abative effect.
3. Define function altering effect.

4. Describe the difference between motivating operations and discriminative relations.
5. Define unconditioned motivating operations (UMOs).
6. State various examples of UMOs as related to the human organism.
7. Define conditioned motivating operations (CMOs).
8. List, define, and provide examples of the different types of CMOs.
9. Discuss the role of various CMOs within a variety of behavior analytic interventions and procedures.
10. Discuss the general implications for the use of motivating operations within the study of behavior analysis.

Chapter Focus Questions

1. Compare and contrast the terms setting event and motivating operation? How is the term setting event currently conceptualized?
2. Why is the word hunger problematic when discussing MOs?
3. What is the difference between behavior altering and value altering effects?
4. What is the difference between a behavior altering effect and a function altering effect?
5. How do MOs work with punishers? Describe the relevant effects.
6. What is meant by the “multiple” effects of MOs? Give an example.
7. Describe the relationship between the CMO-R and negative reinforcement.
8. How is the CMO-R different from an S^D ?
9. What is the role of the CMO-T in mand training?
10. Why are MOs important to the generality of behavior analytic interventions?

Chapter Suggested Readings

Catania, C. A. (1993). Coming to terms with establishing operations. *The Behavior Analyst*, 16(2), 219-224.

This commentary criticized Michael's (1993) paper on establishing operations because of its introduction of new and potentially inconsistent terminology the author felt was inadequately justified, as well as its insular tone that separates the field of behavior analysis from the findings of other related disciplines. The author examined specific aspects of the paper, such as Michael's use of colloquial terms and his distinctions between specific types of establishing operations.

Edwards, T. L., Lotfizadeh, A. D., & Poling, A. (2019). Motivating operations and stimulus control. *Journal of the Experimental Analysis of Behavior*, 112(1), 1-9.

This paper proposes a reconceptualization of the motivating operation concept. The authors' refinements to the definition and characteristics of the motivating operation concept are intended to add to the concept's value in the prediction and change of behavior.

Fragale, C. L., O'Reilly, M. F., Aguilar, J., Pierce, N., Lang, R., Sigafoos, J., & Lancioni, G. (2012). The influence of motivating operations on generalization probes of specific mands by children with autism. *Journal of Applied Behavior Analysis*, 45(3), 565-577.

This study set up two conditions prior to conducting generalization probes for newly taught mands. Participants had pre-session access to a preferred item until they rejected it (abolishing operation) or did not have pre-session access to an item (establishing operation). Results indicated that more manding followed the pre-session no access condition compared to the pre-session access condition.

Iwata, B. A., Smith, R. G., & Michael, J. (2000). Current research on the influence of establishing operations on behavior in applied settings. *Journal of Applied Behavior Analysis*, 33(4), 411-418.

This article commented on behavior analytic research on establishing operations and highlighted three major themes: a) the identification of how EOs affect behavior in applied settings, b) the utility of EO manipulations within behavioral assessments, and c) the incorporation of EO manipulations within behavior analytic interventions. The authors also addressed methodological issues and made suggestions for future research.

Kettering, T. L., Neef, N. A., Kelley, M. E., & Heward, W. L. (2018). A comparison of procedures for unpairing conditioned reflexive motivating operations. *Journal of the Experimental Analysis of Behavior*, 109(2), 422-432.

This study evaluated two methods (extinction unpairing and noncontingent unpairing) to decrease behavior evoked by a CMO-R. Prior to conducting the MO evaluation, the experimenters created a CMO-R condition that evoked previously taught communication responses for avoidance from the task. The CMO-R condition was set up like a classic avoidance contingency where a timer beeped just before the task demand. If the participant engaged in a communicative response, the timer stopped beeping and the task was not presented. During extinction unpairing, when the timer beeped, engaging in the communicative response terminated the beeping. However, task demands always followed the end of the timer beeping intervals. During noncontingent unpairing, when the timer beeped, engaging in the communicative response terminated the beeping. Task demands were never presented following the timer beeping intervals, regardless of the participant's response. Results indicated that noncontingent unpairing effectively reduced the evocative effects of the CMO-R. That is, it consistently reduced the communication responses to low rates. Extinction unpairing was not as effective at reducing the communication response.

Laraway, S., Snyckerski, S., Michael, J., & Poling, A. (2001). The abative effect: A new term to describe the action of antecedents that reduce operant responding. *Analysis of Verbal Behavior*, 18(1), 101-104.

The authors proposed the term “abative” in this commentary and discussed the advantages of the term.

Laraway, S., Snyckerski, S., Michael, J., & Poling, A. (2003). Motivating operations and terms to describe them: Some further refinements. *Journal of Applied Behavior Analysis*, 36(3), 407-414.

This paper provides an analysis of the term “establishing operation” and proposed a needed refinement in terminology via the use of the term “motivating operation”. The authors also discussed examples of motivating operations and their effects on behavior.

McDevitt, M. A., & Fantino, E. (1993). Establishing operations and the discriminative stimulus. *The Behavior Analyst*, 16(2), 225-227.

This paper is a response to the paper by Michael (1993). The authors note a failure to examine the relevance of the topic to related fields and emphasize the importance of discriminative stimuli.

Michael, J. (2000). Implications and refinements of the establishing operation concept. *Journal of Applied Behavior Analysis*, 33(4), 401-410.

This article discusses the development of the terminology associated with the concept of the establishing operation, as well as its implications for the field of applied behavior analysis. The author also provided additional analyses of the concept of establishing operations across other topics.

Michael, J. (1993). Establishing operations. *The Behavior Analyst*, 16(2), 191-206.

The author provides a commentary on discriminative and motivative variables related to operant functional relations. The author also discussed the relevance of and difference between unconditioned establishing operations and conditioned establishing operations.

Michael, J. (1993). Author's response. *The Behavior Analyst*, 16(2), 229-236.

The author responds to criticisms of his earlier paper (Michael, 1993). The author also provides additional insight on relevant terminology and research areas.

Michael, J. (1982). Distinguishing between discriminative and motivational functions of stimuli. *Journal of the Experimental Analysis of Behavior*, 37(1), 149-155.

This article initiated a debate regarding the refinement of terminology pertaining to discriminative stimuli and their effect on behavior. The term “establishing operation” is suggested as a general term to refer to two primary effects.

Rispoli, M., O'Reilly, M., Lang, R., Machalicek, W., Davis, T., Lancioni, G., & Sigafos, J. (2011). Effects of motivating operations on problem and academic behavior in classrooms. *Journal of Applied Behavior Analysis*, 44(1), 187-192.

This study set up conditions where classroom sessions were preceded by periods of access (abolishing operation) and no access (establishing operation) to items functionally related to the children’s problem behavior. Results indicated that pre-session access decreased problem behavior and increased academic behavior during class. The results suggest access to functionally relevant items prior to class may function as an abolishing operation for problem behavior and as an establishing operation for academic behavior.

Schlinger, H. D. (1993). Establishing operations: Another step toward a functional taxonomy of environmental events. *The Behavior Analyst*, 16(2), 207-209.

This commentary is a response to a paper by Michael (1993), which posed the need to further refine terminology associated with establishing operations.

Sundberg, M. L. (1993). The application of establishing operations. *The Behavior Analyst*, 16(2), 211-214.

This article expands on the paper by Michael (1993) that discussed ways to analyze topics related to motivation.

Sundberg, M. L., Loeb, M., Hale, L., Eigenheer, P. (2002). Contriving establishing operations to teach mands for information. *Analysis of Verbal Behavior*, 18(1), 15-29.

This study investigated the need to contrive establishing operations when teaching children with autism to mand “where?” and “who?” The author discussed implications of the methodology of language training for children who have difficulty acquiring mands for information.

Chapter 17: Stimulus Control

Chapter Summary

This chapter reviews the basic concepts and processes involved in stimulus control and the development of stimulus control. It concludes with a discussion of effective methods for transferring stimulus control from artificial response and stimulus prompts to natural occurring stimuli.

Stimulus control is defined as a change in rate, latency, duration, or amplitude of the response in the presence of specific stimuli referred to as the discriminative stimulus or S^D . Stimulus discrimination is achieved when the organism responds only when the S^D is present and not in its absence (stimulus delta, S^Δ condition). The S^D evokes behavior because it has been correlated with the differential *availability* of reinforcement. Stimulus generalization refers to the ability of other stimuli that share similar properties with the S^D to evoke the same behavior. The degree to which stimulus discrimination and generalization occur varies and is graphically depicted in a stimulus generalization gradient. Faulty stimulus control can occur when a behavior comes under the restricted control of an irrelevant antecedent stimulus. The evocative function of an establishing operation (EO) differs from that of an S^D in that it evokes behavior by changing the efficacy of a reinforcer rather than signaling the differential availability of reinforcement. The S^D acquires its controlling function for operant behavior by being paired with stimulus changes that follow the behavior whereas the controlling function for respondent behavior comes from pairing a neutral stimulus with the antecedent stimulus that elicits the behavior.

Stimulus discrimination training entails reinforcing responses in the presence of one stimulus condition (S^D) and not in another condition (S^Δ). Match-to-sample procedures are used to teach stimulus discriminations, which are referred to as “conditional discriminations” because the discrimination between the comparison stimulus is conditional or depends on the sample stimuli presented at each trial. An example of complex stimulus control occurs in learning concepts. A concept is a stimulus class where each example must share one or more common features. Concepts can function within feature stimulus classes (common physical forms or relative relations are shared) or arbitrary stimulus class (do not share physical forms or relative relations). Both discrimination between and generalization within a stimulus class are required to learn concepts.

In learning a discrimination, prompts can be used and serve as supplemental stimuli to occasion the correct response in the presence of the S^D . Response prompts (e.g., instructions, modeling, physical guidance) operate directly on the response to cue the desired behavior and stimulus prompts (e.g., exaggerating, redundancy, position of stimuli) operate directly on the antecedent task stimuli to cue the correct response in conjunction with the S^D . Several factors may inhibit the development of stimulus control, including lack of pre-attending skills, stimulus salience, masking, and overshadowing.

Response prompts and stimulus prompts are used during the acquisition phase and should then be faded so that stimulus control is transferred to the relevant natural stimuli. For response prompts, this can be done through most-to-least prompt sequences, graduated guidance, least-to-most prompt sequences, and time delay procedures. To fade stimulus prompts, the exaggerated features of stimuli are gradually reduced until the relevant stimulus has been returned to its original state.

Chapter Key Terms

antecedent stimulus class	matching-to-sample	stimulus delta (S^Δ)
arbitrary stimulus class	most-to-least response prompts	stimulus discrimination
concept	overselective stimulus control	stimulus discrimination training
conditional discrimination	overshadowing	stimulus fading
constant time delay	progressive time delay	stimulus generalization
discriminative stimulus (S^D)	response prompts	stimulus generalization gradient
errorless learning	stimulus blocking	stimulus prompts
feature stimulus class	stimulus control	time delay
least-to-most response prompts		

Chapter Objectives

1. Define and provide examples of stimulus control.
2. Define and provide examples of stimulus generalization and stimulus discrimination.
3. Define and provide examples of faulty stimulus control.
4. Identify and describe the controlling function of operant versus respondent antecedents.
5. Describe the difference between discriminative and motivating functions of antecedent stimuli.
6. Describe how discrimination training is used to develop stimulus control.
7. Describe conditional discrimination and the use of match-to-sample in developing stimulus control.
8. Define “concept” and describe how stimulus generalization and discrimination contribute to concept formation.
9. Describe how to use response and stimulus prompts to establish stimulus control.
10. Describe factors that affect the development of stimulus control.
11. Describe how to use response and stimulus prompt fading to transfer stimulus control to the relevant stimulus.

Chapter Focus Questions

1. How is stimulus control established?
2. What is a stimulus generalization gradient?
3. How do conditional discriminations alter the three-term contingency?
4. How can the effects of stimulus control be differentiated from those of motivating operations?
5. How do feature stimulus classes and arbitrary stimulus classes differ?
6. What are three types of response prompts?
7. How does stimulus overselectivity affect the development of stimulus control?
8. How is stimulus control transferred from stimulus prompts to the relevant stimuli?
9. What is the difference between a progressive time delay versus constant time delay procedure in response prompt fading?

Chapter Suggested Readings

Dinsmoor, J. A. (1995). Stimulus control: Part I, *The Behavior Analyst*, 18(1), 51-68.

This paper reviews the difference between respondent and operant conditioning when evaluating stimulus control of behavior and further explains the gradients of stimulus control and generalization.

Dinsmoor, J. A. (1995). Stimulus control: Part II, *The Behavior Analyst*, 18(2), 253-269.

This paper is a continuation of Dinsmoor, (1995), Part I and stresses the importance of disparity and salience between the positive and negative stimulus in stimulus control. The author concludes by considering stimulus control in concept formation, imitation, and equivalence relations.

Dymond, S., & Rehfeldt, R. A. (2000). Understanding complex behavior: The transformation of stimulus functions. *The Behavior Analyst*, 23(2), 239-254.

This paper reviews the behavioral literature on stimulus transformation.

Edwards, T. L., Lotfizadeh, A. D., & Poling, A. (2019). Motivating operations and stimulus control. *Journal of the Experimental Analysis of Behavior*, 112(1), 1–9. <https://doi.org/10.1002/jeab.516>

These authors offer a reconceptualization of motivating operations and argue for three changes in how we currently talk about MOs. Their reconceptualization is intended to increase the value of MOs predicting and changing behavior.

Layng, T. V. J. (2019). Tutorial: Understanding concepts: Implications for behavior analysts and educators. *Perspectives on Behavior Science*, 42(2), 345–363. <https://doi.org/10.1007/s40614-018-00188-6>

This tutorial provides a brief introduction to concept learning and teaching using principles of behavior analysis and related disciplines. The purpose is to provide an overview of how concept analysis and teaching may improve instruction.

McIlvane, W. J. (2009). Translational behavior analysis: From laboratory science in stimulus control to intervention with persons with neurodevelopmental disabilities. *Behavior Analyst*, 32(2), 273–280. <https://doi.org/10.1007/BF03392189>

This author discusses the distinction of translational behavior analysis from basic and applied behavior analysis and considers the potential contribution that translational research can make in the development of the science of behavior.

Piazza, C. C., Hanley, G. P., & Fisher, W. W. (1996). Functional analysis and treatment of cigarette pica. *Journal of Applied Behavior Analysis*, 29(4), 437–450.

This study demonstrates how pica was brought under stimulus control of a purple-colored card (s-delta).

Poling, A., Lotfizadeh, A. D., & Edwards, T. L. (2019). Motivating operations and discriminative stimuli: Distinguishable but interactive variables. *Behavior Analysis in Practice*, 13(2), 502–508. <https://doi.org/10.1007/s40617-019-00400-2>

The authors argue that the concept of motivating operations is controversial and has significant limitations. They suggest a redefinition of the MO which includes deemphasizing the subtypes of MOs, emphasizing how S^Ds and MOs interact, and further examining the kinds of environmental changes that alter the reinforcing value of stimuli.

Sidman, M. (2008). Reflections on stimulus control. *The Behavior Analyst*, 31(2), 127–135. <https://doi.org/10.1007/BF03392166>

In this paper, Sidman reflects on the relation between stimulus control and equivalence relations from his own experiences. He makes a case for cooperative relations between professions who approach stimulus control from many different perspectives.

Chapter 18: Verbal Behavior

Chapter Summary

There are two major sections in this chapter. The first is a review of the core elements in Skinner's analysis of verbal behavior. The second is a description of the application of verbal behavior to language assessment and intervention for individuals with autism and intellectual and developmental disabilities. The chapter concludes with a discussion of the use of Skinner's analysis as a model for assessment and intervention for those who have lost verbal behavior.

Skinner's analysis of verbal behavior emphasizes the function of language, arguing that the meaning of language comes from the immediate and historical environmental contingencies that evoke and consequate speaker and listener behavior. Skinner defined verbal behavior as behavior reinforced through the mediation of another person, who in turn is conditioned to reinforce the behavior of the speaker. Using this definition, expressive language is viewed as resulting from three separate sources of antecedent control – motivating variables, non-verbal S^Ds, and verbal S^Ds – and the history of consequences. This provides the framework for classifying five different types of expressive language (elementary verbal operants). Receptive language is the behavior of the listener and is characterized as nonverbal discriminations controlled by verbal S^Ds. However, much of listener behavior is also verbal (e.g., covert self-talk) and should be treated as verbal behavior in these instances. As language involves an interaction between the speaker and listener, the basic unit of analysis is the *verbal episode*.

Mands are a type of verbal behavior where the form of the response is under the functional control of a motivating operation and its specific reinforcement. Mands can be classified by the different types of MOs that control the behavior (deprivations/aversive stimuli UMOs, CMO-T, CMO-R, and CMO-S; multiple control; and private events) and by the different ways mands affect the behavior of the listener (request, command, prayer, question, advice, warning, offer, permission, and call). Learning to mand is a powerful behavioral cusp in child development. *Tacts* are verbal behavior that involve identifying aspects of the physical environment and are under the functional control of nonverbal S^Ds and a history of conditioned reinforcement. Tact relations are reinforced by five different types of generalized reinforcers provided by the listener to the speaker or to the listener themselves (educational, escape/avoidance, extending environmental contact, automatic, and history of contiguous or correlated usage). Not all verbal behavior is learned through direct contingencies. The emergence of a child's ability to produce novel combinations of words in novel contexts without instruction is in part explained through response and stimulus generalization as well as by *generative learning* (a behavioral effect where previously acquired skills enable the acquisition of other skills).

The third type of antecedent, verbal S^Ds, control six types of elementary verbal operants as follows. The *duplex* relation involves verbally copying verbal stimuli and includes the echoic (auditory match), motor imitation in signing (visual match) and copying text (e.g., written letters, finger spelling). The *codic* relation involves one stimulus representing another with point-to-point correspondence but no formal similarity and includes *textual* and *taking dictation*. The final category is the *intraverbal* where no point-to-point correspondence exists with the verbal stimuli. The intraverbal forms the basis for social interactions and conversations as well as academic and intellectual behavior. At least four different types of verbal discriminations can be involved in intraverbal relations (simple, compound, conditional, and function-altering). Emergent intraverbal behavior develops by recruiting skills from previously acquired repertoires and by combining existing verbal repertoires. Additionally, secondary autoclitic verbal responses can be added to these primary verbal behaviors to provide the listener with more information. These secondary responses are controlled by the three types of primary verbal operants: autoclitic mand, autoclitic tact, and autoclitic interverbal frames.

For a complete accounting of language, the behavior of the listener needs to be considered. In a verbal episode, a speaker emits verbal behavior and the listener serves as an audience, provides reinforcement to the speaker, and responds to the speaker's specific verbal behavior. Untrained emergent listener relations can also develop through response and stimulus generalization because the listener is an active responder.

The assessment of language skills is essential for identifying specific problem areas, comparing skills to expected language norms, and providing guidance for remedial intervention. Using a verbal behavior approach, language assessment entails measuring the strength of the elementary verbal operants, listener skills, self-listener skills, multiply controlled responding, and speaker-listener interactions. Each elementary verbal operant has specific

strategies for assessment, intervention, and defining goals. Overall, generative verbal learning is the common overarching goal for all verbal behavior interventions. As with those who are delayed in or unable to acquire verbal behavior without intervention, a verbal behavior approach can benefit those who have lost verbal behavior through disease or injury, such as Alzheimer's or traumatic brain injury. Identifying the strength of each verbal operant and the functional source of control can provide direction for an effective intervention program.

Chapter Key Terms

autoclitic	intraverbal	tact
automatic contingencies	listener	tact extension
bidirectional naming	listener discrimination	taking dictation
codic	mand	textual
compound verbal discrimination	motor imitation (related to sign language)	topographical-based verbal behavior
copying text	multiple control	verbal behavior
duplic	point-to-point correspondence	verbal conditional discrimination
echoic	private events	verbal episode
elementary verbal operants	selection-based (SB) verbal behavior	verbal function altering effect
formal similarity	simple verbal discrimination	
generative learning	speaker	

Chapter Objectives

1. Differentiate between formal and functional properties of language.
2. Define verbal behavior and verbal episode.
3. Define and provide examples of elementary verbal operants and listener discriminations.
4. Classify verbal relations based on the source of the controlling variables.
5. Classify mand relations based on the motivating operation and specific reinforcement.
6. Classify tacts by the nonverbal S^Ds that control the response and identify the reinforcers controlling the various tacts.
7. Define and provide examples of generative learning and emergent tact relations.
8. Define and provide examples of verbal behavior controlled by verbal S^Ds, including duplicates, codics, and intraverbals.
9. Classify intraverbals by simple, compound, conditional, and function altering verbal discriminations and reinforcers controlling the response.
10. Describe and provide examples of emergent intraverbal relations through bidirectional naming procedures (I-Bin).
11. Identify and provide examples of the different roles of the listener.
12. Define and provide examples of an autoclitic relation and autoclitic mands, tacts and intraverbal autoclitic frames.
13. Describe the three ways behavior analysis can contribute to language assessment and intervention.
14. Describe and provide examples of mand assessment and intervention.
15. Describe and provide examples of tact assessment and intervention.
16. Describe and provide examples of duplic and codic assessment and intervention.
17. Define and provide examples of listener assessment and intervention.
18. Define and provide examples of intraverbal assessment and intervention.

19. Define and provide examples of autoclitic assessment and intervention.
20. Describe ways and provide examples of the use of the verbal behavior approach with those who have lost verbal behavior.

Chapter Focus Questions

1. What is the difference between formal and functional properties of language?
2. How is verbal behavior defined?
3. What roles does the listener play in Skinner's analysis of verbal behavior?
4. How are verbal operants classified?
5. What is the difference between a mand and a tact and what are the controlling variables for each?
6. How does generative learning produce untrained emergent tact and interverbal relations?
7. What are the three roles of the listener and under what circumstances does the listener become the speaker?
8. How does an understanding of the functional units of verbal behavior contribute to the analysis of multiple control and complex verbal behavior?
9. What is an autoclitic relation?
10. How does the verbal behavior approach impact assessment and intervention with individuals who are having problems acquiring verbal behavior?
11. How can a verbal behavior approach be useful to people who have lost their verbal behavior through disease or injury?

Chapter Suggested Readings

A good resource for verbal behavior is the journal *The Analysis of Verbal Behavior*, published by the Association for Behavior Analysis.

Barbera, M. L. (with Rasmussen, T., & Sundberg, M. L.). (2007). The verbal behavior approach: How to teach children with autism and related disorders. Jessica Kingsley.

This is a step-by-step guide that provides information on teaching children language skills using a verbal behavior approach. Although designed for those unfamiliar with ABA and VB, this book gives a good introduction on how to use the verbal behavior approach.

DeSouza, A. A., Akers, J. S., & Fisher, W. W. (2017). Empirical application of Skinner's verbal behavior to interventions for children with autism: A review. *Analysis of Verbal Behavior*, 33(2), 229–259. <https://doi.org/10.1007/s40616-017-0093-7>

In this article, the authors provide an update of Sundberg and Michael's review of the use of verbal behavior in interventions with children on the autism spectrum. The authors review journals from 2001 through 2017 and discuss the findings in terms of journal source, frequency, and type of verbal operant studied.

Greer, R. D., & Ross, D. E. (2008). Verbal behavior analysis: Inducing and expanding new verbal capabilities in children with language delays. Pearson/Allyn & Bacon.

This book describes methods for teaching children to produce novel and spontaneous verbal operants, acquire language incidentally, and become socially verbal.

Hernandez, E., Hanley, G. P., Ingvarsson, E. T., & Tiger, J. H. (2007). A preliminary evaluation of the emergence of novel mand forms. *Journal of Applied Behavior Analysis*, 40(1), 137-156.

This study evaluates the use of a teaching strategy that produced generalized language acquisition responding.

Luckevich, D. (2008). *Verbal behavior targets: A tool to teach mands, tacts and intraverbals*. DRL Books.

This is a reference book that includes word lists, phrases, sentences, and questions that can be used to develop the building blocks of functional communication in children with disabilities, especially those with autism spectrum disorder.

Luke, M. M., & Carr, J. E. (2015). The analysis of verbal behavior: A status update. *Analysis of Verbal Behavior*, 31(2), 153–61. <https://doi.org/10.1007/s40616-015-0043-1>

The authors evaluated the content, frequent contributors, and scholarly impact of the Journal of Verbal Behavior over 30 years. Results indicated that there is an increasing number of articles on this topic, especially over the past four years of the publications studied.

Marckel, J. M., Neef, N. A., & Ferreri, S. J. (2006). A preliminary analysis of teaching improvisation with the picture exchange communication system to children with autism. *Journal of Applied Behavior Analysis*, 39(1), 109-115.

This study evaluated a teaching strategy for children who use Picture Exchange Communication Systems (PECS) and who may not have the necessary picture card in their picture binders. Children were taught descriptive words to evaluate whether the descriptions would be used when the correct picture was missing. Results indicated that the teaching strategy promoted improvisation in the children when the correct picture card was absent. Generalization within classes of description (e.g., color) occurred, but generalization across classes did not occur readily.

Skinner, B. F. (1957). *Verbal Behavior*. Copley.

The authoritative, original source for this topic.

Sundberg, M. L., & Partington, J. W. (2013). *Teaching language to children with autism or other developmental disabilities*. Behavior Analysts.

The book provides an introduction to Skinner's analysis of verbal behavior with examples of everyday language skills demonstrated by children. The book contains a brief language assessment system and describes basic teaching procedures for developing early and intermediate elementary verbal operants.

Thompson, R. H., Cotnoir-Bichelman, N. M., McKerchar, P. M., Tate, T. L., & Dancho, K. A. (2007). Enhancing early communication through infant sign training. *Journal of Applied Behavior Analysis*, 40(1), 15-23.

This study demonstrated that young hearing children who were taught to sign demonstrated generalized treatment effects and access to signs helped reduce crying and whining.

Wallace, M. D., Iwata, B. A., & Hanley, G. P. (2006). Establishment of mands following tact training as a function of reinforcer strength. *Journal of Applied Behavior Analysis*, 39(1), 17-24.

This study evaluated whether a response acquired as a tact would later be used as a mand. Results indicated that training transferred from tact to mand conditions in some cases.

Chapter Activity

Observing Verbal Operants

Set-up: individually, in pairs, or in small groups

Students are to find two short videos on the internet of very young children. The first video should be of a preverbal child (8 to 12 months) and the second should be of a child that is slightly older and is talking (13 to 18 months). After watching the videos, have students do the following.

- A. For the older verbal child, identify elementary verbal operants that are captured in the video. Note the context of the operant (antecedent and consequence).
 - i. How many different elementary verbal operants were observed in the video? (note the length of the video)
 - ii. What was the most frequently observed operant?
- B. Repeat this for the child who is preverbal. Is the child engaging in behaviors (e.g., gestures, repeating actions to get a response) that are serving the function of an elementary verbal operant?
 - i. How many different functions of elementary verbal operants were observed in the video? (note the length of the video)
 - ii. What was the most frequently observed function?

Chapter 19: Equivalence-Based Instruction

Chapter Summary

Behavior analysts have studied stimulus equivalence in an attempt to explain symbolic functioning since work by Sidman was published (1971). Stimulus equivalence procedures involve training and testing conditions, during which match-to-sample procedures are commonly used. Following baseline conditions, two interrelated conditional discriminations (e.g., AB and BC) are trained with arbitrary, physically dissimilar stimuli. Training steps include: 1) presentation of a sample stimulus (e.g., A1 or A2); 2) presentation of multiple comparison stimuli (e.g., B1 and B2) contingent on an observing response to the sample; and 3) reinforcement contingent on selection of the correct comparison stimulus (e.g., B1 when the sample is A1). Following training, trials are conducted without reinforcement to probe for the emergence of reflexivity (i.e., generalized identity matching like AA, BB, and CC), symmetry (i.e., reversal of sample-comparison functions like BA and CB), and transitivity (i.e., relations between stimuli that were not presented together during training like AC and CA). Positive demonstration of reflexivity, symmetry, and transitivity supports the conclusion that an equivalence class has formed, and each member of the class (e.g., A, B, and C) will have the same effect on behavior.

The emergence of untrained relations resulting from stimulus equivalence enhances the significance of equivalence-based instruction (EBI) to learning. Key outcomes that add to the effectiveness of EBI include: 1) formation of equivalence classes resulting from testing and probing; 2) delayed emergence (i.e., equivalence performance is frequently strengthened with repeated testing); 3) class expansion (i.e., new stimuli joining the class following training of relation with one member of the class); 4) class merger (i.e., combination of classes following training of relation between one member of each class); 5) transfer of function (i.e., all members of the class having the same effect on behavior following training with one member of the class; and 6) emergence of contextual control (i.e., a five term contingency allows for stimuli to be members of more than one stimulus class).

Procedures for EBI must be geared toward successful generation of equivalence classes and prevention of problematic stimulus-control. Critical decisions for match-to-sample training procedures include: 1) number and type of stimuli, 2) mode of stimulus presentation, 3) inclusion and type of observing response, 4) content of the instructions, 5) arrangement of trial presentations, 6) special training steps, 7) training structure, 8) mastery criteria for training, and 9) consequences for training. Critical decisions for testing procedures include: 1) composition of probe-trial blocks, 2) arrangement of consequences, 3) order of probe-type presentations, and 4) the criteria to be used for judging class formation.

Variations in the standard match-to-sample training and testing approach to equivalence include: 1) stimulus compounds (i.e., multiple-part sample stimuli in a match-to-sample procedure with each part becoming a member of the equivalence class); 2) class-specific reinforcement (i.e., reinforcer for correct responding differs between intended classes with the specified reinforcer functioning as a member of the class); and 3) three-term contingency training (i.e., training simple discriminations can produce equivalence-class formation).

Application of EBI has been demonstrated across populations, settings, and targets. These procedures have been effective for children and adults with intellectual disabilities, young typically developing children, adults receiving clinical services, geriatric populations, and college students. Teaching targets have included: number skills, language skills, music skills, academic skills, Braille reading, health-related behaviors, skills impacted by traumatic brain injury, and university-course content.

Naming theory and relational frame theory (RFT) have been proposed as alternative accounts for derived relational responding. Naming theorists suggest the higher-order speaker-listener operant (i.e., naming) is responsible for all class formation, including equivalence class formation. In contrast, relational frame theory suggests the higher-order operant is framing (i.e., responding to one stimulus in terms of another).

Chapter Key Terms

class expansion	equivalence test	stimulus-control
class merger	exclusion	topographies stimulus
class-specific reinforcement	higher-order operant class	equivalence
conditional discrimination	matching-to-sample procedure	symmetry
contextual control	nodal stimulus (node)	training structure
derived stimulus relations	reflexivity	transfer of function
emergent stimulus relations	simple discrimination	transitivity
equivalence class formation	simple-to-complex testing protocol	

Chapter Objectives

1. Define and give examples of stimulus equivalence.
2. Discuss traditional procedures for training and testing for equivalence class formation.
3. List and describe the derived stimulus relations that are probed for in stimulus equivalence procedures.
4. Discuss the importance of equivalence-based instructional procedures for new skill development.
5. List and describe variations of the match-to-sample training procedure for equivalence-based instruction.
6. Describe naming theory and relational frame theory, and how each relates to stimulus equivalence.

Chapter Focus Questions

1. What is stimulus equivalence and what is its origin?
2. How are stimulus equivalence experiments conducted?
3. What needs to be demonstrated for stimulus equivalence?
4. Why is stimulus equivalence important for skill development?
5. When should equivalence-based instruction be used?
6. What are some variations of equivalence-based instruction?
7. What is naming theory, and how is it related to stimulus equivalence?
8. What is relational frame theory, and how is it related to stimulus equivalence?

Chapter Suggested Reading

Hayes, S. C., Barnes-Holmes, D., & Roche, B. (Eds.). (2001). *Relational frame theory: A post-Skinnerian account of human language and cognition*. Kluwer/Plenum.

This book provides a complete account of relational frame theory and how the conceptualization can be applied.

Lovett, S., Rehfeldt, R. A., Garcia, Y., & Dunning, J. (2011). Comparison of a stimulus equivalence protocol and traditional lecture for teaching single-subject designs. *Journal of Applied Behavior Analysis*, 44(4), 819-833.

This article provides a technological description of equivalence-based instruction procedures and compares the effectiveness of those procedures to traditional college-level lectures.

McLay, L. K., Sutherland, D., Church, J., & Tyler-Merrick, G. (2013). The formation of equivalence classes in individuals with autism spectrum disorder: A review of the literature. *Research in Autism Spectrum Disorders*, 7(2), 418-431.

This article provides a comprehensive review of literature focused on the application of equivalence-based instruction with learners with autism spectrum disorders.

Montoya-Rodríguez, M. M., Molina, F. J., & McHugh, L. (2017). A review of relational frame theory research into deictic relational responding. *The Psychological Record*, 67(4), 569–579.

This is a review of research on relational frame theory. Thirty-four articles on deictic relations were reviewed.

Sidman, M. (2009). Equivalence relations and behavior: An introductory tutorial. *The Analysis of Verbal Behavior*, 25(1), 5–17.

This article provides a complete description of stimulus equivalence procedures from the researcher who conducted the initial stimulus equivalence experiments.

Sidman, M., & Tailby, W. (1982). Conditional discrimination vs. matching to sample: An expansion of the testing paradigm. *Journal of the Experimental Analysis of Behavior*, 31(1), 5-22.

This is an essential article for behavior analysts conducting research with conditional discriminations. It provides a thorough breakdown of the required components of conditional discrimination paradigms.

Chapter Activity

1. Provide students with the profile of a hypothetical learner and a list of desired stimulus classes. Have the students design a teaching protocol in which equivalence-based instruction will be utilized for the desired class formation.

Chapter 20: Engineering Emergent Learning with Nonequivalence Relations

Chapter Summary

Operant behavior occurs under the control of particular sets of stimuli. Some stimuli that participate in various contingencies may become arbitrarily related in a class: they share no formal similarities, in other words, but similar responses occur in their presence because of contingencies of reinforcement established by the verbal community. Perhaps the best known of these relationships is stimulus equivalence: stimuli become members of a class by virtue of “sameness,” in terms of the responses they evoke (chapter 19). Further, some stimuli that become related as “same” may evoke responding without behavior ever having been directly reinforced in their presence. This cannot be considered stimulus generalization because the evocative stimuli bear no formal similarity. Rather, it is considered to be an emergent or derived relation.

Stimuli may be related in many ways other than “sameness.” The terms with which we have become familiar for discussing equivalence relations, therefore, apply to just one type of relation among many, and this fact points to the need for a more general set of overarching terms. “Symmetry,” for example, refers to a bidirectional relationship demonstrated by a learner who, when taught some form of “If A then B,” may derive the response “if B then A” without additional instruction (e.g., being taught to match the written word “cat” to a photo of a cat, the child can match the photo to the written word). According to relational frame theory (RFT), however, bidirectionality may be observed in other relationships such as those of “distinction,” “temporal” and “spatial,” and “cause-effect.” Opposition, for instance, is a type of distinction: if a learner is taught that “big” is the opposite of “small,” they may—given the right learning history—identify “small” as the opposite of “big” with no further training. Bidirectional relationships of this type are called “mutual entailment.”

Another term in the equivalence literature is “transitivity,” which refers to a situation in which two stimuli, “B” and “C,” are responded to as being the same, by virtue of their having been separately taught to be associated with a third stimulus, “A.” Within RFT, “combinatorial entailment” is the more general term for a derived relation in which the function of a given stimulus depends on other stimuli to which it is related.

It is important to note that the same stimuli can be brought into many different classes and relations: think about a stack of photos of produce, that may be sorted according to how they grow, how they are harvested, season of availability, means of preparation, botanical classification, or simply shape or color. The way in which the stimuli in this example are related is under the control of contextual stimuli. For instance, a “cat’s paw” is a curved implement for pulling nails from lumber; you would probably go to your toolbox and produce this tool if asked for one by the foreman on a construction site, but it would be surprising if you did so when your veterinarian said, “Show me your cat’s paw.”

If symmetry and transitivity are special cases of mutual and combinatorial entailment, it is tempting to suppose by analogy that relational frame theory is a broader form of Sidman’s theory of stimulus equivalence. Both are overarching accounts of observed phenomena that cohere with respect to basic principles, but there is an important difference: Sidman maintained that derived relations necessarily were an automatic outcome of specific reinforcement contingencies, whereas RFT assumes that “deriving” is a generalized operant that develops, much like generalized imitation, as the outcome of a particular learning history that is characterized by multiple-exemplar training.

Relational frame theory posits that (a) derived stimulus relations are essentially verbal processes, and (b) given enough reinforced experience with multiple examples, people develop a higher-order skill to derive relations among given sets of stimuli in the absence of further reinforced experience. The resulting generalized repertoire, in the parlance of RFT, is called arbitrarily applicable relational responding; any specific type of relation—forms of distinction or deictic relations, for example—is called a relational frame.

Certain broad types of relation may represent classes of behavior that are essentially tacted by big-picture psychological constructs: “Categorical knowledge,” which is manifested in hierarchical relations; “self-concept,” which is represented in deictic relations that are central to the socially important skill of perspective-shifting; and intellectual development, which seems to track with verbal skills and increasingly sophisticated forms of relational

responding (indeed, systematically training stimulus relations has been shown to increase scores of a variety of learners on standardized intelligence tests).

Another area of human experience in which RFT has made an impact is personal “well-being,” defined as behaving in ways that make contact with one’s most valued reinforcers. Sometimes individuals behave in ways that interfere with optimal well-being, and precepts of RFT, such as transformation of function and the examination of rule-governed behavior, may shed light on mechanisms that account for the interfering behavior. Acceptance and Commitment Therapy (ACT) is a behavior therapy predicated in part on RFT and on research in derived relations. The treatment methods employed by ACT often focus on private events and depart significantly from applied behavior analysis as conventionally conceived and practiced—they do not target discrete observable target behavior or systematically manipulate externally arranged consequences, for instance—but they have been evaluated experimentally and have been shown to improve not only such complaints as self-reported anxiety and depression (and associated symptoms) but also, in some cases, to have an impact on over problem behavior. These technological departures may be uncomfortable for some behavior analysts but they are grounded in behavioral principles and ripe for additional research.

Chapter Key Terms

acceptance and commitment therapy	deictic relations	perspective shifting
arbitrarily applicable relational responding	derived relations	relational frame theory
arbitrary relations	distinction relations	relational frame
behavioral inflexibility	hierarchical relations	rule-governed behavior
causal relations	multiple-exemplar training	spatial relations
contextual stimulus	mutual entailment	transformation of function
combinatorial entailment	nonequivalence relations	temporal relations

Chapter Objectives

1. Define derived stimulus relations.
2. Using examples, distinguish between equivalence and nonequivalence relations.
3. Define and provide examples of transitivity and symmetry.
4. Define and provide examples of mutual entailment and combinatorial entailment.
5. Define and provide examples of main types of nonequivalence relations: distinction, spatial and temporal, and causal.
6. Define and provide examples of hierarchical relations as they relate to categorization.
7. Define and provide examples deictic relations, and discuss their relationship with perspective shifting.
8. Using examples, distinguish between relational frame theory, arbitrarily applicable relational responding, and relational frames.
9. Explain the relationship between relational frame theory and acceptance and commitment therapy.
10. Discuss the similarities and differences of acceptance and commitment therapy and conventional behavior analytic approaches to problem behavior.
11. Discuss, with respect to examples, the relationship between derived relations, rule-governed behavior, and acceptance and commitment therapy.

Chapter Focus Questions

1. How would you design instruction that achieves symmetry as an outcome and how would you test for it?
2. How would you design instruction that achieves transitivity as an outcome and how would you test for it?

3. Why do nonequivalence relations call for a vocabulary that expands on the terms employed to discuss equivalence relations, specifically, mutual and combinatorial entailment?
4. Provide examples of distinction relations.
5. Provide examples of temporal and spatial relations.
6. Provide examples of causal relations.
7. What are three types of categorization that can arise when hierarchical relations are created via derived stimulus relations protocols?
8. How are deictic relations associated with perspective shifting, in terms of simple and complex deictic relations?
9. What are relational frame theory (RFT) and arbitrarily applicable relational responding (AARR) and how do they challenge the standard view of the way derived stimulus relations are acquired?
10. How is “contextual control” related to relational responding?
11. How is “multiple-exemplar training” related to relational responding?
12. What is meant by the term psychological flexibility and how is it related to rule-governed behavior?
13. How do private events curtail contact with personal reinforcers and what are some remedies provided by acceptance and commitment therapy (ACT) when individuals experience these problems?

Chapter Suggested Readings

Texts on Relational Responding

Hayes, S. C., Barnes-Holmes, D., & Roche, B. (Eds.). (2001). *Relational frame theory: A post-Skinnerian account of human language and cognition*. Kluwer/Plenum.

Rehfeldt, R. A., & Barnes-Holmes, Y. (Eds.). (2009). *Derived relational responding: Applications for learners with autism and other developmental disabilities: A progressive guide to change*. Harbinger Publications.

Törneke, N. (2010). *Learning RFT: An introduction to relational frame theory and its clinical application*. New Harbinger Publications.

The Emergence of Emergent Learning as a Verbal Phenomenon: Theory and Research

Berens, N. M., & Hayes, S. C. (2007). Arbitrarily applicable comparative relations: Experimental evidence for a relational operant. *Journal of Applied Behavior Analysis*, 40(1), 45–71.

Critchfield, T. S., Barnes-Holmes, D., & Dougher, M. J. (2018). Editorial: What Sidman Did—Historical and contemporary significance of research on derived stimulus relations. *Perspectives on Behavior Science*, 41, 9–32.

Galizio, M., & Bruce, K. E. (2018). Abstraction, multiple exemplar training and the search for derived stimulus relations in animals. *Perspectives on Behavior Science*, 41(1), 45–67.

Horne, P. J., & Lowe, C. F. (1996). On the origins of naming and other symbolic behavior. *Journal of the Experimental Analysis of Behavior*, 65(1), 185–241.

Rehfeldt, R. A. (2011). Toward a technology of derived stimulus relations: An analysis of articles published in the *Journal of Applied Behavior Analysis*, 1992–2009. *Journal of Applied Behavior Analysis*, 44(1), 109–119.

Zentall, T. R., Galizio, M., & Critchfield, T. S. (2002). Categorization, concept learning and behavior analysis: An introduction. *Journal of the Experimental Analysis of Behavior*, 78(3), 237–248.

Educational Applications of Emergent Learning

- Amd, M., & Roche, B. (2018). Assessing the effects of a relational training intervention on fluid intelligence among a sample of socially disadvantaged children in Bangladesh. *The Psychological Record*, 68(2), 141–149.
- Critchfield, T. S. (2018). Efficiency is everything: Promoting efficient practice by harnessing derived stimulus relations. *Behavior Analysis in Practice*, 11(3), 206–210.
- Critchfield, T. S., & Twyman, J. S. (2014). Prospective instructional design: Establishing conditions for emergent learning. *Journal of Cognitive Education and Psychology*, 13(2), 201–217.
- Dixon, M. R., Belisle, J., McKeel, A., Whiting, S., Speelman, R., Daar, J. H., & Rowsey, K. (2017). An internal and critical review of the PEAK relational training system for children with autism and related intellectual disabilities: 2014–2017. *The Behavior Analyst*, 40(2), 493–521.

Behavior Analysis, Emotions, and Acceptance and Commitment Therapy

- Dack, C., McHugh, L., & Reed, P. (2009). Generalization of causal efficacy judgments after evaluative learning. *Learning & Behavior*, 37(4), 336–348.
- Friman, P. C., Hayes, S. C., & Wilson, K. G. (1998). Why behavior analysts should study emotion: The example of anxiety. *Journal of Applied Behavior Analysis*, 31(3), 137–156.
- McEnteggart, C. (2018). A brief tutorial on Acceptance and Commitment Therapy as seen through the lens of derived stimulus relations. *Perspectives on Behavior Science*, 41(1), 215–227.
- Singh, N. N., Lancioni, G. E., Manikam, R., Winton, A. S. W., Singh, A. N., Singh, J., & Singh, A. D. A. (2011). A mindfulness-based strategy for self-management of aggressive behavior in adolescents with autism. *Research in Autism Spectrum Disorders*, 5(3), 1153–1158.
- Singh, N. N., Lancioni, G. E., Winton, A. S. W., Karazsia, B. T., Myers, R. E., Latham, L. L., & Singh, J. (2014). Mindfulness-based positive behavior support (MBPBS) for mothers of adolescents with autism spectrum disorder: Effects on adolescents' behavior and parental stress. *Mindfulness*, 5, 646–657.

Chapter 21: Modeling, Imitation, and Observational Learning

Chapter Summary

A behavior is considered imitative if: 1) it follows a model (i.e., another person's demonstration of the behavior); 2) the model and the evoked behavior "look the same" (i.e., have formal similarity); 3) there is a slight delay between the model and the evoked behavior; and 4) the model serves as the controlling variable for the evoked behavior. Learners can be taught to imitate using systematic, researched based procedures with the goal of establishing generalized imitation. Streifel (1974) recommended the following imitation training sequence: 1) assessing and teaching prerequisite skills, 2) selecting models, 3) pretesting, 4) sequencing models for training, and 5) performing imitation training. Guidelines for imitation training include: 1) keep sessions active and brief, 2) reinforcing prompted and imitative responses, 3) pairing praise and attention with tangible reinforcers, 4) backing up and move ahead slowly if progress stalls, 5) fading out prompts, and 6) measuring and reviewing the data after each session.

Once generalized imitation has been acquired, modeling procedures, including video modeling, can be a strategy for learners to acquire new skills by imitating. The most effective modeling procedures include the following elements: 1) similarities between the model and learner, 2) models that the learner admires, 3) emphasis on critical aspects of the behavior, 4) prompting attending to the model, 5) model in authentic context, 6) feedback immediately following practiced response, and 7) reinforcement of imitative response.

When another person's behavior and its consequence are observed, and that information is used to determine whether or not to imitate the behavior, it is considered observational learning. Observational learning involves imitation or non-imitation of the observed response. The skills required to developing an observational learning repertoire include: 1) attending, 2) imitating, and 3) discriminating.

Chapter Key Terms

generalized imitation
imitation
imitation training

modeling
observational learning

video modeling
video self-modeling

Chapter Objectives

1. Define, and provide examples of, imitation, modeling, and observational learning.
2. Discriminate between examples and nonexamples of imitation, modeling, and observational learning.
3. List and describe the required elements of imitation.
4. Describe the guidelines for effective imitation training.
5. Discuss the elements of effective modeling procedure to teach new skills.
6. List and describe the essential skills for observational learning.

Chapter Focus Questions

1. What are the four behavior-environment relations that define imitation?
2. What are the steps and decision rules involved in imitation training?
3. How can modeling be used to effectively teach new skills?
4. What is observational learning, and how is it different than imitation?

Chapter Suggested Readings

Eikeseth, S., & Nasset, R. (2003). Behavioral treatment of children with phonological disorder: The efficacy of vocal imitation and sufficient-response-exemplar training. *Journal of Applied Behavior Analysis*, 36(3), 325-337.

This article describes a study in which children with phonological disorders were taught vocal imitation. The authors found that after the children developed an imitative repertoire of vocalizations, their articulation improved in everyday situations.

Garcia, E., Baer, D. M., & Firestone, I. (1971). The development of generalized imitation within topographically determined boundaries. *Journal of Applied Behavior Analysis*, 4(2), 101-112.

This article describes a study that evaluated whether imitation generalized to different response topographies or whether it was topography specific. The findings indicated that imitation generalized to topographies similar to those that were trained.

Holth, P. (2003). Generalized imitation and generalized matching to sample. *The Behavior Analyst*, 26(1), 155-158.

This article presents a conceptual discussion surrounding many of the terms in imitation training.

MacDonald, J., & Ahearn, W. H. (2015). Teaching observational learning to children with autism. *Journal of Applied Behavior Analysis*, 48(4), 800-816.

The introduction section of this article provides a detailed review of observational learning, and the responses an organism must have in their repertoire for the development of observational learning.

Young, J. M., Krantz, P. J., McClannahan, L. E., & Poulson, C. L. (1994). Generalized imitation and response-class formation in children with autism. *Journal of Applied Behavior Analysis*, 27(4), 685-697.

This article describes a study in which a multiple-baseline design was used to evaluate the effects of imitation training on the generalized imitation of children with autism.

Chapter 22: Shaping

Chapter Summary

Shaping is defined as the differential reinforcement of successive approximations of a desired terminal behavior. A successive approximation is a behavior that gradually changes to more closely resemble the terminal behavior until it meets criterion for that terminal behavior. During a shaping procedure, a behavior analyst reinforces a learner's emission of behaviors that are closer to the terminal behavior than the client's previously emitted behaviors, while placing the previously emitted less closer behaviors on extinction. A behavior can be shaped along any of its measurable dimensions (e.g., form, duration, magnitude, latency, etc.). The term to describe shaping in this manner is "shaping within response topographies", as the form of the behavior remains constant and only a specific dimension of the behavior is gradually changed. Behavior can also be shaped across response topographies, where the form of behavior changes until it meets criterion for the terminal behavior.

The benefits of shaping are it teaches learners to engage in novel behaviors with the use of positive reinforcement and it typically does not involve aversive procedures. Shaping is also systematic and can easily be combined with other behavior change strategies. Shaping has a number of limitations, with the primary one being that its implementation can be time consuming. Although, the term "successive" suggests that shaping is a linear process, many times it is not. The process can be erratic and may not move forward in a smooth progression, especially when conducted with less skilled practitioners. The practitioner must continuously monitor the behavior and detect and reinforce subtle changes toward the terminal behavior. As with other behavior change procedures, individuals (often those not trained in behavior analysis) unknowingly misapply the procedure and inadvertently shape inappropriate behavior (including harmful ones).

Prior to using shaping, practitioners should consider a number of factors. Is the terminal behavior appropriate for shaping? Are appropriate resources available to successfully implement shaping? Will another behavior change procedure more adequately address the issue? Additionally, one should be familiar with the ten *Modern Principle of Shaping* (Prior, 1999). Since time is a concern with shaping, strategies aimed at improving its efficiency are likely to further its utility. The efficiency of shaping can be improved by combining it with verbal, model, and physical prompts. One's use of a percentile schedule might assist the practitioner in selecting and reinforcing successive approximations in a more systematic manner. This would enable a more consistent application of the procedure across practitioner skill levels and among a team of individuals using shaping with an individual learner. A popular application of shaping is called clicker training. It has been used to shape behavior across a wide array of animals, including humans. Emerging applications of shaping includes its use with computers, in robotics, and in telehealth.

Chapter Key Terms

clicker training
differential reinforcement
extinction-induced variability

response differentiation
shaping
successive approximation

Chapter Objectives

1. Define and provide examples of shaping.
2. Define the following terms and explain their role in shaping: differential reinforcement, extinction-induced variability, response differentiation, successive approximations.
3. Define and provide examples of shaping across different response topographies and shaping within the same response topography.
4. State the benefits and limitation of shaping.
5. Explain how the use of a discriminative stimulus, physical guidance, imitative prompts, and percentile schedules can increase the efficiency of shaping.
6. State the guidelines for effectively using shaping including the ten Modern Principles of Shaping.

Chapter Focus Questions

1. What are the three processes conducted by the behavior analyst when shaping a behavior?
2. Which dimensions of behavior can be shaped and how would you implement shaping across these relevant dimensions?
3. How is shaping across different response topographies different from shaping within a response topography?
4. What is the difference between shaping and fading?
5. How is each listed guideline to shaping likely to improve a shaping procedure?
6. What strategies might help a beginner learn to effectively shape behavior?

Chapter Suggested Readings

Fonger, A. M., & Malott, R. W. (2019). Using shaping to teach eye contact to children with autism spectrum disorder. *Behavior Analysis in Practice*, 12(1), 216-221.

In this study, three preschool-aged children diagnosed with autism learned to make eye-contact via shaping. The experimenters used shaping within response topographies to increase the duration of eye contact from less than 1 s to 3 s.

Ghaemmaghami, M., Hanley, G. P., Jessel, J., & Landa, R. (2018). Shaping complex functional communication responses. *Journal of Applied Behavior Analysis*, 51(3), 502-520.

This study evaluated the efficacy and necessity of a shaping procedure to teach four children complex functional communication responses (i.e., FCR, complex mand statements) from simpler FCRs. Experiment 1 demonstrated the efficacy of the shaping procedure with two children. Experiment 2 evaluated the same shaping procedure with two different children but also included probes of the terminal response throughout. The results of both experiments indicated complex FCRs can be taught via shaping while keeping problem behavior low. The results of Experiment 2 indicated that each progressive step of the shaping procedure was necessary, as the participants did not engage in the terminal form of the FCR until all previous approximations had been mastered and the terminal response had been directly taught.

Harrison, A. M., & Pyles, D. A. (2013). The effects of verbal instruction and shaping to improve tackling by high school football players. *Journal of Applied Behavior Analysis*, 46(2), 518-522.

This study evaluated the use of a shaping procedure that included verbal instruction and TAG teach to improve tackling with high school football players. The procedures increased the accuracy of the football players' tackling at walking, jogging, and running speeds.

Hunter, M., & Rosales-Ruiz, J. (2019). The power of one reinforcer: The effect of a single reinforcer in the context of shaping. *Journal of the Experimental Analysis of Behavior*, 111(3), 449-464.

The purpose of this study was to investigate if a “desperation-driven click” situation could be produced with humans in the context of a shaping procedure, as the phenomenon has been anecdotally reported when shaping the behavior of non-human animals. When a trainer moves from one successive approximation to the next during a shaping procedure, the subject may not readily engage in the new successive approximation. This results in an extended period of time without the subject receiving reinforcement. In this situation, the trainer might reinforce a response that does not meet the new criterion, in an effort to increase the rate of reinforcement. This reinforcement delivery has been called a “desperation-driven click.” Additional anecdotal reports suggest the subject may continue performing the behavior that was just followed by the one reinforcer presentation, even without additional reinforcement. This situation is problematic, as it can interfere with the subject's acquisition of the terminal behavior. The “desperation-driven click” situation was created with the human participants and its results have implications regarding the effect of just one accidental reinforcer delivery during the implementation of behavioral interventions, especially those that include shaping procedures.

Galbicka, G. (1994). Shaping in the 21st century: Moving percentile schedules into applied settings. *Journal of Applied Behavior Analysis*, 27(2), 739-760.

This article discusses future directions of shaping with respect to how the use of percentile schedules might improve the precision and consistency of implementation with shaping procedures.

Ferguson, D. L., & Rosales-Ruiz, J. (2001). Loading the problem loader: The effects of target training and shaping on trailer-loading behavior of horses. *Journal of Applied Behavior Analysis*, 34(4), 409-424.

This study examined a shaping procedure to teach horses to enter a transportation trailer. The experimenters taught horses to touch a target and gradually moved the target further inside the trailer.

Hagopian, L. P., & Thompson, R. H. (1999). Reinforcement of compliance with respiratory treatment in a child with cystic fibrosis. *Journal of Applied Behavior Analysis*, 32(2), 233-236.

This study evaluated a shaping procedure to teach a child with cystic fibrosis to comply with medically necessary respiratory treatments.

Pryor, K. (2017). *Don't shoot the dog!: The new art of teaching and training* (Revised ed.). Bantam Books. (Original work published 1999)

This book is an excellent resource on dog training. It describes shaping in a user-friendly manner with lots of applied examples.

Pryor, K. (2004). *Lads before the wind: Diary of a dolphin trainer*. Sunshine Books.

Dr. Pryor recounts her time as a dolphin trainer at Sea World in Hawaii. She provides a historical context regarding learning about shaping from B.F. Skinner. Dr. Pryor also describes how she used shaping to train the dolphins to engage in daily routine behaviors (e.g., approaching the water's surface to receive reinforcers) and perform show tricks at Sea World.

Pryor, K. (2005). *Getting started: Clicker training for dogs*. Sunshine Books.

In this book, Dr. Pryor explains how to shape dog behavior. While teaching others how to effectively use shaping, Dr. Pryor hopes to greatly reduce the use of punishment in animal training.

Rea, J., & Williams, D. (2002). Shaping exhale durations for breath CO detection for men with mild mental retardation. *Journal of Applied Behavior Analysis*, 35(4), 415-418.

In this study, the experimenters used shaping to increase the duration of the participants' exhalations, as verbal instructions did not evoke the desired response. Increased exhalations were necessary when testing for the presence of CO in the participants' breath as part of a smoking cessation program.

Chapter Activities

Sniffy the Virtual Rat:

Instruct students to purchase a computer-based simulation exercise (e.g., Sniffy the Virtual Rat: The Shaping Game from http://www.wadsworth.com/psychology_d/special_features/sniffy.html) aimed at teaching students about the schedules of reinforcement and how to shape behavior. Assign a specific behavior for the students to shape with the virtual rat. Students should submit the cumulative record data from their shaping exercises.

The Shaping Game:

- 1) Play "the shaping game" (an in vivo, group activity) with your students. You may divide your students into multiple groups of three or four individuals and have each group play the game or have the entire class play each round together.
- 2) Select one student to leave the room (the target student). The rest of the students should pick a behavior to shape with the target student. (It's best to instruct the students to select an appropriate behavior that will not embarrass the student.) You may provide the students with examples, such as standing on a chair or standing on one foot and turning around three times.

- 3) After selecting a target behavior, tell the target students to come back into the room. The other students may use a clicker or praise to provide reinforcement while shaping successive approximations to the target behavior.
- 4) Instruct the students to assume they are working with a person who is unable to follow instructions. They should not talk to the target student (other than to praise the correct approximations) or provide prompts. The target student must engage in the target behavior solely due to contact with the contingencies of reinforcement.
- 5) When the game has finished, discuss the game experience with the students. You might ask: 1) what did they noticed about the process, 2) what portions of the game were difficult, 3) did they discover any specific strategies, 4) how might they improve their process in the future, and 5) were untargeted behaviors accidentally shaped up and how did that occur?

Chapter 23: Chaining

Chapter Summary

A behavior chain is a specific sequence of discrete behaviors that result in one terminal outcome. Each response within the behavior chain produces a specific stimulus change that reinforces that response and each stimulus change functions as an S^D for the following response. The reinforcer for the final response also functions as a reinforcer for completion of all the behaviors in the chain. Chaining is used to teach new behaviors by combining or adding to behaviors already in the learner's repertoire to create more complex behaviors. Chaining can be combined with other behavior change strategies to teach learners more skills. Further, the use of chaining to teach new skills enables learners to become more independent and live in less restrictive environments.

The components of a behavior chain are determined via a task analysis (TA), where the steps that make up a complex task are broken up into smaller, sequenced, teachable parts. A task analysis should be individualized for the specific learner. It can be constructed by observing a competent individual perform the task, completing the task yourself, or consulting with an expert. Systematic trial and error procedures may also be needed to further refine the TA. Once the TA has been finalized, the behavior analyst uses it to assess the learner's performance of each component. The four methods for teaching a behavior chain are forward chaining, backward chaining, total-task chaining, and backward chaining with leap aheads. The training method used to teach a specific task to a learner should be determined by the task and the learner's individual needs.

The term "behavior chain" is likely to bring up thoughts of favorable adaptive skills. However, individuals may also engage in maladaptive and harmful behavior chains. In addition to knowing how to teach behavior chains, behavior analyst must also be adept at disrupting or breaking undesirable behavior chains. Six strategies aimed at addressing inappropriate behavior chains include extinction, satiation, unchaining, interrupting the chain, substituting the S^D , and extending the chain with time delays.

As with other behavioral procedures, troubleshooting issues with the chaining procedure might be necessary when it does not produce the desired results. One could re-examine the S^D - response sequences to make sure the correct contingencies have remained in place. One may need to determine if similar S^D s are evoking a different response. The identification of both relevant and irrelevant S^D s within the natural setting, ensuring there is cohesion between the S^D s in the training and natural settings, and identifying and planning for the appearance of novel stimuli might also address a problematic behavior chain procedure. Additional variables that should be considered include, the accuracy of the TA, the behavior chain's complexity, the use of appropriate schedules of reinforcement, the use of sufficient variations of relevant stimuli, and the potential need for relevant response variations. All these factors may individually or in combination influence the learner's performance of a behavior chain and the efficacy of chaining procedures.

Chapter Key Terms

backward chaining	forward chaining
backward chaining with leap aheads	interrupted chain procedure
behavior chain	task analysis
behavior chain interruption strategy	total-task chaining
behavior chain with limited hold	unchaining
chaining	

Chapter Objectives

1. Define and describe the components of a behavior chain.
2. State the reasons for using a behavior chain.

3. Define a task analysis and state the steps involved in conducting a task analysis.
4. Describe the methods of evaluating a learner's performance on individual components of a task analyzed skill.
5. Define and give examples of forward chaining, total-task chaining, and backward chaining.
6. Provide examples of maladaptive behavior chains and describe the six methods behavior analysts use to interrupt or break them.
7. State and describe the factors that can affect a learner's performance of a behavior chain.

Chapter Focus Questions

1. What is a behavior chain?
2. What is a behavior chain with a limited hold? Provide an example.
3. What is meant by the term "chaining" and what is the rationale for using chaining?
4. How does one construct a task analysis?
5. What are the four ways one might validate a task analysis?
6. What are the methods for evaluating a learner's performance on the components of a task analyzed skill?
7. What is backward chaining with leap aheads? What is the advantage of using it compared to traditional backward chaining?
8. Which of the three chaining methods is most effective?
9. What are the three procedural variations regarding unfinished links in a behavior chain?
10. In addition to efficacy, what other factors might be considered when choosing a chaining method or procedure?
11. What strategies might one use to intervene when a learner engages in problematic behavior chains?

Chapter Suggested Readings

Blair, B. J., Weiss, J. S., & Ahearn, W. H. (2018). A comparison of task analysis training procedures. *Education & Treatment of Children, 41*(3), 357-369.

This study compared the use of two different prompting procedures (most to least physical prompt fading and most to least vocal prompt fading) in training a behavior chain.

Contrucci Kuhn, S. A., Lerman, D. C., Vorndran C. M., & Addison, L. (2006). Analysis of factors that affect responding in a two-response chain in children with developmental disabilities *Journal of Applied Behavior Analysis, 39*(3), 263-280.

This study evaluated three procedures (extinction, satiation, and unchaining) for breaking behavior chains.

Griffen, A. K., Wolery, M., & Schuster, J. W. (1992). Triadic instruction of chained food preparation responses: Acquisition and observational learning. *Journal of Applied Behavior Analysis, 25*(1), 193-204.

The results of this study indicated that children can learn complex behavior chains via peer observation almost as well as when learned from a teacher's direct instruction.

Lambert, J. M., Copeland, B. A., Karp, E. L., Finley, C. I., Houchins-Juarez, N. J., & Ledford, J. R. (2016). Chaining functional basketball sequences (with embedded conditional discriminations) in an adolescent with autism. *Behavior Analysis in Practice, 9*(3), 199-210.

The authors of this study initially taught a male teenager with autism nine fundamental basketball skills via discrete trial training. Following his mastery of those skills, they used forward chaining to teach the boy how to play a game of basketball.

MacDuff, G. S., Krantz, P. J., & McClannahan, L. E. (1993). Teaching children with autism to use photographic activity schedules: Maintenance and generalization of complex response chains. *Journal of Applied Behavior Analysis*, 26(1), 89-97.

This study evaluated the use of picture schedules to teach and maintain complex after school activity behavior chains.

McKay, J. A., Weiss, J. S., Dickson, C. A., & Ahearn, W. H. (2014). Comparison of prompting hierarchies on the acquisition of leisure and vocational skills. *Behavior Analysis in Practice*, 7(2), 91-102.

This study evaluated the efficacy of two prompting hierarchies of differing complexity (most to least prompt fading and manual guidance with a 2 s delay) when teaching a behavior chain. Both prompting procedures resulted in each participant's efficient mastery of the complex skill.

Schuster, J. W., Gast, D. L., Wolery, M., & Guiltinan, S. (1988). The effectiveness of a constant time-delay procedure to teach chained responses to adolescents with mental retardation. *Journal of Applied Behavior Analysis*, 21(2), 169-178.

This study evaluated the use of constant time delay teaching procedure combined with chaining to teach complex behavior chains.

Tereshko, L., MacDonald, R., & Ahearn, W. H. (2010). Strategies for teaching children with autism to imitate response chains using video modeling. *Research in Autism Spectrum Disorders*, 4(3), 479-489.

This study evaluated the use of a segmented video modeling procedure to teach children with autism who initially did not imitate video models how to imitate an 8-step behavior chain.

Vintere, P., Hemmes, N. S., Brown, B. L., & Poulson, C. L. (2004). Gross-motor skill acquisition by preschool dance students under self-instruction procedures. *Journal of Applied Behavior Analysis*, 37(3), 305-322.

This article describes and analyzes procedures for teaching gross-motor behavior chains.

Werts, M. G., Caldwell, N. K., & Wolery, M. (1996). Peer modeling of response chains: Observational learning by students with disabilities. *Journal of Applied Behavior Analysis*, 29(1), 53-66.

In this study, students with disabilities watched their peers demonstrate the completion of a complex behavior chain. The peers also described each step of the behavior chain as they demonstrated it to the student. This resulted in the students with disabilities acquiring the skill.

Chapter Activity

Ask students to create a task analysis for a skill (e.g., making a peanut butter and jelly sandwich). Allow the students a set amount of time to complete the activity. Select a TA from one of the students and ask a different student to attempt to perform the task in front of the class *exactly as written* in the TA. Bring the appropriate supplies to complete the activity (e.g., bread, peanut butter, jelly, plates, butter knives, napkins). Discuss the modifications that might be necessary to make the TA more accurate and complete.

Chapter 24: Extinction

Chapter Summary

This chapter reviews the definition of extinction as a procedure, process, and principle and discusses misuses of the term, function-based extinction procedures, secondary effects of extinction, and variables affecting resistance to extinction. The chapter concludes with a description of best practices for the effective use of extinction and circumstances when extinction may be contraindicated.

Extinction involves withholding reinforcement for a previously reinforced behavior, which subsequently decreases the rate of that behavior. As a behavior change tactic, extinction provides zero probability of reinforcement. As a process, extinction refers to the diminished rate of a behavior when it no longer produces reinforcement. As a principle, extinction describes the functional relation between withholding the reinforcer and the diminishing rate of a behavior. Despite it being a specific procedure, process, and principle, the term extinction is frequently misused. Misuses that commonly occur include using the term extinction to refer to any decrease in responding, confusing extinction with forgetting, confusing response blocking with sensory extinction, and confusing non-contingent reinforcement with extinction. These errors in understanding extinction can lead to erroneous assumptions and faulty treatment decisions.

Different extinction procedures are used to address the function of the problem behavior and these procedures often produce secondary effects. Extinction of behaviors maintained by positive reinforcement occurs when the behavior no longer produces the reinforcer. Extinction of behavior maintained by negative reinforcement occurs when the behavior does not result in the removal of an aversive stimulus (escape extinction). Extinction of behavior maintained by automatic positive reinforcement occurs when the behavior does not produce the sensory consequence (sensory extinction). It is common for behaviors undergoing extinction to show predictable characteristics which can make the procedure difficult to apply. There is frequently an immediate initial increase in the rate of behavior during extinction, known as an “extinction burst”, and the magnitude of the behavior may intensify as well. There can also be extinction-induced variability, where diverse and novel forms of behavior occur during the extinction process. It is common for the behavior undergoing extinction to reappear after being reduced to a pre-reinforcement level, a phenomenon known as “spontaneous recovery”. A reappearance of the target behavior, referred to as “resurgence”, can also occur when reinforcement for a replacement behavior is reduced or discontinued. Finally, extinction procedures can result in emotional and aggressive outbursts, such as escape rage, prolonged whining, and crying.

Continued responding during an extinction procedure is called “resistance to extinction” and is a result of the schedule of reinforcement or the strength of the reinforcer, the strength of the motivating operation, the number of previous extinction trials, or the response effort required to engage in the behavior. In general, greater resistance to extinction is seen with behaviors on intermittent, variable, or thin schedules of reinforcement, behaviors where the MO is high, behaviors with long histories of reinforcement, and behaviors requiring little effort.

To increase the effectiveness of extinction, several guidelines are recommended and include withholding the reinforcer consistently, adding instructions to the extinction procedure, combining extinction with other interventions, increasing the number of extinction trials, and involving others in the implementation of extinction. Practitioners should plan for extinction induced aggression and guard against unintentional extinction of desired behaviors. Although extinction can be effective, it is contraindicated in circumstances where the behavior is harmful, sources of reinforcement cannot be withheld, when a rapid reduction is needed, or when others are likely to imitate the problem behavior.

Chapter Key Terms

escape extinction
extinction
extinction burst

extinction-induced variability
resistance to extinction

resurgence
spontaneous recovery

Chapter Objectives

1. State the definition of extinction and describe it as a process, procedure, and principle.
2. Describe the difference between functional and procedural forms of extinction.
3. Describe common misuses of the term extinction.
4. Identify, provide examples, and compare the use of extinction with behaviors maintained by positive, negative, and automatic reinforcement.
5. Identify, describe, and provide examples of the secondary effects of extinction.
6. Identify, describe, and provide examples of the variables affecting resistance to extinction.
7. Describe practical guidelines for the effective use of extinction.
8. Identify circumstances when it is not advisable to use extinction.

Chapter Focus Questions

1. How is extinction defined in terms of a behavior tactic, process, and principle?
2. How does extinction vary procedurally based on the function of a target behavior?
3. What are four common misconceptions about extinction?
4. When is it likely that an increase in response magnitude might occur in an extinction process?
5. What is an extinction burst and spontaneous recovery and how do they differ?
6. What is extinction induced variability and why does it occur?
7. What is behavioral resurgence, how is it different than spontaneous recovery, and why does it occur in extinction?
8. How do continuous versus intermittent schedules of reinforcement affect extinction and resistance to extinction?
9. How does the level of the motivating operation affect extinction and resistance to extinction?
10. How does the quantity and quality of the reinforcer affect extinction and resistance to extinction?
11. How does previous successful application of extinction affect future applications with the same behavior?
12. How does response effort affect extinction and resistance to extinction?
13. What are five strategies for making extinction more successful?
14. Under what conditions would the use of extinction be contraindicated?

Chapter Suggested Readings

Anderson, C. M., & McMillan, K. (2001). Parental use of escape extinction and differential reinforcement to treat food selectivity. *Journal of Applied Behavior Analysis*, 34(4), 511-515.

This study demonstrates parental, rather than clinical or classroom staff, implementing extinction effectively.

Iwata, B. A., Pace, G. M., Cowdery, G. E., & Miltenberger, R. G. (1994). What makes extinction work: An analysis of procedural form and function. *Journal of Applied Behavior Analysis*, 27(1), 131-144.

This article reviews the procedural variations for extinction based on behavioral function. It includes an excellent table that summarizes the ideas in the article.

Kuhn, D. E., DeLeon, I. G., Fisher, W. W., & Wilke, A. E. (1999). Clarifying an ambiguous functional analysis with matched and mismatched extinction procedures. *Journal of Applied Behavior Analysis*, 32(1), 99–102. <https://doi.org/10.1901/jaba.1999.32-99>

This article demonstrates that when the function of the behavior matches the form of extinction used, the treatment is more effective.

Lerman, D. C., & Iwata, B. A. (1996). Developing a technology for the use of operant extinction in clinical settings: An examination of basic and applied research. *Journal of Applied Behavior Analysis*, 29(3), 345-382.

This article reviews the basic and applied research on extinction and the variables that influence both the direct and indirect effects of extinction.

Lerman, D. C., Iwata, B. A., & Wallace, M. D. (1999). Side effects of extinction: Prevalence of bursting and aggression during the treatment of self-injurious behavior. *Journal of Applied Behavior Analysis*, 32(1), 1-8.

This study evaluates the prevalence of extinction bursts and extinction-induced aggression during extinction procedures. Results showed that one or both effects were observed approximately 50% of the time when extinction was implemented alone. However, if extinction was combined with another procedure, these side effects were dramatically reduced.

Reed, G. K., Piazza, C. C., Patel, M. R., Layer, S. A., Bachmeyer, M. H., Bethke, S. D., & Gutshall, K. A. (2004). On the relative contributions of noncontingent reinforcement and escape extinction in the treatment of food refusal. *Journal of Applied Behavior Analysis*, 37(1), 27-42.

This study evaluated the effects of NCR and escape extinction on the food refusal of young children. Results indicated that therapeutic treatment effects were obtained only when escape extinction was included as part of the intervention package.

Richman, D. M., Wacker, D. P., Asmus, J. M., & Casey, S. D. (1998). Functional analysis and extinction of different behavior problems exhibited by the same individual. *Journal of Applied Behavior Analysis*, 31(3), 475–478. <https://doi.org/10.1901/jaba.1998.31-475>

This study compares the use of function-based extinction procedures employed with one individual who exhibited different behaviors with different functions. As in previous research, this person's behavior was only effectively reduced when the form of extinction matched the function of the behavior.

Thompson, R. H., Iwata, B. A., Hanley, G. P., Dozier, C. L., & Samaha, A. L. (2003). The effects of extinction, noncontingent reinforcement, and differential reinforcement of other behavior as control procedures. *Journal of Applied Behavior Analysis*, 36(2), 221-238.

This article suggests that extinction may be the most useful “control” condition when implementing single subject research designs (i.e., it produced the most consistent and rapid reversal effects).

Recent Articles on Behavioral Resurgence

Fisher, W. W., Greer, B. D., Fuhrman, A. M., Saini, V., & Simmons, C. A. (2018). Minimizing resurgence of destructive behavior using behavioral momentum theory. *Journal of Applied Behavior Analysis*, 51(4), 831–853. <https://doi.org/10.1002/jaba.499>

In this study the authors describe procedures they used to reduce the amount of behavioral resurgence by altering aspects of functional communication training (FCT) based on behavior momentum theory.

Greer, B. D., & Shahan, T. A. (2019). Resurgence as choice: Implications for promoting durable behavior change. *Journal of Applied Behavior Analysis*, 52(3), 816–846. <https://doi.org/10.1002/jaba.573>

This article takes a new look at the phenomena of resurgence and argues that it is not explained by behavior momentum theory. The authors note that the efficacy of differential reinforcement has been conceptualized as a quantitative model of choice between concurrent operants (i.e., the matching law). They then offer a novel quantitative model of resurgence called Resurgence as Choice (RaC), which suggests that resurgence results from these same basic choice processes.

Kimball, R. T., Kelley, M. E., Podlesnik, C. A., Forton, A., & Hinkle, B. (2018). Resurgence with and without an alternative response. *Journal of Applied Behavior Analysis*, 51(4), 854–865. <https://doi.org/10.1002/jaba.466>

In this study, a modified resurgence procedure was used to compare the effects of the presence versus absence of the alternative response. Results showed greater resurgence when the alternative response was absent and suggests that more robust resurgence might occur if the alternative response is not available as opposed to the alternative response contacting extinction.

Sullivan, W. E., Saini, V., DeRosa, N. M., Craig, A. R., Ringdahl, J. E., & Roane, H. S. (2020). Measurement of nontargeted problem behavior during investigations of resurgence. *Journal of Applied Behavior Analysis*, 53(1), 249–264. <https://doi.org/10.1002/jaba.589>

These two experimental investigations examined target response resurgence and the occurrence of nontargeted responses. Results indicated that the participants displayed target-response resurgence accompanied by the emergence of nontargeted forms of problem behavior.

Recent Articles on Extinction-Induced Variability

Hangen, M. M., Romero, A. N., Neidert, P. L., & Borrero, J. C. (2020). "Other" behavior and the DRO: The roles of extinction and reinforcement. *Journal of Applied Behavior Analysis*. <https://doi.org/10.1002/jaba.736>

This study analyzed the impact of a DRO on other behaviors and evaluated whether changes in the rate of other behaviors were a function of extinction induced variability or adventitious reinforcement. The author concluded that the results suggest that increased rates of target-other responding and nontarget-other responding during the DRO condition may be a result of extinction-induced variability.

Chapter Activity

Set-Up: Pairs or small groups

Have student develop a case example where extinction might be used in an intervention and then have the group answer the following questions. This can be an example from their own experience or a fictitious case. The target behavior and environmental antecedents and consequences should be clearly defined.

1. What type of extinction would be the most appropriate to use in this scenario (positive, negative, or automatic reinforcement)?
2. Describe what an extinction burst might look like in this scenario.
3. Describe what spontaneous recovery might look like in this scenario.
4. Describe what behavioral resurgence might look like in this scenario.

Chapter 25: Differential Reinforcement

Chapter Summary

This chapter describes well-researched tactics of differential reinforcement that can be used to decrease problem behavior, including variations of differential reinforcement of alternative behavior, other behavior, and low rate responding.

At its foundation, differential reinforcement entails reinforcing one response class and withholding reinforcement for another response class. When used to reduce problem behavior, all differential reinforcement procedures consist of a) providing reinforcement for either the occurrence of a behavior other than problem behavior or a reduced rate of the problem behavior and b) withholding reinforcement for problem behavior.

Differential reinforcement of alternative behavior (DRA) procedures use reinforcement to strengthen desirable alternatives to the problem behavior and withhold reinforcement for the problem behavior. DRA procedures employ concurrent schedules of reinforcement and strengthen the alternative behavior because responding is allocated based on the density of reinforcement, which favors the alternative behavior (matching law). A special case of the DRA, where the alternative behavior cannot physically be emitted simultaneously with the problem behavior, is differential reinforcement of incompatible behaviors (DRI). When using DRA/DRI procedures, the practitioner should select incompatible/alternative behaviors that are already in the learner's repertoire, require less effort than the problem behavior, and occur naturally at a rate that will provide sufficient opportunities for reinforcement. Additionally, best practices include reinforcing alternative behaviors immediately and consistently, gradually thinning the schedule of reinforcement, and combining DRA/DRI with other procedures to maximize its effectiveness.

Differential reinforcement of other behavior (DRO) procedures provide reinforcement for the absence of problem behavior during or at specific times. There are interval DRO schedules of reinforcement, which require the practitioner to deliver reinforcement at the end of specific intervals if problem behavior did not occur during the interval. The intervals can be fixed (FI-DRO) or variable (VI-DRO). This is in contrast to momentary DRO schedules of reinforcement, which require the practitioner to deliver reinforcement at the end of a specific interval if problem behavior did not occur at the exact time the interval ends. These intervals can also be fixed (FM-DRO) or variable (VM-DRO). When using DRO, the practitioner should establish the initial DRO interval length short enough to ensure the learner's current level of behavior will produce frequent reinforcement. The mean baseline interresponse time (IRT) is often used to ensure an adequate rate of reinforcement. Best practices also include gradually increasing the duration of the interval over time, implementing the DRO across settings and/or times of day, and combining DRO with other procedures.

Differential reinforcement of low rate (DRL) procedures are used when the goal is to decrease the overall frequency of a behavior but not eliminate it completely. There are full-session, interval, and spaced-responding DRL schedules. In full-session DRL, reinforcement is delivered when responding is equal to or falls below a predetermined criterion for the entire session. In interval DRL, the full session is divided into a series of equal intervals, and reinforcement is provided when responding is equal to or falls below a predetermined criterion for each individual interval. During spaced responding DRL schedules, reinforcement is provided for each response that is separated from the previous response by a minimum amount of time. Best practice when using DRL schedules include selecting the most useful DRL schedule for the target behavior and desired outcome, using baseline data to guide the initial selection of reinforcement requirements, and providing feedback to help learners monitor their rate of responding.

Chapter Key Terms

differential reinforcement of alternative behavior (DRA)	full-session DRL
differential reinforcement of incompatible behavior (DRI)	interval DRL
differential reinforcement of low rates (DRL)	spaced-responding DRL
differential reinforcement of other behavior (DRO)	variable-interval DRO (VI-DRO)
fixed-interval DRO (FI-DRO)	variable-momentary DRO (VM-DRO)
fixed-momentary DRO (FM-DRO)	

Chapter Objectives

1. Define differential reinforcement and the basic components of all differential reinforcement procedures.
2. Define, give examples of, and describe how to use differential reinforcement of incompatible and alternative behavior.
3. Define, give examples of, and describe how to use interval and momentary schedules of differential reinforcement of other behavior.
4. Define, give examples of, and explain how to use full-session, interval, and spaced-responding differential reinforcement of low rate behavior.

Chapter Focus Question

1. How does differential reinforcement function to decrease problem behavior (i.e., what are the principles of behavior underlying it)?
2. What consequence is provided for the target behavior in a DRO, DRI, and DRA?
3. How do DRI and DRA procedures differ?
4. What factors are important to consider when selecting the alternative behavior in a DRAs?
5. What is a DRO and what are the two interval schedules that can be used?
6. How are DRO intervals established for interval and momentary schedules?
7. What is a DRL and what are the schedule variations that can be used?
8. What type of behavioral outcome is an appropriate target for DRL schedules?
9. What procedure can be added to a DRL to enhance its effectiveness?

Chapter Suggested Readings

Becraft, J. L., Borrero, J. C., Davis, B. J., Mendres-Smith, A. E., & Castillo, M. I. (2018). The role of signals in two variations of differential-reinforcement-of-low-rate procedures. *Journal of Applied Behavior Analysis, 51*(1), 3–24. <https://doi.org/10.1002/jaba.431>

These authors compared differential-reinforcement-of-low-rate (DRL) spaced-responding and full-session schedules with and without signals. Results of the studies highlight the importance of signals for decreasing but not eliminating responses in DRL schedules.

Briggs, A. M., Dozier, C. L., Lessor, A. N., Kamana, B. U., & Jess, R. L. (2019). Further investigation of differential reinforcement of alternative behavior without extinction for escape-maintained destructive behavior. *Journal of Applied Behavior Analysis*, 52(4), 956–973. <https://doi.org/10.1002/jaba.648>

This study analyzed the effects of manipulating dimensions of reinforcement in differential reinforcement of alternative behavior (DRA) schedules when extinction could not be used. Results indicated that effective treatments with maintenance of the treatment effects were developed in the absence of extinction by manipulating the quality and magnitude of reinforcement.

Iannaccone, J. A., Hagopian, L. P., Javed, N., Borrero, J. C., & Zarcone, J. R. (2019). Rules and statements of reinforcer loss in differential reinforcement of other behavior. *Behavior Analysis in Practice*, 13(1), 81–89. <https://doi.org/10.1007/s40617-019-00352-7>

This study replicated and extended the effects of rules and statements of reinforcer loss (SRL) on the effectiveness of DROs. The rule DRO with SRL condition produced a substantial decrease in problem behavior for all participants, suggesting that a consequent rule enhances the efficacy of DRO.

Lindberg, J. S., Iwata, B. A., Kahng, S., & DeLeon, I. G. (1999). DRO contingencies: An analysis of variable-momentary schedules. *Journal of Applied Behavior Analysis*, 32(2), 123-136.

This study evaluated the relative effectiveness of a variety of variable momentary DRO (VM-DRO) schedules of reinforcement and compared them to fixed schedules. The results showed that variable DRO schedules may provide a more effective treatment solution.

Roane, H. S., Fisher, W. W., Sgro, G. M., Falcomata, T. S., & Pabico, R. R. (2004). An alternative method of thinning reinforcer delivery during differential reinforcement. *Journal of Applied Behavior Analysis*, 37(2), 213-218.

This article describes a study that evaluated the effectiveness of a reinforcement thinning procedure for a DRA intervention that involved restricting the participant's access to alternative response materials.

Chapter Activity

Set-up: Individually, pairs, or small group

Case Description: Samuel is a 9-year-old child with intellectual and developmental disabilities. Sam uses an iPad and gestures to mand for items and occasionally also correctly tacts the name of an animal that happens to be outside the classroom window. Samuel preferred to be outside as much as possible and enjoys being very physically active. Sam engages in high frequency finger flicking, occurring most often when asked to do schoolwork requiring sitting at a desk. Baseline data indicated that the rate of the behavior was 16 times per hour on average.

1. Describe how a DRO procedure could be used. Identify how you would determine the interval and whether you would use an interval or momentary schedule and employ a fixed or variable interval.
2. Describe how a DRI procedure could be used. Describe how you would select the incompatible behavior and how you would arrange the reinforcement contingencies.

Chapter 26: Antecedent Interventions

Chapter Summary

This chapter provides an overview of antecedent intervention and categorizes interventions as either contingency dependent (i.e., depends on differential consequences for a targeted or alternative behavior) or contingency independent (i.e., does not depend on differential consequences). The evidenced-based, contingency-independent interventions are then reviewed, including noncontingent reinforcement procedures, high-probability instructional sequences, and functional communication training. The chapter concludes with a discussion of three “default interventions” - antecedent exercise, enriched environments, and physical restraint.

Antecedent interventions are implemented prior to the occurrence of a targeted behavior and are independent of that behavior. A number of interventions fall under the umbrella of antecedent interventions and vary in their approach to reducing behavior. Some procedures manipulate motivating operations, others restrict engagement in the behavior by changing the environment, some train an alternative behavior, while others make the target behavior more effortful. It is important to understand the principle(s) underlying each of the various interventions in order to implement the procedures effectively.

Non-contingent reinforcement (NCR) involves presenting stimuli with known reinforcing properties on a fixed-time (FT) or variable-time (VT) schedule independent of the learner’s behavior. NCR decreases problem behavior by making reinforcers that maintain the behavior available freely and frequently, which functions as an abolishing operation (AO) to reduce the motivation for the problem behavior. The effectiveness of NCR requires that the correct positive, negative, or automatic reinforcer is identified through a functional analysis. Other means of enhancing the effects of NCR include identifying an effective time-based schedule of reinforcement, thinning the schedule appropriately, establishing a terminal criterion for NCR, and combining NCR with other procedures.

A high-probability (high-p) instructional sequence involves presenting several high probability tasks the learner has complied with previously, prior to presenting a target instruction where there is a low probability of learner compliance. The reductive effects of this procedure resemble the abative effects of an AO as the procedure decreases the value of escape from requests as a reinforcer. Some behavior analysts use the term *behavior momentum* to describe these reductive effects. Using high-p instructional sequence effectively requires that the practitioner use potent reinforcers, acknowledges compliance, and that requests are presented in a rapid sequence.

Functional communication training (FCT) establishes an appropriate communicative behavior that is sensitive to existing motivating operations (MOs) and that competes with the problem behavior. The adaptive response is taught using a differential reinforcement of alternative behavior (DRA) procedure, in which the response results in the same reinforcer as the problem behavior, making it a functionally equivalent alternative. The effectiveness of FCT is enhanced when a dense schedule of reinforcement is used, when FCT is used as part of a treatment package, and when the schedule of reinforcement is thinned after the replacement behavior becomes a firmly established communicative response.

Antecedent exercise, enriched environments, and restraint are default antecedent interventions utilized to reduce target behaviors which do not rely on aligning the antecedent variables with the function of the behavior to be effective. Antecedent exercise procedures incorporate aerobic exercise prior to introducing a low-p task, while enriched environment strategies rely on noncontingent access to preferred reinforcers to compete with the reinforcers maintaining the problem behavior. Finally, antecedent restraint strategies, including personal, protective equipment, and self-restraint, rely on physically prohibiting the individual from engaging in the target behavior.

Chapter Key Terms

antecedent exercise
antecedent intervention
behavioral momentum
enriched environment
fixed-time schedule

functional communication training (FCT)
high-probability (high-p) request sequence
noncontingent reinforcement (NCR)
restraint
variable-time schedule

Chapter Objectives

1. Define contingency dependent and contingency independent antecedent interventions.
2. Define and provide examples of noncontingent reinforcement and list strategies for using NRC effectively.
3. Define and provide examples of a high-probability instructional sequence and list strategies for using high-p procedures effectively.
4. Define and provide examples of functional communication training and list strategies for using FCT effectively.
5. Define and provide examples of three default interventions - antecedent exercise, enriched environments, and restraint.

Chapter Focus Questions

1. What is the difference between a contingency dependent versus contingency independent antecedent intervention?
2. How do noncontingent reinforcement procedures differ when the function of the problem behavior is positive, negative, or automatic reinforcement?
3. What are the two explanations given for how the high-probability instructional sequence affects behavior?
4. How does functional communication training reduce problem behavior?
5. How does antecedent exercise reduce problem behavior and how does it differ from contingent effort procedures such as overcorrection?
6. How do enriched environment interventions reduce problem behaviors?
7. What forms of restraint can be used in antecedent interventions and how does restraint reduce problem behavior?

Chapter Suggested Readings

High-p Instructional Sequences

Banda, D. R., Neisworth, J. T., & Lee, D. L. (2003). High-probability request sequences and young children: Enhancing compliance. *Child and Family Behavior Therapy*, 25(2), 17-29.

Empirical studies in which high-probability request sequence were employed in an effort to increase compliance among children are reviewed. A theoretical framework, methodological adequacies, utility, and implications for research are addressed.

Hansen, B., DeSouza, A. A., Stuart, A. L., & Shillingsburg, M. A. (2019). Clinical application of a high-probability sequence to promote compliance with vocal imitation in a child with autism spectrum disorder. *Behavior Analysis in Practice*, 12(1), 199–203. <https://doi.org/10.1007/s40617-018-00280-y>

This study evaluated the effects of a high-p instructional procedure on compliance. The high-p procedural sequence was effective in increasing the levels of compliance with vocal imitation.

Houlihan, D., Jacobson, L., & Brandon, P. K. (1994). Replication of a high-probability request sequence with varied interprompt times in a preschool setting. *Journal of Applied Behavior Analysis*, 27(4), 737-738.

This brief article describes the high-probability request sequence and the effects of its implementation with a young child with autism.

Humm, S. P., Blampied, N. M., & Liberty, K. A. (2005). Effects of parent-administered, home-based, high-probability request sequences on compliance by children with developmental disabilities. *Child and Family Behavior Therapy*, 27(3), 27-45.

This study looks at the effects of parents implementing the high-probability request sequence with their children to gain compliance within the home environment.

Killu, K. (1999). High-probability request research: Moving beyond compliance. *Education and Treatment of Children*, 22(4), 470-494.

This article examines the use of the high-probability request sequence. It provides an outline of research and proposes various applications of the strategy.

Lee, D. L. (2005). Increasing compliance: A quantitative synthesis of applied research on high-probability request sequences. *Exceptionality*, 13(3), 141-154.

This article is a meta-analysis of the high-probability request sequence. The study looks at the intervention as a strategy for individuals with and without disabilities.

Wehby, J. H., & Hollahan, M. S. (2000). Effects of high-probability requests on the latency to initiate academic tasks. *Journal of Applied Behavior Analysis*, 33(2), 259-262.

This study investigates the use of the high-probability request sequence as an intervention for decreasing the latency to initiating math assignments and increasing the duration on-task for an elementary student.

Functional Communication Training

Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis*, 18(2), 111-126.

This study utilizes assessment data to implement differential reinforcement of communication responses for four children with developmental disabilities. Results are presented and discussion illustrates how different topographies of problem behavior actually served similar functions for the individual participants.

Durand, V. M., & Carr, E. G. (1991). Functional communication training to reduce challenging behavior: Maintenance and application in new settings. *Journal of Applied Behavior Analysis*, 24(2), 251-264.

Functional communication training was examined as an intervention for three students with mental retardation. Results include generalization and maintenance data.

Durand, V. M., & Merges, E. (2001). Functional communication training: A contemporary behavior analytic intervention for problem behaviors. *Focus on Autism and Other Developmental Disabilities*, 16(2), 110-119.

This article discusses functional communication training specifically as it relates to individuals with autism. Conditions under which this intervention is effective are discussed and comparisons to other behavioral approaches are made.

Fisher, W. W., Piazza, C., Cataldo, M., Harrell, R., Jefferson, G., & Conner, R. (1993). Functional communication training with and without extinction and punishment. *Journal of Applied Behavior Analysis*, 26(1), 23-36.

Functional communication training is examined by itself and in combination with extinction procedures in this study.

Fisher, W. W., Kuhn, D. E., & Thompson, R. H. (1998). Establishing discriminative control of responding using functional and alternative reinforcers during functional communication training. *Journal of Applied Behavior Analysis*, 31(4), 543-560.

Communication responses were trained to be emitted by two individuals. Results are discussed and highlight the fact that differential reinforcement of communication resulted in a reduction of problem behavior regardless of the reinforcers available.

Fisher, W. W., Thompson, R. H., Hagopian, L. P., Bowman, L. G., & Krug, A. (2000). Facilitating tolerance of delayed reinforcement during functional communication training. *Behavior Modification*, 24(1), 3-29.

This study investigates the use of functional communication training with extinction for three participants with severe behavior disorders and mental retardation whose problem behavior were maintained by positive reinforcement.

Hagopian, L. P., Fisher, W. W., Sullivan, M. T., Aquisto, J., & LeBlanc, L. A. (1998). Effectiveness of functional communication training with and without extinction and punishment: A summary of 21 inpatient cases. *Journal of Applied Behavior Analysis*, 31(2), 211-235.

This study examines the use of functional communication training with and without the use of extinction amongst 21 individuals with mental retardation.

Kahng, S. W., Hendrickson, D. J., & Vu, C. P. (2000). Comparison of single and multiple functional communication training responses for the treatment of problem behavior. *Journal of Applied Behavior Analysis*, 33(3), 321-324.

This study examines two functional communication training conditions that were used as a potential intervention to treat problem behaviors of a child with mental retardation.

Lalli, J. S., Casey, S., & Kates, K. (1995). Reducing escape behavior and increasing task completion with functional communication training, extinction, and response chaining. *Journal of Applied Behavior Analysis*, 28(2), 261-268.

This study investigates the effects of combining functional communication training, extinction, and response chaining to decrease problem behavior and increase task participation with three children with varying disabilities.

O'Neill, R. E., & Sweetland-Baker, M. (2001). Brief report: An assessment of stimulus generalization and contingency effects in functional communication training with two students with autism. *Journal of Autism and Developmental Disorders*, 31(2), 235-240.

Potential generalized effects and the role of different contingencies for functional communication training are discussed in relation to two individuals with autism for whom FCT was used as intervention.

Peck Peterson, S. M., Caniglia, C., Royster, A. J., Macfarlane, E., Plowman, K., Baird, S. J., & Wu, N. (2005). Blending functional communication training and choice making to improve task engagement and decrease problem behaviour. *Educational Psychology*, 25(2-3), 257-274.

This study examined the effects of choice making within functional communication training to increase the task engagement of two participants with inappropriate behaviour. FCT was implemented to teach participants to request for breaks as a replacement for problem behaviour, and choice-making was utilized to increase participants' ability to choose between taking breaks or completing task demands.

Rooker, G. W., Jessel, J., Kurtz, P. F., & Hagopian, L. P. (2013). Functional communication training with and without alternative reinforcement and punishment: An analysis of 58 applications. *Journal of Applied Behavior Analysis*, 46(4), 708-722. <https://doi.org/10.1002/jaba.76>

The current consecutive case series summarized data from 58 applications of FCT. The results of the current case series analysis suggest that FCT can be enhanced when used in combination with alternative reinforcement and when multiple schedules are used during schedule thinning.

Wacker, D. P., Steege, M. W., Northup, J., Sasso, G., Berg, W., Reimers, T., Cooper, L., Cigrand, K., & Donn, L. (1990). A component analysis of functional communication training across three topographies of severe behavior problems. *Journal of Applied Behavior Analysis*, 23(4), 417-429.

Three individuals displaying severe problem behaviors were trained to emit communicative responses in the present study.

Worsdell, A. S., Iwata, B. A., Hanley, G. P., Thompson, R. H., & Kahng, S. W. (2000). Effects of continuous and intermittent reinforcement for problem behavior during functional communication training. *Journal of Applied Behavior Analysis*, 33(2), 167-179.

This study evaluated the effectiveness of functional communication training in reducing problem behavior and in strengthening alternative behavior of 5 individuals with intellectual and developmental disabilities.

Non-Contingent Reinforcement

Berth, D. P., Bachmeyer, M. H., Kirkwood, C. A., Mauzy, C. R., IV, Retzlaff, B. J., & Gibson, A. L. (2019). Noncontingent and differential reinforcement in the treatment of pediatric feeding problems. *Journal of Applied Behavior Analysis*, 52(3), 622–641. <https://doi.org/10.1002/jaba.562>

This study compared the effects of differential and noncontingent reinforcement, and the relative effects of escape extinction with and without differential or noncontingent reinforcement. Escape extinction was necessary for 4 of 5 children. The addition of positive reinforcement resulted in beneficial effects (i.e., more stable acceptance, decreased inappropriate mealtime behavior or negative vocalizations) with 3 of 4 children.

Carr, J. E., Coriaty, S., Wilder, D. A., Gaunt B. T., Dozier, C. L., Britton, L. N., Avina, C., & Reed, C. L. (2000). A review of "noncontingent" reinforcement as treatment for the aberrant behavior of individuals with developmental disabilities. *Research in Developmental Disabilities*, 21(5), 377-391.

This article discusses the history of noncontingent reinforcement and summarizes findings from treatment research.

Carr, J. E., Dozier, C. L., Patel, M. R., Adams, A. N., & Martin, N. (2002). Treatment of automatically reinforced object mouthing with noncontingent reinforcement and response blocking: Experimental analysis and social validation. *Research in Developmental Disabilities*, 23(1), 37-44.

The present study examines the use of separate and combined effects of response blocking and non-contingent reinforcement as a treatment for object mouthing in a young girl with autism.

Lancaster, B. M., LeBlanc, L. A., Carr, J. E., Brenske, S., Peet, M. M., & Culver S. J. (2004). Functional analysis and treatment of the bizarre speech of dually diagnosed adults. *Journal of Applied Behavior Analysis*, 37(3), 395-399.

Noncontingent reinforcement was used with two individuals with dual diagnoses to decrease bizarre speech that was attention maintained.

Roscoe, E. M., Iwata, B. A., & Goh, H.-L. (1998). A comparison of noncontingent reinforcement and sensory extinction as treatments for self-injurious behavior. *Journal of Applied Behavior Analysis*, 31(4), 635-646.

This study compares noncontingent reinforcement and sensory extinction as treatment for the self-injurious behavior of three individuals with developmental disabilities.

Tucker, M., Sigafos, J., & Bushell, H. (1998). Use of noncontingent reinforcement in the treatment of challenging behavior: A review and clinical guide. *Behavior Modification*, 22(4), 529-547.

This article reviews studies in which noncontingent reinforcement was used as an intervention to treat problem behaviors. The article also includes guidelines for using the technique.

Vollmer, T. R., Iwata, B. A., Zarcone, J. R., Smith, R. G., & Mazaleski, J. L. (1993). The role of attention in the treatment of attention-maintained self-injurious behavior: Noncontingent reinforcement and differential reinforcement of other behavior. *Journal of Applied Behavior Analysis*, 26(1), 9-21.

This study compares DRO and NCR as possible treatments for reducing self-injurious behavior in three adults with profound mental retardation.

Vollmer, T. R., Ringdahl, J. E., Roane, H. S., & Marcus, B. A. (1997). Negative side effects of noncontingent reinforcement. *Journal of Applied Behavior Analysis*, 30(1), 161-164.

This article reviews concerns about the use of noncontingent reinforcement. Concerns are illustrated utilizing a case study.

Wilder, D. A., Normand, M., & Atwell, J. (2005). Noncontingent reinforcement as treatment for food refusal and associated self-injury. *Journal of Applied Behavior Analysis*, 38(4), 549-553.

This study examines the use of noncontingent reinforcement to decrease self-injury and increase bite acceptance in a child who exhibited food refusal. First, a brief functional analysis suggested that self-injury was maintained by escape from food presentation. Results of the intervention showed a decrease in self-injury and an increase in bite acceptance.

Select Summary Resources on Antecedent Interventions

Kern, L., & Chen, R. (2019). Antecedent interventions. In K. C. Radley & E. H. Dart (Eds.), *Handbook of behavioral interventions in schools: Multi-tiered systems of support* (p. 250). Oxford University Press. <https://doi.org/10.1093/med-psych/9780190843229.003.0013>

The chapter describes various advantages to antecedent interventions in comparison to other intervention strategies. A range of antecedent interventions that can be used in schools is then discussed including seating arrangements, praise structure, effective instruction, and task modification.

Luiselli, J. K. (2006). *Antecedent assessment & intervention: Supporting children & adults with developmental disabilities in community settings*. Paul H. Brookes Pub.

This book is an update of the 1998's "Antecedent Control" and details guidelines on using antecedent interventions with children and adults. Case studies are used to illustrate best practices.

Luiselli, J. K. (2008). Antecedent (preventive) intervention. In J. K. Luiselli, D. C. Russo, W. P. Christian, & S. M. Wilczynski (Eds.), *Effective practices for children with autism: Educational and behavior support interventions that work* (pp. 393-412). Oxford University Press. <https://doi.org/10.1093/med-psych/9780195317046.003.0016>

This chapter reviews antecedent (preventive) interventions for children with autism spectrum disorder and illustrates how antecedent events in the child's environment can be arranged to prevent problem behaviors. It highlights clinical applications of antecedent interventions derived from functional analysis.

Seubert, C., Fryling, M. J., Wallace, M. D., Jiminez, A. R., & Meier, A. E. (2014). Antecedent interventions for pediatric feeding problems. *Journal of Applied Behavior Analysis*, 47(2), 449-453. <https://doi.org/10.1002/jaba.117>

This article reviews recent research in the *Journal of Applied Behavior Analysis* (2000-2012) that evaluated antecedent interventions for pediatric feeding problems. Feeding diagnosis (food refusal vs. food selectivity) and presence of feeding-related medical conditions were related to the differential implementation of antecedent interventions.

Chapter Activity

Set-up: Individually, in pairs, or small groups

Have students generate their own case example or use the case below.

Case Description: Samuel is a 9-year-old child with intellectual and developmental disabilities. Sam uses an iPad and gestures to mand for items and occasionally also correctly tacts the name of an animal that happens to be outside the classroom window. Samuel prefers to be outside as much as possible and enjoys being very physically active. Sam engages in high frequency finger biting, occurring most often when asked to do schoolwork sitting at a desk. Baseline data indicate that the average rate of the behavior is 16 times per hour.

1. Describe how an NCR procedure could be used in this example. Discuss the reinforcer and the schedule of delivery.
2. Describe how a high-p procedure could be used in this example. Discuss how the low-p tasks would be identified and how the procedure would be implemented.
3. Describe how an FCT procedure could be used in this example. Discuss the specific communicative response(s) you would teach and how the procedure would be implemented.

Chapter 27: Functional Behavior Assessment

Chapter Summary

Operant behavior is learned and maintained because it reliably produces access to positive, negative, and/or automatic reinforcement. Problem behavior is no different, in that it can be said to have a “function” (e.g., to gain access to stimuli or escape stimuli). The topography, or form, of the problem behavior may be of concern, but it often reveals little useful information about the conditions that account for it. On the other hand, identifying the conditions that control and maintain behavior can suggest variables one can alter to prevent or reduce the behavior, and therefore lead to intervention strategies likely to be effective. Assessment of the function of problem behavior is referred to as functional behavior assessment (FBA).

FBA can lead to effective interventions in several ways. It can identify antecedent variables—both motivating operations and discriminative stimuli—that can be altered to prevent problem behavior. Principally, however, it identifies reinforcers that maintain problem behavior; once these have been discovered, they can be made available contingent upon appropriate replacement behavior or they can be managed in a way that prevents problem behavior (e.g., delivered noncontingently). A positive side effect of FBA is that it can decrease reliance on increasingly intrusive, coercive, potentially unsafe, and punishment-based interventions. Decreased reliance on these “default technologies” occurs because when FBAs are conducted, reinforcement-based interventions are more likely to be implemented than are interventions that include a punishment component.

FBA methods can be classified into three types: descriptive assessment, indirect assessment, and functional (experimental) analysis. Descriptive assessment involves observation of the problem behavior in relation to events that are not arranged in a systematic manner. These are easier to conduct than functional analyses; however, caution must be exercised when interpreting information from them because they can be unreliable. Indirect functional assessment uses structured interviews, rating scales, and/or questionnaires. Again, these forms of assessment are easier to conduct than functional analyses, but they can be unreliable and only correlational in nature. Descriptive and indirect assessments are best reserved for hypothesis formulation only. Functional analysis, in contrast, involves systematically manipulating environmental events thought to maintain problem behavior, which may yield a clear demonstration of the variable(s) controlling problem behavior.

The basic strategy of conducting an FBA is to (1) gather information via indirect and descriptive assessments, (2) interpret the information from these assessments and formulate hypotheses about the purpose of problem behavior, (3) test these hypotheses using functional analysis, and (4) develop intervention options based on the function of problem behavior. Often, an intervention consists of selecting a replacement behavior that serves the same function as (i.e., is “functionally equivalent” to) the problem behavior.

Chapter Key Terms

brief functional analysis	functional analysis (as part of FBA)	latency-based functional analysis
conditional probability	functional behavior assessment (FBA)	scatterplot recording
contingency reversal	functionally equivalent	trial-based functional analysis
contingency space analysis	indirect functional assessment	
descriptive functional behavior assessment	interview-informed synthesized contingency analysis	

Chapter Objectives

1. Name the functions that problem behavior can serve, with reference to specific examples that distinguish between socially mediated and automatic reinforcement.
2. Describe the role functional behavior assessment plays in preventing problem behavior and developing interventions for problem behavior.

3. State and provide examples of the different methods of conducting a functional behavior assessment and explain the strengths and limitations of each.
4. State the primary characteristics of and rationale for conducting a descriptive assessment.
5. Describe various methods for gathering descriptive assessment data and give examples of the circumstances under which each is appropriate.
6. Given a set of descriptive data, interpret the data to form a hypothesis regarding the possible function of problem behavior.
7. Describe various methods for conducting an indirect assessment and give examples of the circumstances under which each is appropriate.
8. State the primary characteristics of and rationale for conducting a functional analysis as a form of functional behavior assessment.
9. Describe, with respect to examples, how to conduct each of the following functional analyses:
 - a. analog functional analysis.
 - b. brief functional analysis.
 - c. trial-based functional analysis.
 - d. latency-based functional analysis.
 - e. functional analysis of precursor behavior.
 - f. interview-informed synthesized contingency analysis.
10. Given a set of data from a functional analysis, interpret the data to determine the function of problem behavior.
11. Give examples of positively and negatively reinforced problem behavior and suggest interventions for each with respect to each element of the three-term contingency (i.e., antecedent, response, and consequence).

Chapter Focus Questions

1. What are three categories of consequences that problem behavior may function to produce, and what might be a functionally matched intervention for each of them?
2. What are default technologies for managing problem behavior and how, with respect to an example, can you reduce their use?
3. With consideration of their strengths and limitations, what are situations in which you would choose to conduct each of the 3 methods of functional behavior assessment?
4. Given a particular problem behavior and hypothesized function, how might you intervene with respect to each element of the three-term contingency (i.e., antecedent, response, and consequence)?
5. Why and how would you conduct each of the following? Give examples for each of the behaviors and circumstances of concern.
 - a. brief functional analysis.
 - b. trial-based functional analysis.
 - c. latency-based functional analysis.
 - d. functional analysis of precursor behavior.
 - e. interview-informed synthesized contingency analysis.

Chapter Suggested Reading

Functional Analysis Retrospective

Beavers, G. A., Iwata, B. A., & Lerman, D. C. (2013). Thirty years of research on the functional analysis of problem behavior. *Journal of Applied Behavior Analysis*, 46(1), 1-21.

This was the lead article of Volume 46, issue 1 of the *Journal of Applied Behavior Analysis*, which commemorated 30 years of practice and research in functional analysis. The article states that 435 functional analysis studies—with line graphs for 981 FAs—have been published since 1961, and comments on recent trends in FA research.

Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1982/1994). Toward a functional analysis of self-injury. *Analysis and Intervention in Developmental Disabilities*, 2(1), 3-20 [Reprinted in *Journal of Applied Behavior Analysis*, 27(2), 197-209.]

This article is the seminal article on functional analysis. The methods employed by the authors in this study laid the foundation for myriad research studies on functional analyses celebrated in the 2013 special issue (above).

Functional Assessment and Analysis in Applied Settings

Hanley, G. P. (2012). Functional assessment of problem behavior: Dispelling myths, overcoming implementation obstacles, and developing new lore. *Behavior Analysis in Practice*, 5(1), 54-72.

Hanley confronts conventional wisdom among behavior analysts regarding a least-to-most intrusive hierarchy in the process of conducting functional assessment/analysis and offers suggestions for overcoming common obstacles to completing formal analyses.

Iwata, B. A., & Dozier, C. L. (2008). Clinical applications of functional analysis methodology. *Behavior Analysis in Practice*, 1(1), 3-9.

A brief and clear presentation of the variations of functional analysis methods presented in chapter 27.

LeJeune, L. M., Lambert, J. M., Lemons, C. J., Mottern, R. E., & Wisniewski, B. T. (2019). Teacher-conducted trial-based functional analysis and treatment of multiply controlled challenging behavior. *Behavior Analysis: Research and Practice*, 19(3), 241-246.

Martens, B. K., DiGennaro, F. D., Reed, D. D., Szczech, F. M., & Rosenthal, B. D. (2008). Contingency space analysis: An alternative method for identifying contingent relations from observational data. *Journal of Applied Behavior Analysis*, 41(1), 69-81.

Contingency space analysis is a new key term in chapter 27. This article presents step-by-step procedures for conducting a contingency space analysis (CSA), a proposed alternative to other tactics for examining conditional probabilities derived from descriptive assessment of behavior-consequence relations.

Schieltz, K. M., & Wacker, D. P. (2020). Functional assessment and function-based treatment delivered via telehealth: A brief summary. *Journal of Applied Behavior Analysis*, 53(3), 1242-1258.

Wacker and colleagues have been pioneers in the delivery of behavioral telehealth services. This article is from a special series on public health and telehealth from the *Journal of Applied Behavior Analysis*, commencing with volume 53, issue 3 (summer, 2020).

Scott, T. M., Liaupsin, C. J., Nelson, C. M., & Jolivette, K. (2003). Ensuring student success through team-based functional behavioral assessment. *Teaching Exceptional Children*, 35(5), 16-21.

This article provides a detailed description of how school personnel implemented a team-based functional assessment for a student demonstrating problem behavior. The article provides suggestions for implementing the functional behavior assessment, sample information collecting sheets, and planning ideas. The article comes from an issue of *Teaching Exceptional Children* that included several accessible articles on functional assessment written for educators.

Resolving Inconclusive (Non-Differentiated) Outcomes of Analyses

Hagopian, L. P., Rooker, G. W., Jessel, J., & DeLeon, I. G. (2013). Initial functional analysis outcomes and modifications in pursuit of differentiation: A summary of 176 inpatient cases. *Journal of Applied Behavior Analysis*, 46(1), 88-100.

A consecutive case-series analysis in which function of problem behavior was identified for 86.9% of 176 cases of individuals whose initial analyses were undifferentiated. The standard analysis protocol was modified with respect to antecedents, consequences, design, or some combination. This article also appeared in the 2013 special issue.

Roscoe, E. M., Schlichenmeyer, K. J., & Dube, W. V. (2015). Functional analysis of problem behavior: A systematic approach for identifying idiosyncratic variables. *Journal of Applied Behavior Analysis*, 48, 289–314.

Following inconclusive analyses, indirect assessment (a questionnaire) and subsequent descriptive assessment led to redesigned analyses that yielded definitive outcomes for 5 of 6 participants.

Tiger, J. H., Fisher, W. W., Toussaint, K. A., & Kodak, T. (2009). Progressing from initially ambiguous functional analyses: Three case examples. *Research in Developmental Disabilities*, 30(5), 910–926.

Multiple Control of Problem Behavior

Fisher, W. W., Greer, B. D., Romani, P. W., Zangrillo, A. N., & Owen, T. M. (2016). Comparisons of synthesized and individual reinforcement contingencies during functional analysis. *Journal of Applied Behavior Analysis*, 49(3), 596-616.

Ghaemmaghami, M., Hanley, G. P., Jin, S. C., & Vanselow, N. R. (2015). Affirming control by multiple reinforcers via progressive treatment analysis. *Behavioral Interventions*, 31(1), 70-86.

Mitteer, D. R., Fisher, W. W., Briggs, A. M., Greer, B. D., & Hardee, A. M. (2019). Evaluation of an omnibus mand in the treatment of multiply controlled destructive behavior. *Behavioral Development*, 24(2), 74–88.

Slaton, J. D., Hanley, G. P., & Raftery, K. J. (2017). Interview-informed functional analyses: A comparison of synthesized and isolated components. *Journal of Applied Behavior Analysis*, 50(2), 252-277.

Collectively these articles are concerned with the challenging nature of analysis of multiply controlled problem behavior. They explicitly address the question of conducting analyses with isolated or synthesized contingencies, particularly in terms of how results inform function-based treatment.

Function-Based Treatment

Ala'i-Rosales, S., Cihon, J. H., Currier, T. D. R., Ferguson, J. L., Leaf, J. B., Leaf, R., McEachin, J., & Weinkauff, S. M. (2019). The big four: Functional assessment research informs preventative behavior analysis. *Behavior Analysis in Practice*, 12(1), 222–234.

This article proposes that prevention, based on common functions of behavior established in the assessment literature, be incorporated as a practice guideline for early intervention.

Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis*, 18(2), 111-126.

An early and compelling demonstration of replacing problem behavior with functionally equivalent communicative responses, based on experimentally determined function.

Geiger, K. B., Carr, J. E., & Linda A. LeBlanc, L. A. (2010). Function-based treatments for escape-maintained problem behavior: A treatment-selection model for practicing behavior analysts. *Behavior Analysis in Practice*, 3(1), 22-32.

Grow, L. L., Carr, J. E., & LeBlanc, L. A. (2009). Treatments for attention-maintained problem behavior: Empirical support and clinical recommendations. *Journal of Evidence-Based Practices for Schools*, 10(1), 70-92.

These two articles—Geiger et al. and Grow et al.—offer helpful algorithms for treating problem behavior maintained, respectively, by escape and attention.

Jessel, J., Ingvarsson, E. T., Metras, R., Kirk, H., & Whipple, R. (2018). Achieving socially significant reductions in problem behavior following the interview-informed synthesized contingency analysis: A summary of 25 outpatient applications. *Journal of Applied Behavior Analysis*, 51(1), 130-157.

The authors present 25 applications in an outpatient clinic of interview-informed synthesized contingency analysis (IISCA), from analysis to individualized treatment (functional communication training with contingency-based reinforcement thinning), and report that each participant reduced problem behavior by at least 90%.

Chapter Activity

Use a specific descriptive and/or indirect assessment method to design an experimental analysis of a particular problem behavior. Based on the results, state the form of functional analysis might you use, and explain your choice. Sketch hypothetical data from the analysis and explain how you would develop an intervention based on the outcome of this hypothetical analysis.

Chapter 28: Token Economy, Group Contingencies, and Contingency Contracting

Chapter Summary

A token economy is a behavior change system that consists of a list of target behaviors to be reinforced, tokens or points that learners receive for emitting those target behaviors, and a menu of items/activities for which they can exchange their tokens. There are six basic steps for implementing a token economy: (1) selecting the tokens; (2) identifying the target behaviors and criteria for earning and losing tokens (if there is to be a response cost component) and if and how these vary at respective levels; (3) selecting the backup reinforcers; (4) establishing the ratio of exchange; (5) writing procedures for when and how tokens will be dispensed and exchanged; and (6) field-testing the system. Important decisions must be made for how to begin, implement, maintain, remove, and evaluate such systems.

A group contingency is a common consequence contingent upon the behavior of an individual member of a group, a part of the group, or everyone in the group. There are three major forms of group contingencies: independent, dependent, and interdependent group contingencies. There are six guidelines for implementing a group contingency: (1) choosing a powerful reinforcer; (2) determining the behavior to change and collateral behaviors that might be affected; (3) setting appropriate performance criteria; (4) combining with other procedures; (5) selecting the most appropriate group contingency; and (6) monitoring individual and group performance.

A contingency contract specifies the contingent relationship between the completion of a specified behavior and access to a specific reinforcer. A contract explicitly describes the (a) task or tasks and (b) reward, with respect to who, what, when, where, and how; it may also include a record of progress and interim rewards. Implementing a contract involves a complex package of interventions, but is widely used in classroom, home, and clinical settings. Contracts can be rendered graphically or pictorially for non-readers, and may even be used as a self-management tactic.

Chapter Key Terms

backup reinforcer	group contingency	level system
contingency contract	hero procedure	self-contract
dependent group contingency	independent group contingency	token
Good Behavior Game	interdependent group contingency	token economy

Chapter Objectives

1. Define token economy and give examples that include its various components.
2. Explain, with respect to practical examples, the considerations that must be made when implementing a token economy.
3. Define and give examples of the different types of group contingencies.
4. Explain, with respect to practical examples, the considerations that must be made when implementing a group contingency.
5. Define contingency contract and give examples that include its various components.

Chapter Focus Questions

1. What are the three major components of a token economy?
2. What is a level system?
3. What steps would you follow to set up a token economy?
4. Once having implemented a token economy, what decisions must be made with respect to its operation?

5. What are some limitations or barriers to implementation of token economies?
6. What is a group contingency and what are the three main ways it can be implemented?
7. What is the Good Behavior Game and how might you use it in a particular classroom?
8. What are some considerations to take into account when setting up a group contingency?
9. What is a contingency contract and what type of information does it contain?
10. What are some examples of how contingency contracts have been applied in different environments? How would you employ one in a classroom and in a home?

Chapter Suggested Reading

Token Economy

Hackenberg, T. D. (2018). Token reinforcement: Translational research and application. *Journal of Applied Behavior Analysis*, 51(2), 393-435.

Hackenberg organizes a broad literature using a taxonomy of basic behavioral functions and economic variables. In doing so, he identifies areas in need of additional research. He argues that basic and applied research on token economies is bidirectional and mutually enriching, and can contribute to theoretical advances.

Ivy, J. W., Meindl, J. N., Overley, E., & Robson, K. M. (2017). Token economy: A systematic review of procedural descriptions. *Behavior Modification*, 41(5), 708-737.

The authors report that of 96 articles published between 2000 and 2015 that included implementation of token economy in an applied setting, only 19% contained replicable descriptions of the 6 critical features of a token economy. They provide recommendations to improve component descriptions, to enhance research and practice.

McGinnis, J. C., Friman, P. C., & Carlyon, W. D. (1999). The effect of token rewards on "intrinsic motivation" for doing math. *Journal of Applied Behavior Analysis*, 32(3), 375-379.

This article evaluates the use of a token economy on academic skills and attempts to address the often-debated question of whether reinforcement affects "intrinsic" motivation.

Phillips, E. L., Phillips, E. A., Fixsen, D. L., & Wolf, M. M. (1971). Achievement Place: Modification of the behaviors of predelinquent boys within a token economy. *Journal of Applied Behavior Analysis*, 4(1), 45-59.

This article is valuable from an historical perspective, because it was a very early report of token economy, and because Achievement Place had a lasting legacy on behavioral intervention and research.

Pritchard, D., Penney, H., & Mace, F. C. (2018). The ACHIEVE! Program: A point and level system for reducing severe problem behavior. *Behavioral Interventions*, 33(1), 41-55.

The authors present a program description and correlational study of a school-wide point and level system that emphasized prosocial behavior and was associated with reduced problem behavior, without the use of punishment.

Soares, D. A., Harrison, J. R., Vannest, K. J., & McClelland, S. S. (2016). Effect size for token economy use in contemporary classroom settings: A meta-analysis of single-case research. *School Psychology Review*, 45(4), 379-399.

An examination of data from 28 studies published between 1980 and 2014, representing 90 participants. The authors report a large effect size and interesting findings from a moderator analysis.

Group Contingencies

Barrish, H. H., Saunders, M., & Wolf, M. M. (1969). Good behavior game: Effects of individual contingencies for group consequences on disruptive behavior in a classroom. *Journal of Applied Behavior Analysis*, 2(2), 119-124.

The good behavior game has been implemented and researched for over fifty years. This was the first published experimental analysis of what has come to be known as an interdependent group contingency.

Joslyn, P. R., Donaldson, J. M., Austin, J. L., and Vollmer, T. R. (2019). The Good Behavior Game: A brief review. *Journal of Applied Behavior Analysis*, 52(3), 811-815.

This review succinctly summarizes the evolution of the Good Behavior Game, discusses mechanisms that may account for its efficacy, and suggests directions for future research.

Joslyn, P. R., & Vollmer, T. R. (2020) Efficacy of teacher-implemented Good Behavior Game despite low treatment integrity. *Journal of Applied Behavior Analysis*, 53(1), 465–474.

This study extends the literature concerning the Good Behavior Game by studying its implementation by 3 teachers at an alternative school for students with emotional and behavioral disorders and severe problem behavior. It reports significant reductions in problem behavior even though procedural fidelity was not optimal.

Deshaies, M. A., Fisher, A. B., & Kahng, S. A comparison of group contingencies on academic compliance. *Journal of Applied Behavior Analysis*, 52(1), 116-131.

This article, which reports on a study conducted in a first grade general education classroom, is interesting both because of its comparison of the effects on compliance with academic demands of 2 types of group contingency and because of its discussion, in terms of obtained reinforcement, of the differential appeal of the respective contingencies to distinct groups of students.

Contingency Contracting

Bowman-Perrott, L., Burke, M. D., de Marin, S., Zhang, N., & Davis, H. (2015) A meta-analysis of single-case research on behavior contracts: Effects on behavioral and academic outcomes among children and youth. *Behavior Modification*, 39(2), 247-269.

This article was a statistical meta-analysis of the use of contracts for 58 children, ages 5 to 21. Findings include a moderate effect size for the use of contracts, which were found to be more effective for reducing problem behavior than for increasing desirable behavior; effects did not appear to be moderated by grade, gender, or disability status.

Dardig, J. C., & Heward, W. L. (2016). *Sign here: A contracting book for children and their parents* (2nd ed.). ACTA.

This illustrated book presents a step-by-step process for developing contingency contracts; the number of situations and issues for which families and teachers can use it is limited only by the imagination. It is also available in Czech, Italian, Polish, Romanian, Russian, Turkish, and (soon) Chinese, Filipino, Spanish, Japanese, and Norwegian language editions.

Chapter 29: Self-Management

Chapter Summary

We tend to assign causal states to events that precede behavior. When causal variables are not apparent in the immediate environment, the tendency to resort to internal causes, such as willpower or drive, is strong. However, these hypothetical constructs do little to actually help us understand the behaviors they claim to explain and instead lead to circular reasoning. Skinner (1953) was the first to apply the philosophy and theory of radical behaviorism to actions considered to be controlled by the self, and conceptualized self-control as a two-response phenomenon: the controlling response and the controlled response. A controlling response affects the variables in such a way as to change the probability of another behavior, the controlled response.

Self-management is defined as the personal application of behavior change tactics that produces a desired improvement in behavior in order to live a more effective or efficient life, break undesirable habits and acquire new ones, accomplish difficult tasks, and achieve personal goals. Self-management programs may involve limited tactics, or comprise an intervention package; they may be restricted to a limited response class or set of circumstances or they may be applied across a large number of responses or settings. As a behavior change strategy, self-management possesses numerous virtues, including its potential to: influence private events; capture subtle or rare responses that may be overlooked by external change agents; promote generalization; and serve as an efficient pivotal skill—that is, once learned, self-management skills may be adapted over time to a variety of situations and ultimately contribute to living a healthy and productive life.

The term self-control is often treated as synonymous with self-management, but despite Skinner’s analysis, there are several reasons to prefer self-management. The main reason for this is that self-control has a narrower connotation as impulse control—as one possible outcome of self-management, in other words, and not as the independent variable by which it is achieved. Self-control in this sense can be conceptualized in terms of delay discounting: the more steeply someone discounts “larger, later” rewards, the more likely they are to act to produce “smaller, sooner” rewards and be characterized as lacking self-control. Much research has been conducted in which problematic behavior such as gambling and substance abuse are viewed through the lens of delay discounting. That literature includes several approaches to help individuals opt for larger, later rewards, including making a commitment response, progressively increasing the delay to the later reward, and engaging in intervening activities during the delay.

Two principal categories of self-management are antecedent tactics and self-monitoring. Examples of the former include manipulating motivating operations—that is, changing the conditions that make behavior more or less likely with respect to a given reinforcer—or directly modifying situational antecedents. Methods for modifying antecedents include posting prompts in the relevant setting, limiting behavior to a specific set of conditions, or arranging the environment to make desirable behavior more likely (e.g., performing the initial steps of a chain, such as putting the trash by the door in the evening so it will be more likely to be brought out in the morning) or to make undesirable behavior less likely (e.g., restricting the stimulus condition such as by removing matches and lighters from your home or car to make smoking less likely).

Self-monitoring—the most extensively studied and applied self-management strategy—is a procedure by which a person observes and responds to the behavior they are trying to change. Self-monitoring was originally developed as a method of clinical assessment for behaviors that were thought to only be observable by the client himself. Self-monitoring is frequently combined with additional procedures such as goal setting, self-evaluation, and reinforcement delivered for meeting predetermined and self-determined criteria. Self-monitoring is useful across a wide range of behavior for individuals of varying ages and abilities. It is more likely to be successful if it is easy to do, supported by supplemental materials (e.g., timers), focused on the most critical dimensions of the target behavior (e.g., rate vs. count), and conducted as frequently as possible without being disruptive or counterproductive.

Self-management programs may include self-delivery of consequences. Conceptually, self-administered consequences cannot be seen simply as the application of operant reinforcement or punishment: to leave it at that, as Skinner pointed out, does not account for why an individual does not abandon the controlling (self-administration) response in favor of responding to more appetitive concurrent schedules in effect. Guidelines for employing self-

administered consequences include selecting small and easy-to-deliver consequences, setting criteria that are both meaningful and attainable, keeping the program simple, and eliminating alternative (“bootleg”) sources of reinforcement—even if it means putting someone else in charge.

Other types of self-management tactics include self-instruction, habit reversal, systematic desensitization, and massed practice. These are not as easy to classify with respect to the four-term contingency, but have in common the fact of a person acting in some way to change their subsequent behavior.

Implementing a self-management program can have a significant impact on the target behavior. The following six steps are recommended for designing and implementing an effective self-management program: (1) specify a goal and define the behavior to be changed; (2) self-monitor the behavior; (3) create contingencies that will compete with natural contingencies; (4) go public with the commitment to change the behavior; (5) get a self-management partner; and (6) continually evaluate the program and redesign it as needed. Finally, the most fundamental principle of self-management is that behavior changes behavior.

Chapter Key Terms

delay discounting	self-control [impulse control]	self-monitoring
habit reversal	self-evaluation	systematic desensitization
massed practice	self-instruction	
self-control [Skinner’s analysis]	self-management	

Chapter Objectives

1. Discuss Skinner’s two-response conceptualization of self-control as the basis for self-management.
2. Define self-management as a behavior change strategy and discuss its benefits.
3. Define delay discounting, describe how it can be problematic, and give examples of mitigating the phenomenon.
4. Define and give examples of antecedent self-management tactics.
5. Define self-monitoring and give examples of treatment packages that incorporate self-monitoring, self-evaluation, and reinforcement.
6. Discuss, with respect to examples, suggested procedural features of self-monitoring interventions.
7. Define and provide examples of different types of self-administered consequences.
8. Define and give examples of four additional types of self-management tactics: self-instruction, habit reversal, self-directed systematic desensitization, and massed practice.
9. Design a self-management program that incorporates the six recommended elements of an effective program.

Chapter Focus Questions

1. What is the definition of self-management and how is it conceptualized in behavioral terms?
2. What is the difference between self-management and self-control?
3. Define delay discounting and provide examples, with respect to specific target behavior, of tactics for reducing the phenomenon.
4. What are benefits of using self-management?
5. What are antecedent-based self-management strategies? How might they be implemented, with respect to specific examples?

6. What is self-monitoring as a behavior change technology and what are some possible underlying behavioral mechanisms?
7. Provide examples of how other types of tactics may be combined with self-monitoring.
8. What practices or features promote the success of self-monitoring interventions?
9. Provide examples of self-administered consequences.
10. Define self-instruction and provide an example of how it is implemented.
11. Define habit reversal and provide an example of how it is implemented.
12. Define systematic desensitization and provide an example of how it is implemented.
13. Define massed practice and provide an example of how it is implemented.
14. What are six steps for designing and implementing an effective self-management program?

Chapter Suggested Reading

Skinner and Self-management

Epstein, R. (1997). Skinner as self-manager. *Journal of Applied Behavior Analysis*, 30(3), 545-568.

Epstein focuses on Skinner's personal application of self-management strategies.

Skinner, B. F. (1953). *Science and human behavior*. Free Press.

Skinner introduces his two-response conceptualization of self-control.

Neuringer, A. (1981). Self-experimentation: A call for change. *Behaviorism*, 9(1), 79-94.

The article is not about Skinner but would acknowledge a debt to him. It is as much about self-study as self-management and should be required reading before launching a self-management project. It closes with this request: "Help me, by doing research on that subject most important to us all—yourself."

Articles for Special Educators in Practice

Hoff, K. E., & Ervin, R. A. (2013). Extending self-management strategies: The use of a classwide approach. *Psychology in the Schools*, 50(2), 151-164.

Joseph, L. M., & Konrad, M. (2009). Twenty ways to have students self-manage their academic performance. *Intervention in School and Clinic*, 44, 246-249.

McCollow, M. M., Curiel, E. S. L., Davis, C. A., & Sainato, D. (2016). Utilizing antecedent strategies in early childhood settings. *Young Exceptional Children*, 19(4), 5-19.

Rafferty, L. A. (2010). Step-by-step: Teaching students to self-monitor. *Teaching Exceptional Children*, 43(2), 50-58.

Meta-analyses and Reviews

Briesch, A. M., & Briesch, J. M. (2016). Meta-Analysis of behavioral self-management interventions in single-case research, *School Psychology Review*, 45(1), 3-18.

The study meta-analyzed 47 single-subject studies of behavioral self-management interventions published between 1971 and 2011. No significant differences were identified depending on the grade level of the student or educational setting, but lower effect sizes were identified for students diagnosed with ADHD and specific learning disabilities. The discussion is not conducted in strictly behavioral terms, but the article is nonetheless an interesting survey of research of this technology.

Briesch, A. M., & Chafouleas, S. M. (2009). Review and analysis of literature on self-management interventions to promote appropriate classroom behaviors (1988-2008). *School Psychology Quarterly*, 24(2), 106-118.

Review of the literature identified 16 different characterizations of self-management interventions, each of which varied widely in terms of the number of intervention components included as well as the degree to which students were involved in implementation. Although self-observation and recording of a predefined behavior appear to be the cornerstones of self-management interventions, meaningful differences were noted, including whether reinforcement was involved and whether changes in performance were tracked over time.

Carr, M. E., Moore, D. W., & Anderson, A. (2014). Self-management interventions on students with autism: A meta-analysis of single-subject research. *Exceptional Children*, 81(1), 28-44.

Percentage of non-overlapping data results from 23 single-subject studies indicate that self-management interventions are effective for increasing both social and academic skills for students of all ages and levels of ability. Results generalized to other settings and untreated behaviors and were maintained over time.

Harris, K. R., Friedlander, B. D., Saddler, B., Frizzelle, R., & Graham, S. (2005). Self-monitoring of attention versus self-monitoring of academic performance. *The Journal of Special Education*, 39(3), 145-156.

Though not a meta-analysis or review, this may be of interest because it is a well-designed study that finds interesting results. Six elementary students with attention-deficit/hyperactivity disorder (ADHD) in a general education classroom monitored attention and performance on a spelling task. While improvement in on-task behavior was comparable across the two interventions, self-monitoring of attention produced substantially higher gains in spelling study behavior among 4 of the 6 students. This is the first study in which differential effects of these 2 interventions was investigated among students with ADHD; previous studies of students with learning disabilities (LD) found that self-monitoring of performance tended to result in higher rates of spelling study than did self-monitoring of attention.

Lee, S.-H., Simpson, R. L., & Shogren, K. A. (2007). Effects and implications of self-management for students with autism: A meta-analysis. *Focus on Autism and Other Developmental Disabilities*, 22, 2-13.

Average percentage of non-overlapping data (PND) values from single-subject research suggest that self-management interventions are an effective treatment for increasing the frequency of appropriate behavior of students with autism. The article discusses implications for further research extending the use and understanding of self-management for students with autism.

Mooney, P., Ryan, J. B., Uhing, B. M., Reid, R., & Epstein, M. H. (2005). A review of self-management interventions targeting academic outcomes for students with emotional and behavioral disorders. *Journal of Behavioral Education*, 14, 203-221.

Twenty-two studies published in 20 articles and involving 78 participants met inclusionary criteria. The overall mean effect size (ES) across those studies was 1.80 (range -0.46 to 3.00), indicating effects were generally large in magnitude and educationally meaningful. Self-monitoring interventions were the predominant type of self-management technique used by researchers. Interventions targeted improvement in math calculation skills more than any other area. There was evidence to support a claim of the generalization and maintenance of findings.

Delay Discounting

Reed, D. D., Niileksela, C. R., & Kaplan, B. A. (2013). Behavioral economics: A tutorial for behavior analysts in practice. *Behavior Analysis in Practice*, 6(1), 34-54.

Chapter 30: Generalization and Maintenance of Behavior Change

Chapter Summary

When a learner is taught a new response, that behavior is said to have generalized if it occurs at other times or in other places without having to be retrained completely in those particular times or places, or if functionally related behaviors occur that were not trained directly occur. This chapter concentrates on three main types of generalized behavior change: response maintenance, setting/situation generalization, and response generalization. Response maintenance refers to the extent to which a learner continues to perform a behavior after a portion or all of the intervention responsible for the initial change in behavior has been removed. Setting/situation generalization is the extent to which a learner emits the target behavior in settings or situations that are different from the instructional setting, or the setting in which the behavior was originally taught. Finally, response generalization refers to the extent to which a learner emits untrained responses that are functionally equivalent to the trained response. Some learner-intervention combinations may yield large and widespread generalization across time, settings, and responses while other interventions may produce limited generalization. As a behavioral phenomenon, generalization can take undesirable forms. For instance, with respect to setting/situation generalization, overgeneralization occurs when responding comes under the control of too broad a stimulus class, and faulty stimulus control occurs when responding occurs in the presence of irrelevant stimuli. Response generalization is problematic if variations are not forms that produce reinforcement for a given task or setting, or that may produce aversive consequences (e.g., if they are unsafe).

Generalized behavior change involves systematic planning. The first step in promoting generalized behavior changes is to select target behaviors that will meet naturally existing contingencies of reinforcement. Identifying all of the desired behavior changes and all the environments in which the learner should emit the target behaviors after training is removed defines the scope of the teaching task and helps prioritize setting-response combinations and determine which responses should be taught directly.

Stokes and Baer (1977) proposed “an implicit technology of generalization” and behavior analysts still rely on this taxonomy when they conceptualize strategies and tactics for promoting generalized behavior change. Strategies and tactics vary with respect to a number of factors, including whether they promote generalized outcomes by concentrating on stimulus features (e.g., teaching sufficient examples, programming common stimuli, teaching loosely, and incorporating negative teaching examples), teaching a variety of response topographies, or focusing primarily on response-reinforcer relations (e.g., capitalizing on behavior traps or reinforcers that are naturally available in the generalization setting, reinforcing response variability, or using intermittent schedules of reinforcement or indiscriminable contingencies). Of course, an intervention is likely to incorporate a number of these elements. Three additional tactics that can be used to mediate generalization are bringing the target behavior under the control of a contrived stimulus in the instructional setting, teaching the learner self-management skills, and teaching the learner to recruit reinforcement or assistance.

Typically, it is impractical and undesirable to continue any behavior change intervention indefinitely. Shifting from intervention to the natural environment can be accomplished by gradual and systematic withdrawal of some or all of the three distinct components of the intervention: antecedent stimuli (e.g., prompts, cues), task modifications (form and/or criteria), and consequence variables (e.g., natural vs. contrived, immediate vs. delayed, densely vs. thinly scheduled). It must also be recognized that some learners may require some level of ongoing intervention and monitoring.

Finally, the five guiding principles for promoting generalized behavior change are: 1) minimize the need for generalization as much as possible (in other words, prioritizing and teaching the setting-response combinations that are most frequently encountered and beneficial to the learner), 2) conduct generalization probes before, during, and after instruction, 3) involve significant others whenever possible, 4) promote generalized behavior change with the least intrusive and costly tactics possible, and 5) contrive intervention tactics as needed to achieve important generalized outcomes.

Chapter Key Terms

behavior trap	generalization setting	program common stimuli
contrived contingency	generalized behavior change	response generalization
contrived mediating stimulus	indiscriminable contingency	response maintenance
general case analysis	instructional setting	setting/situation generalization
generalization across subjects	multiple-exemplar training	teach loosely
generalization probe	naturally existing contingency	teach enough examples

Chapter Objectives

1. Define and provide examples of the three basic forms of generalized behavior change.
2. Define and provide examples of the different undesirable types of generalized behavior change.
3. Describe, with respect to examples, the planning process you would use to promote setting/situation and response generalization.
4. Give examples of using instructional tactics for promoting generalized behavior change.
5. Give examples of using consequence-based tactics for promoting maintenance of behavior change.
6. Name and give examples of the two main ways to mediate generalization.
7. Discuss methods for modifying and withdrawing successful interventions.
8. Name and give examples of the five guiding principles for promoting generalized outcomes.

Chapter Focus Questions

1. Provide examples of response maintenance.
2. Provide examples of setting/situation generalization.
3. What is the difference between the instructional setting and the generalization setting?
4. What are examples of response generalization?
5. Name and provide examples of undesirable forms of generalization?
6. How would you conduct pre-intervention planning for generalized outcomes?
7. What is the general case strategy?
8. Provide examples of negative (“Don’t do it”) teaching examples.
9. What are five ways to maximize contact with reinforcement in the generalization setting?
10. What does it mean to “mediate generalization” and what are two ways to accomplish it?
11. What does it mean to “train to generalize” and how would you accomplish it?
12. How can successful interventions be modified and withdrawn?
13. What are the five guiding principles for promoting generalized outcomes?

Chapter Suggested Reading

Overview of Concepts and Processes

Horner, R. H., Dunlap, G., & Koegel, R. L. (1988). Generalization and maintenance: Life-style changes in applied settings. Paul H. Brookes.

This outstanding book focusses on helping individuals with developmental disabilities enjoy meaningful lives in the community and features chapters on a range of topics, including pivotal response training, peer-mediated intervention, functional equivalence, and maintaining reductions in problem behavior.

Kirby, K. C., & Bickel, W. K. (1988). Toward an explicit analysis of generalization: A stimulus control interpretation. *The Behavior Analyst*, 11, 115-129.

An interesting attempt at clarifying the technologies identified in Stokes and Baer's (1977) taxonomy by identifying both explicit and implicit stimulus relations within each of the nine technologies.

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis*, 10, 349-367.

The classic article that distilled, in a conceptually systematic way, the many extant practices for promoting generalization into a taxonomy that guides researchers and practitioners to this day.

Stokes, T. F., & Osnes, P. G. (2016). An operant pursuit of generalization. *Behavior Therapy*, 47, 720-732. Reprinted from *Behavior Therapy*, 20, 1989, 337-355.

Stokes and Osnes refine and elaborate the categories proffered in Stokes and Baer (1977).

Various Tactics for Promoting Generalization and Maintenance

Campbell, G. R., & Stremel-Campbell, K. (1982). Programming "loose training" as a strategy to facilitate language generalization. *Journal of Applied Behavior Analysis*, 15, 295-301.

Teach loosely.

Cammilleri, A. P., & Hanley, G. P. (2005). Use of a lag differential reinforcement contingency to increase varied selections of classroom activities. *Journal of Applied Behavior Analysis*, 38, 111-115.

Reinforcing variability.

Cariveau, T., & Kodak, T. (2017). Programming randomized dependent group contingency and common stimuli to promote durable behavior change. *Journal of Applied Behavior Analysis*, 50, 121-133.

Program common stimuli/contrived mediating stimulus.

Day, H. M., & Horner, R. H. (1986). Response variation and the generalization of a dressing skill: Comparison of single instance and general case instruction. *Applied Research in Mental Retardation*, 7, 189-202.

General case strategy (teach enough examples).

Deitchman, C., Reeve, S. A., Reeve, K. F., & Progar, P. R. (2010). Incorporating video feedback into self-management training to promote generalization of social initiations by children with autism. *Education and Treatment of Children*, 33, 475-488.

Self-management (train to generalize).

Fowler, S. A., & Baer, D. M. (1981). "Do I have to be good all day?" The timing of delayed reinforcement as a factor in generalization. *Journal of Applied Behavior Analysis*, 14, 13-24.

Delayed reinforcement.

Horner, R. H., Eberhard, J. M., & Sheehan, M. R. (1986). Teaching generalized table bussing: The importance of negative teaching examples. *Behavior Modification, 10*, 457-471.

“Don’t do it” examples.

Hunter, W. C., Maheady, L., Jasper, A. D., Williamson, R. L., Murley, R. C., & Stratton, E. (2015). Numbered Heads Together as a Tier I instructional strategy in multitiered systems of support. *Education and Treatment of Children, 38*, 345-362.

Indiscriminable contingencies.

Stokes, T. F., Fowler, S. A., & Baer, D. M. (1978). Training preschool children to recruit natural communities of reinforcement. *Journal of Applied Behavior Analysis, 11*, 285-303.

Recruiting reinforcement (aim for natural contingencies).

Chapter 31: Ethical and Professional Responsibilities of Applied Behavior Analysts

Chapter Summary

This chapter reviews the ethical responsibilities of behavior analysts as outlined in *The Professional and Ethical Compliance Code for Behavior Analysts* (Behavior Analysis Certification Board, 2014) (the Code or the Compliance Code), with a specific focus on ethical issues in client services, advocating for clients, working with other professionals, and social media and technology. The chapter concludes with a discussion of creating a culture of ethical practices in organizations that provide behavioral services.

Ethical rules of conduct help behavior analysts address three basic questions: What is the right thing to do? What is worth doing? What does it mean to be a good behavior analyst? Practicing ethically and adhering to professional guidelines are essential to protecting and furthering the welfare and best interest of consumers of behavior analytic services. For behavioral practitioners, identifying the “right thing” to do is guided by the Compliance Code. In addition to the Compliance Code, the personal history and training of the behavior analyst, and the context in which they practice influence the definition of appropriate professional behavior. Deciding what is “worth doing” requires behavior analysts to balance the immediate health and safety of a client with the short- and long-term effects of an intervention while resisting the temptation to engage in “situational ethics” where decisions are based solely on short-term gains. The social validity and cost-benefit ratio of a treatment are also important factors in determining whether an intervention will result in sufficient value to the consumer. Finally, defining what it means to be a “good behavior analyst” requires practitioners to not only follow the Compliance Code, but to also engage in “self-regulation” whereby ethical decisions are calibrated over time and tempered with a well-informed integration of values, contingencies, rights, and responsibilities. Following the Compliance Code is necessary but not sufficient for being an ethical practitioner.

The Compliance Code delineates ten (10) areas of professional responsibility covering seventy-one (71) elements and provides guidance in each area. Several key requirements are essential in order for behavior analysts to meet their ethical obligations. Behavior analysts must acquire the necessary skills to practice competently, become certified and sometimes licensed where appropriate, and engage in ongoing professional development to stay current in the field of behavior analysis. Ethical practice requires that behavior analysts seek and obtain informed consent from clients prior to providing services, maintain client confidentiality at all times, and protect client dignity, health, and safety in the delivery of services. Providing ethical client services also pertains to interactions on social media and in the use of other new technologies. Behavior analysts have a responsibility to advocate for clients by assessing whether behavior treatment is needed and likely to be successful and they coordinate their services with other professionals. Practitioners should avoid conflicts of interest with their clients and especially, guard against the development of multiple relationships. In general, ethical practice requires intentional effort and is most likely to occur when behavior analysts create an organizational climate where ethical practices are supported. Practicing ethically is a pro-active, life-long process that demands vigilance and self-monitoring.

Chapter Key Terms

Compliance Code
confidentiality
conflict of interest
countercontrol

disciplinary standards
ethical codes of behavior
ethics
fraudulent conduct

informed consent
negligence
risk-benefit analysis

Chapter Objectives

1. Define ethics and state why ethical practice and codes are important.
2. Define and explain standards of professional practice relevant to behavior analysts.
3. Define the ways the professional competence of a behavior analyst is ensured.
4. Describe ethical issues in client services.

5. Identify ethical considerations in the use of social media and other new technologies.
6. Identify and explain important considerations when advocating for clients.
7. Describe ways a behavior analyst can effectively coordinate with other professionals.
8. Describe potential conflicts of interest in working with clients and the responsibility of a behavior analyst when conflicts arise.
9. Describe ways that behavioral organizations can create a culture of ethical practice.

Chapter Focus Questions

1. How is ethics defined and what is the basic purpose of practicing ethically?
2. What is countercontrol and why is it important in ethics?
3. What three fundamental questions should be answered to effectively guide the ethics of a behavior analyst's decisions and actions?
4. Which documents define the standard of practice for behavior analysts?
5. Which organization(s) establish standards of practice for behavior analysts?
6. What are five ways that a behavior analyst's professional competence is ensured?
7. What are the three tests for establishing valid consent?
8. What is a risk-benefit analysis and why is it important in consent?
9. What are the two types of breaches of confidentiality and how do they differ?
10. What are negligence and fraudulent conduct and how do they differ?
11. What are the responsibilities of a behavior analyst prior to initiating services?
12. What is the behavior analyst's responsibility when nonbehavioral treatments are recommended by other professionals?
13. What is a conflict of interest and which is the most common form in the work of behavior analysts?
14. What are the core features of an organizational environment designed to support ethical practices?

Chapter Suggested Readings

The following are documents that describe codes of professional conduct and ethical practice for behavior analysts. All are important additional reading for this chapter.

American Psychological Association. (2002, amended effective June 1, 2010, and January 1, 2017). *Ethical principles of psychologists and code of conduct*. [www.APA.org/ethics/code](http://www.apa.org/ethics/code)

The APA's code of conduct for psychologists was used as a model in developing the Compliance Code for behavior analysts. Some elements differ in each of the codes, as the scope of practices is different for each profession. The scope of practice for a psychologist encompasses behavior analytic services for those who have been trained in ABA and are competent to provide these services.

Association for Behavior Analysis International. (1990). *Statement on students' right to effective education, 1990*. Retrieved July 1, 2020, from <https://www.abainternational.org/about-us/policies-and-positions/students-rights-to-effective-education,-1990.aspx>

Based on the principles that have been demonstrated to improve student learning and performance, ABAI recommended six (6) educational entitlements for all students. These include recommendations pertaining to the educational context, the curriculum and objectives, assessment and placement, the instructional methods, evaluations, and responsibilities for success.

Association for Behavior Analysis International. (1990). *Statement on the right to effective behavioral treatment, 1989*. Retrieved July 1, 2020, from <https://www.abainternational.org/about-us/policies-and-positions/right-to-effective-behavioral-treatment,-1989.aspx>

This document outlines ABAI's position statement on a client's right to effective behavioral treatment and establishes six (6) guiding principles to protect individuals from harm as a result of either the lack of or the inappropriate use of behavioral treatment.

Association for Behavior Analysis. (2010) *Statement on restraint and seclusion, 2010*. Retrieved July 1, 2020, from <https://www.abainternational.org/about-us/policies-and-positions/restraint-and-seclusion,-2010.aspx>

This document outlines ABAI's principles and application guidelines for the use of restraint or seclusion. The conditions under which seclusion and restraint may be necessary and proper, strategies for implementing these procedures appropriately and safely are described, and a strong adherence to professional judgment and best practice is emphasized.

Behavior Analyst Certification Board (2014). *Professional and ethical compliance code for behavior analysts*. https://www.bacb.com/wp-content/uploads/2020/05/BACB-Compliance-Code-english_190318.pdf

This BACB document defines ethical conduct for behavior analysts. The Code or Compliance Code includes 10 sections relevant to professional and ethical behavior and a glossary of terms.

Behavior Analyst Certification Board (2014). *Fourth edition task list*. <https://www.bacb.com/wp-content/uploads/2020/05/BCBA-BCaBA-task-list-fourth-edition-english.pdf>

The BCBA/BCaBA Task List includes the knowledge and skills that serve as the foundation for the BCBA and BCaBA exams. The exams will be based on this version of the task list until December 31, 2021.

Behavior Analyst Certification Board (2017). *Fifth edition task list*. <https://www.bacb.com/wp-content/uploads/2020/05/170113-BCBA-BCaBA-task-list-5th-ed-.pdf>

The BCBA/BCaBA Task List includes the knowledge and skills that serve as the foundation for the BCBA and BCaBA exams. The exams will be based on this version of the task list starting January 1, 2022.

Behavior Analyst Certification Board. (n.d.). *Board certified behavior analyst: Maintaining certification*. Retrieved July 1, 2020, from <https://www.bacb.com/bcba/#BCBAMaintain>

Documents and information pertaining to maintaining a BCBA/BCaBA certification including continuing education requirements can be found on this site.

Chapter Additional Readings: Ethics in Behavior Analysis

Bailey, J. S., & Burch, M. R. (2016). *Ethics for behavior analysts* (3rd ed.). Routledge.

These authors published the first book on ethics in behavior analysis. This 3rd edition of the textbook has numerous case studies covering all the elements in the BACB Code and provides an accessible and comprehensive discussion of ethical conduct related to the Code elements.

Bailey, J. S., & Burch, M. R. (2019). *Analyzing ethics questions from behavior analysts: A student workbook*. Routledge. <https://doi.org/10.4324/9781351117784>

Supplementing "Ethics for Behavior Analysts", this book presents over 50 original and up-to-date ethics cases recently faced by behavior analysts. The workbook provides "solutions" to each question written by experts in the field.

Beirne, A., & Sadavoy J. A. (2019). *Understanding ethics in applied behavior analysis: Practical applications*. Routledge.

This book provides the foundation for ethical practice in working with individuals with autism spectrum disorder and other developmental disabilities. Included are explanations for each element in the Compliance Code. The book addresses professional behavior for the behavior analyst fulfilling roles as teacher, employee, manager, colleague, advocate, or member of a multidisciplinary team.

Brodhead, M. T., Cox, D. J., & Quigley, S. P. (2018). *Practical ethics for effective treatment of autism spectrum disorder*. Academic Press.

This book focuses on behavior analysts who work with individuals with a diagnosis on the autism spectrum. The principles and values underlying the Compliance Code and factors that affect ethical decision-making are covered as well as scope of competence, evidenced-based practice, and working with other professionals.

Sush, D. J., & Najdowski, A. C. (2019). *A workbook of ethical case scenarios in applied behavior analysis*. Academic Press.

Over 80 real life case examples that behavior analysts often face in their day-to-day work are presented in this book. There is a wide range of examples to cover the unique challenges faced by practitioners in this field.

Chapter Activity

Behavior Analysts on Social Media

In pairs or small groups, request that students find the following on the internet:

- a. The social media site(s) of an ABA company (e.g., Facebook, Instagram, Twitter) or
- b. An open social media group where ABA is discussed.

Have students review the postings, and the comments to posts, and evaluate whether the organization or group is following recommended practices for behavior analysts on social media. Direct students to Box 31.3, p. 777 as a reference. Have students identify and discuss the following:

- a. What good practices do you see on the site that are consistent with the recommendations?
- b. What questionable practices do you see?
 - a. Why are they questionable?
 - b. How could these questionable practices impact clients?
 - c. What would you suggest the organization/group do to correct the questionable practices?

Chapter 1 Test Questions

Multiple Choice

1. The levels of understanding science include
 - A. prediction, depiction & control.
 - B. prediction, description & calculation.
 - C. prediction, description, & control.
 - D. picture, description, & control.
2. When a behavior analyst notices that a child in a pre-kindergarten classroom has a tantrum whenever a peer cries, the analyst may have gained understanding at the level of
 - A. prediction.
 - B. description.
 - C. control.
 - D. replication.
3. There would be no logical or practical point in trying to develop a technology of behavior change in the absence of which assumption?
 - A. philosophic doubt
 - B. prediction
 - C. determinism
 - D. experimentation
4. Watson's so-called S-R psychology was simple but incomplete. Skinner's filling the gaps while continuing to seek causal relationships in the environment is an example of
 - A. replication
 - B. parsimony
 - C. prediction
 - D. (all of the above)
5. When a behavior analyst uses experimental manipulation to show that an intervention is effective for middle schoolers with developmental disabilities, the analyst can't claim that it also works for high school students with learning disabilities unless they also demonstrate
 - A. replication.
 - B. experimentation.
 - C. reproduction.
 - D. control.
6. A behavior analyst who studies schedules of reinforcement in video games with college students in his lab is probably a(n)
 - A. methodological behaviorist.
 - B. experimental analyst.
 - C. behavioral practitioner.
 - D. applied behavior analyst.

7. A BCBA employed by a school district to conduct functional assessment and develop behavior intervention plans is working as a(n)
 - A. radical behaviorist.
 - B. experimental analyst.
 - C. applied behavior analyst.
 - D. practitioner guided by behavior analysis.
8. According to Cooper, Heron, & Heward (2020), the experimental branch of behavior analysis formally began with
 - A. Watsonian psychology or S-R psychology
 - B. Pavlov's study of reflexive behavior
 - C. Fuller's study on the application of operant behavior to humans
 - D. Skinner's publication *The Behavior of Organisms*
9. A child often hits their sister when their mother leaves the room. A clinician claims that the reason for this is that they have separation anxiety and believe that hitting will cause their mother to return. This interpretation reflects
 - A. mentalism.
 - B. pragmatism.
 - C. radical behaviorism.
 - D. methodological behaviorism.
10. If a behavioral practitioner is gathering baseline data by asking patients in a psychiatric hospital to count the number of positive self-statements they make each day before noon, that practitioner's request would be consistent with
 - A. mentalism.
 - B. radical behaviorism.
 - C. methodological behaviorism.
 - D. pragmatism.
11. If a behavior analyst wants to develop a behavior intervention plan based on the strongest possible, empirically-derived information about the target behavior, they are most likely to do so only after demonstrating
 - A. experimental control over the behavior.
 - B. a functional relation between an independent variable and the behavior.
 - C. a reliable change in the behavior given repeated manipulation of a particular aspect of the environment.
 - D. (all of the above)
12. A behavioral practitioner puts an intervention in place with the intention of reducing a 2nd grader's disruptive vocal stereotypy. After 2 weeks the child is emitting vocal stereotypy in 87% of intervals rather than 92%. The practitioner reasonably decided that the treatment was not
 - A. applied.
 - B. technological.
 - C. conceptually systematic.
 - D. effective.

13. If a paper that describes the effect of feedback on energy use neglects to mention that points were awarded in some cases for energy use below a certain threshold, the paper could be criticized for failing to be
- A. analytic.
 - B. behavioral.
 - C. technological.
 - D. behavioral.
14. Cooper, Heron, and Heward (2020) offer additional characteristics of applied behavior analysis, including (check all that apply)
- A. ☐ persistent
 - B. ☐ accountable
 - C. ☐ optimistic
 - D. ☐ relatable
 - E. ☐ detectable
 - F. ☐ empowering

True/False

1. TRUE or FALSE. The overarching purpose of applied behavior analysis as field of study is to understand and improve socially important or significant behaviors.
2. TRUE or FALSE. The philosophical position that the truth or value of a scientific statement is determined by the extent to which it promotes effective action is known as pragmatism.
3. TRUE or FALSE. The highest level of scientific understanding is prediction or the ability to establish a correlation between events.
4. TRUE or FALSE. Empiricism is the assumption upon which science is predicted, that the universe is a lawful and orderly place, and events occur as the result of other events.
5. TRUE or FALSE. Research that bridges basic and applied research and informs both of these domains is known as transitional research.
6. TRUE or FALSE. Psychology in the early 1900's was dominated by the study of behavior through measurable and observable means.
7. TRUE or FALSE. B.F. Skinner is considered the founder of the experimental analysis of behavior.

Short Answer/Essay

1. Describe the level(s) of understanding that science provides and the overarching purpose(s) and goal(s) of science.
2. Describe what is meant by a functional relation, and provide a concrete example for a human organism.
3. There have been attempts to explain behavior philosophically other than using Skinner's radical behaviorism. Briefly define mentalism and methodological behaviorism and contrast them with radical behaviorism.

Chapter 2 Test Questions

Multiple Choice

1. If certain forms of behavior vary in topography but have a similar effect on the environment, they are considered a
 - A. repertoire.
 - B. stimulus class.
 - C. response class.
 - D. skill set.
2. A specific instance of behavior is referred to as a
 - A. skill.
 - B. response.
 - C. response class.
 - D. repertoire.
3. Features of the environment that share specified common elements along formal, temporal, and/or functional dimensions are known as a(n)
 - A. stimulus class.
 - B. response class.
 - C. antecedent class.
 - D. stimulus change.
4. A reflex is a(n)
 - A. conditioned response evoked by a stimulus.
 - B. conditioned response elicited by a stimulus.
 - C. unconditioned response evoked by a stimulus.
 - D. unconditioned response elicited by a stimulus.
5. The basic unit of analysis in the analysis of operant behavior is the
 - A. the response-reinforcer relationship.
 - B. three-term contingency.
 - C. behavioral repertoire.
 - D. (all of the above.)
6. Mr. Goldstein decides to give his students points, usable for extra free time, when they raise their hands and wait to be called on. He discovers that more students raise their hand and fewer students blurt out answers when he awards points than when he does not. This finding seems to show
 - A. a functional relation between points and hand raising.
 - B. punishment of blurting out answers
 - C. points serving as a motivating operation for hand-raising.
 - D. points exerting stimulus control over blurting out answers.

7. A teacher discovers that food often does not function as an effective reinforcer for skills taught after lunch. This is an example of
 - A. respondent conditioning.
 - B. stimulus salience.
 - C. satiation.
 - D. deprivation.
8. Operant behavior is
 - A. ontogenic.
 - B. selected by consequences.
 - C. sensitive to contingencies of reinforcement.
 - D. (all of the above.)
9. Operant conditioning refers to the process and selective effects of consequences on behavior. Consequences (mark all that apply)
 - A. select response classes, not individual responses.
 - B. select individual responses, but not response classes.
 - C. influence the future probability of behavior under any conditions.
 - D. have the greatest effect when they are immediate.
 - E. select any behavior that precedes them.
10. A principle of behavior is one which (mark all that apply)
 - A. has generality across species, settings, and behavior.
 - B. describes a functional relation between behavior and controlling variables.
 - C. can only be demonstrated in laboratory research.
 - D. is inferred from many experiments that demonstrate the same functional relation.
11. When Ms. Smith was in the checkout line at the grocery store, her child had a tantrum because she wouldn't buy him candy. She was embarrassed and gave in, and he immediately calmed. Now the child begins to loudly ask for candy as they approach the checkout, but Ms. Smith carries a bag of treats in her pocket that she can give him. Based on their current behavior it would appear that in the original episode
 - A. yelling was negatively reinforced and giving candy was positively reinforced.
 - B. yelling was positively reinforced and giving candy was negatively reinforced.
 - C. yelling was extinguished and giving candy was negatively reinforced.
 - D. both yelling and giving candy were positively reinforced.
12. Fernando continues to play with his iPad after his teacher announces that free time is over and asks the students to open their books. The teacher removes a token from Fernando's board. The next time the teacher asks him to put away his iPad, Fernando follows the direction quickly, because with regard to his playing, losing a token must have functioned as
 - A. positive punishment.
 - B. negative reinforcement.
 - C. negative punishment.
 - D. extinction.

13. Renee is not fond of reading, but for each book she read her teacher gave points that could be exchanged for a variety of things she liked. At a certain point in the school year, the teacher decided that reading should be intrinsically reinforcing by now, and discontinued the point system. The fact that Renee subsequently read less probably is an indicator of
- positive punishment.
 - negative punishment.
 - negative reinforcement.
 - extinction.

True/False

- TRUE or FALSE. Principles of behavior describe how behavior works and behavior-change tactics are how applied behavior analysts put the principles to work to help people learn and use socially significant behaviors.
- TRUE or FALSE. Operant conditioning is best described as a stimulus-response relationship, where the stimulus *elicits* the response.
- TRUE or FALSE. Reinforcement and punishment are specific behavior-change tactics that should be part of every practitioner's repertoire.
- TRUE or FALSE. It is not stimulus conditions but stimulus change that provides the primary environmental influence on behavior.
- TRUE or FALSE. Extinction is defined as removing a preferred item contingent upon inappropriate behavior.

Short Answer/Essay

- What is the major difference between behavior and response? Give an example of each.
 - State, with reference to examples, the two basic effects stimulus changes can have on behavior.
 - 6. Fill in the blanks A - D
- Type of Stimulus Change

		Present or Increase Intensity of Stimulus	Withdraw or Decrease Intensity of Stimulus
Effect on Future Frequency of Behavior	Increase ↑	A.	C.
	Decrease ↓	B.	D.

7. What are the elements of the three-term contingency? Give an example of reinforcement or punishment that describes the operation with respect to the three terms.
 8. What is a “history of reinforcement” and how does it help explain individual differences?
 9. Define ontogeny and phylogeny and give an example of each.
 10. State a similarity and difference between positive and negative reinforcement. Provide examples that refer to the same response.
 11. State a similarity and difference between positive and negative punishment. Provide examples that refer to the same response.
 12. Discuss, with reference to examples, the difference between a principle of behavior and a behavior-change tactic.
 13. With reference to examples, compare and contrast discriminative stimuli and motivating operations.
 14. Define “stimulus control” and discuss the role of antecedent stimuli in operant conditioning.
- .

Chapter 3 Test Questions

Multiple Choice

1. The progression of gathering information during a behavioral assessment should move from
 - A high to low.
 - B broad to narrow.
 - C low to high.
 - D narrow to broad.
2. A six-year-old learner who has no systematic modality of communication, does not count, and engages in demand related aggressive behavior, is learning additional skills because classmates are learning the skills. This would not be considered
 - A age appropriate.
 - B socially valid.
 - C functionally reliable.
 - D a relevant skill.
3. Which of the following questions must be answered prior to conducting a behavioral assessment?
 - A Who will conduct the assessment?
 - B Where will observations be conducted?
 - C What is the nature of the problem behavior?
 - D Who has the authority and skill to intervene with the behavior?
4. When interviewing a significant other about a client's behavior, the behavior analyst should ask variations of all of the following types of questions except which one?
 - A what
 - B how
 - C why
 - D when
5. A preferred method for identifying potential target behaviors is to complete a checklist of skills/behaviors using systematic _____.
 - A ecological assessment
 - B interviews
 - C scatterplot
 - D direct observation
6. When selecting a skill to be taught, it is advantageous to choose a behavior _____ because they produce increasing opportunities for reinforcement in other environments.
 - A cusp
 - B drift
 - C pivot
 - D invitation

7. Teaching a learner to make choices can be considered a _____ because it can result in modifications to other untrained behaviors.
 - A behavior cusp
 - B critical behavior
 - C initiating behavior
 - D pivotal behavior
8. Holding a face-to-face meeting to interview a client's parent is which type of behavioral assessment?
 - A direct
 - B indirect
 - C empirical
 - D analytic
9. Improving academic grades is not a good target behavior because "academic grades"
 - A are not a socially valid outcome.
 - B does not specify the behaviors required to achieve the goal.
 - C are too complex an outcome for behavior analysis.
 - D have poorly defined performance criteria.
10. When prioritizing behaviors for change, a chronic behavior, as compared to a more recently acquired behavior, should
 - A be easier to change.
 - B take precedence.
 - C be consider low priority.
 - D require less intervention.
11. One method of priority ranking various potential target behaviors is to use a(n)
 - A ranking matrix.
 - B standardized test.
 - C interviewing significant others.
 - D behavioral assessment.
12. Behaviors being targeted for behavior analytic programming must be clearly defined because they increase the likelihood of all of the following EXCEPT
 - A consistent program implementation.
 - B positive behavior change.
 - C accurate measurement of behavior.
 - D accurate communication of outcomes.
13. Which would be the best method to set the criterion when targeting initiating interactions with peers for a middle-school student?
 - A set the criterion as one interaction initiation per minute
 - B collect data on your own interaction initiation responses
 - C record initiation data of students in the school's hallway
 - D ask peers how many interactions they'd like with the student

14. A definition of eating that describes the movement of the client's mouth and swallowing is which type of behavior definition?
- A topography-based
 - B measurable
 - C function-based
 - D objective

True/False

1. TRUE or FALSE. Continuously observing a client and recording each behavior of interest and what is happening around the client is considered an anecdotal observation.
2. TRUE or FALSE. A topography-based definition classifies behavior in terms of their common effects on the environment.
3. TRUE or FALSE. Learning a pivotal behavior can result in modification of other behaviors that have not yet been learned.
4. TRUE or FALSE. An ecological assessment is an essential component in applied behavior analysis research and practice.

Short Answer/Essay

1. What are the benefits of interviews as a method for obtaining assessment information?
2. Contrast the methods of standardized tests and direct observation with regard to how assessment information is obtained, the type of information gathered, and effects on the target behaviors.
3. Describe the causes of reactivity and what behavior analysts should do to minimize this effect.
4. How does the concept of habilitation help the behavior analyst determine which behavior should be targeted for behavior change?
5. Explain how the concept of normalization influences the selection of target behavior and appropriate interventions.
6. What ethical challenges should a behavior analyst consider before engaging in behavior change procedures?
7. What are the benefits of using observable and measurable terms to describe behaviors and intervention outcomes?
8. Discuss the importance of selecting a replacement behavior when reducing or eliminating target behavior.
9. Explain the problems with setting a general goal (e.g., *to be more successful*) as opposed to a more specific goal.
10. Differentiate a behavior cusp and a pivotal behavior.

11. Explain the benefits of including the client, family, and/or staff in the goal determination process.

Chapter 4 Test Questions

Multiple Choice

1. Features of events that can be measured are called
 - A. units.
 - B. dimensions.
 - C. qualities.
 - D. characteristics.
2. Each of the following is a measurable dimensional quantity except
 - A. repeatability.
 - B. temporal extent.
 - C. temporal locus.
 - D. topography.
3. If you are interested in the amount of time it takes a student to begin a task after the teacher has given an instruction you would measure
 - A. latency.
 - B. interresponse time.
 - C. trials-to-criterion.
 - D. duration.
4. If you are focusing on the volume at which a client speaks, which dimension of the behavior is of interest?
 - A. topography
 - B. magnitude
 - C. locus
 - D. vibration
5. The procedure of observing and recording behavior during intervals or at specific moments in time is called
 - A. time sampling.
 - B. temporal extent.
 - C. celeration.
 - D. measurement artifact.
6. A procedure that can be used to measure a continuous behavior that is targeted for increase, such as academic engagement, is
 - A. event recording.
 - B. whole interval.
 - C. permanent product.
 - D. response latency.

7. Each of the following behaviors could be assessed using natural permanent product measurement EXCEPT
 - A. test scores.
 - B. washing dishes.
 - C. raising hand in class.
 - D. picking up garbage.
8. Permanent product measurement may be more accurate, complete, and continuous for all of the following reasons EXCEPT
 - A. the observer can take their time reviewing.
 - B. the behavior definitions are more precise.
 - C. the observer can review the product more than once.
 - D. measurement can be conducted with no distractions.
9. A BCBA is interested in how often a student responds to a greeting from a peer. Which would be the most representative method of measurement?
 - A. whole interval
 - B. latency
 - C. momentary time sampling
 - D. percentage
10. A teacher is interested in measuring the engagement of groups of students at certain times of the day. An appropriate measurement procedure for this would be
 - A. momentary time sampling.
 - B. permanent product.
 - C. planned activity check.
 - D. event recording.
11. Which method facilitates data collection for interobserver agreement and treatment integrity?
 - A. measurement artifact
 - B. permanent product
 - C. direct observation
 - D. time sampling

True/False

1. TRUE or FALSE. Measurement is the process of applying qualitative labels to events.
2. TRUE or FALSE. The number of response opportunities needed to achieve a predetermined level of performance is called trials-to-criterion.
3. TRUE or FALSE. A feature of data that appears to exist because of the way the data are measured or examined is called an artifact.
4. TRUE or FALSE. The amount of time that elapses between two consecutive instances of a response class is called latency.
5. TRUE or FALSE. It is important to consider the skills of the observer when selecting a measurement method.

Matching

Match the method of measurement/dimension of interest to the reporting statement.

- A. duration
- B. magnitude
- C. latency
- D. count
- E. permanent product
- F. interresponse time
- G. planned activity check

1. ____ The student emitted 42 hits during the observation period.
2. ____ The tantrum lasted for 6m 13s.
3. ____ Thirty-nine seconds elapsed between instances of screaming.
4. ____ Head hits were strong enough to leave a mark.
5. ____ Students A, D, E, and G were engaging in independent leisure activities when the timer sounded.
6. ____ The student attempted the worksheet six times before mastering it.
7. ____ The learner started cleaning up 2.25 minutes after the teacher gave the direction.

Short Answer/Essay

1. Provide a brief explanation of why applied behavior analysts measure behavior.
2. What are two benefits of measurement for practitioners?
3. Define event recording and give three examples of devices or procedures used to collect event data.
4. Describe the difference between whole-interval and partial-interval recording.
5. Describe one example of when a trials-to-criterion method could be used to evaluate outcome.
6. Describe the two definitional measures of behavior.
7. For what type of behavior is duration recording an appropriate method?
8. What observation problems do time sampling procedures address?
9. What is the main advantage of using the momentary time sampling procedure over other recording procedures?
10. What is artifactual variability?

11. What are two ways that measurement by permanent product differs from the other procedures for measuring behavior?
12. What should be considered when selecting a method for measuring a behavior?

Chapter 5 Test Questions

Multiple Choice

1. When data yield the same values across repeated measurement of the same event, they are considered
 - A. indirect.
 - B. direct.
 - C. reliable.
 - D. valid.
2. Which of the following skews the representation of the behavior due to the methods of measurement?
 - A. checks
 - B. IOA
 - C. standards
 - D. artifacts
3. What is the greatest threat to the accuracy and reliability of data?
 - A. indirect measurement
 - B. human error
 - C. calibration mistakes
 - D. (all of the above)
4. If the way an observer records behavior slowly shifts without a designed change, what has occurred?
 - A. measurement bias
 - B. observation slide
 - C. observer drift
 - D. observer bias
5. If two observers watch the same video of a teaching session, record the frequency of pinching, and compare their findings, they are assessing
 - A. interobserver agreement.
 - B. interobserver accuracy.
 - C. observer drift.
 - D. observation bias.
6. Which is a false statement about the requirements of IOA? IOA observers must
 - A. use the same observation code.
 - B. measure the same participants and events.
 - C. always score videotapes at the same time.
 - D. observe the behavior independent of other observers.

7. In order to base procedural decisions on specified measurement with confidence, the data must be
 - A. reliable.
 - B. valid.
 - C. accurate.
 - D. (all of the above)
8. Which of the following is not a factor that contributes to measurement error?
 - A. poorly designed measurement systems
 - B. observer drift
 - C. expectations of what the data should look like
 - D. well-trained observers
9. Measurement bias caused by observer expectations can be avoided by using
 - A. informed recorders.
 - B. trained observers.
 - C. many recorders.
 - D. naïve observers.
10. How is IOA typically reported in ABA?
 - A. percentage of agreement
 - B. point-by-point
 - C. interval-by-interval
 - D. (all of the above)
11. Scored-interval IOA is recommended for behaviors that occur at relative _____ frequencies; unscored-interval IOA is recommended for behaviors that occur at relative _____ frequencies.
 - A. high, low
 - B. moderate, high
 - C. low, moderate
 - D. low, high

True/False

1. TRUE or FALSE. Measurement is accurate when observed values, the data produced by measuring an event, match the true state, or true values, of the event.
2. TRUE or FALSE. Observers should not receive systematic training prior to data collection because training will cause observer bias.
3. TRUE or FALSE. Observers should receive feedback about the extent to which their data confirm or run counter to hypothesized results or treatment goals.
4. TRUE or FALSE. True values for some behaviors (e.g., compliance) are difficult because the process for determining true value must be different from the measurement procedures used to obtain the data one wishes to compare to the true value.

5. TRUE or FALSE. A mean of 80% agreement means the data are accurate.

Matching

Match the method of IOA calculation for event recording with its formula.

- A $\frac{\text{Int 1 IOA} + \text{Int 2 IOA} + \text{Int N IOA}}{\text{N Intervals}} \times 100$
- B $\frac{\text{Number of Intervals of 100\% IOA}}{\text{N Intervals}} \times 100$
- C $\frac{\text{Smaller Count}}{\text{Larger Count}} \times 100$
- D $\frac{\text{Number of Trials (items) Agreement}}{\text{Total Number of Trials (items)}} \times 100$

1. ____ Exact Count-per-Interval IOA
2. ____ Total Count IOA
3. ____ Trial-by-Trial IOA
4. ____ Mean Count-per-Interval IOA

Match each term with its definition

- A. Any procedure used to evaluate the accuracy of a measurement system and, when sources of error are found, to use that information to correct or improve the measurement system.
- B. Measurement conducted in a manner such that some instances of the response class(es) of interest may not be detected.
- C. Occurs when the behavior that is actually measured is the same as the behavior that is the focus of the investigation.
- D. Occurs when the behavior that is actually measured is in some way different from the behavior of interest.
- E. Measurement conducted in a manner such that all instances of the response class(es) of interest are detected during the observation period.
- F. The extent to which observed values, the data produced by measuring an event, match the true state, or true values, of the event as it exists in nature.
- G. The extent to which repeated measurement of the same event yield the same values.
- H. The extent to which data obtained through measurement are related to the target behavior and the reason for measuring it.

1. ____ Accuracy (of measurement)
2. ____ Calibration
3. ____ Continuous measurement
4. ____ Direct measurement
5. ____ Indirect measurement
6. ____ Discontinuous measurement
7. ____ Validity (of measurement)
8. ____ Reliability (of measurement)

Short Answer/Essay

1. List and describe the three elements of valid measurement in Applied Behavior Analysis.
2. Describe three threats to valid measurement in Applied Behavior Analysis.
3. State and describe three common causes of measurement artifacts.
4. Discuss three factors that contribute to human measurement error.
5. Describe ways to reduce the negative effects of a complex measurement system.
6. List skills observers must have prior to collecting data for an experiment.
7. Compare and contrast observer drift and observer reactivity.
8. Describe four purposes for assessing the accuracy of measurement.
9. Describe the importance of calibrating measurement instruments as it relates to accurate measurement. Discuss how you would calibrate a timing instrument – such as a watch.
10. List and describe four benefits and uses of IOA.
11. What is the recommended frequency of IOA for researchers?
12. For what variables and when should IOA be obtained and reported in research?
13. What standard should be used when determining the most appropriate type of IOA and what factors contribute to an acceptable level of IOA?

Chapter 6 Test Questions

Multiple Choice

1. Why is it important to maintain direct and continuous contact with the behavior under investigation?
 - A. Measuring behavior is simple and easy.
 - B. Measuring behavior is time-consuming and affordable.
 - C. Behavioral measurement is a dynamic and on-going process.
 - D. Behavioral measurement is a cumulative and static process.
2. Which are relatively simple formats for visually displaying relationships among and between a series of measurements and relevant variables?
 - A. lists
 - B. tables
 - C. graphics
 - D. graphs
3. The three fundamental properties of behavior illustrated on a graph include
 - A. level, trend, and variability.
 - B. movement, on-going, and continual.
 - C. line, bar, and cumulative.
 - D. series, numerical, and data.
4. Graphs are devices that help the practitioner or experimenter interpret the results of a study or treatment, and therefore may be considered a
 - A. proper decision.
 - B. statistical tool.
 - C. treatment aid.
 - D. judgmental aid.
5. Which of the following is the most common graphic format for displaying data in applied behavior analysis?
 - A. bar graph
 - B. cumulative record
 - C. line graph
 - D. scatterplot
6. Which properties of behavior are displayed on line graphs, but not bar graphs?
 - A. Level and trend
 - B. Variability and trend
 - C. Level and number
 - D. Number and variability

7. On a cumulative record the _____ the slope, the _____ the response rate.
 - A. steeper, higher
 - B. steeper, lower
 - C. flatter, steadier
 - D. steadier, lower
8. Ratio scales are well suited to display and communicate which type of change?
 - A. sequential
 - B. simple
 - C. proportional
 - D. traditional
9. Which type of display provides a standardized means of charting and analyzing how the frequency of behavior changes over time?
 - A. celeration graph
 - B. bar graph
 - C. scatterplot
 - D. Standard Celeration Chart
10. Rather than the specific frequency of correct and incorrect responses Precision teaching focuses on
 - A. time.
 - B. celeration.
 - C. rate.
 - D. speed.
11. Behavior analysts typically interpret graphically displayed data through
 - A. statistical analysis.
 - B. numerical analysis.
 - C. visual analysis.
 - D. graphic analysis.
12. The value on the vertical axis scale around which a set of behavior measures converge is called
 - A. trend.
 - B. rate.
 - C. variability.
 - D. level.
13. The overall direction taken by a data path is its
 - A. trend.
 - B. rate.
 - C. variability.
 - D. level.

True/False

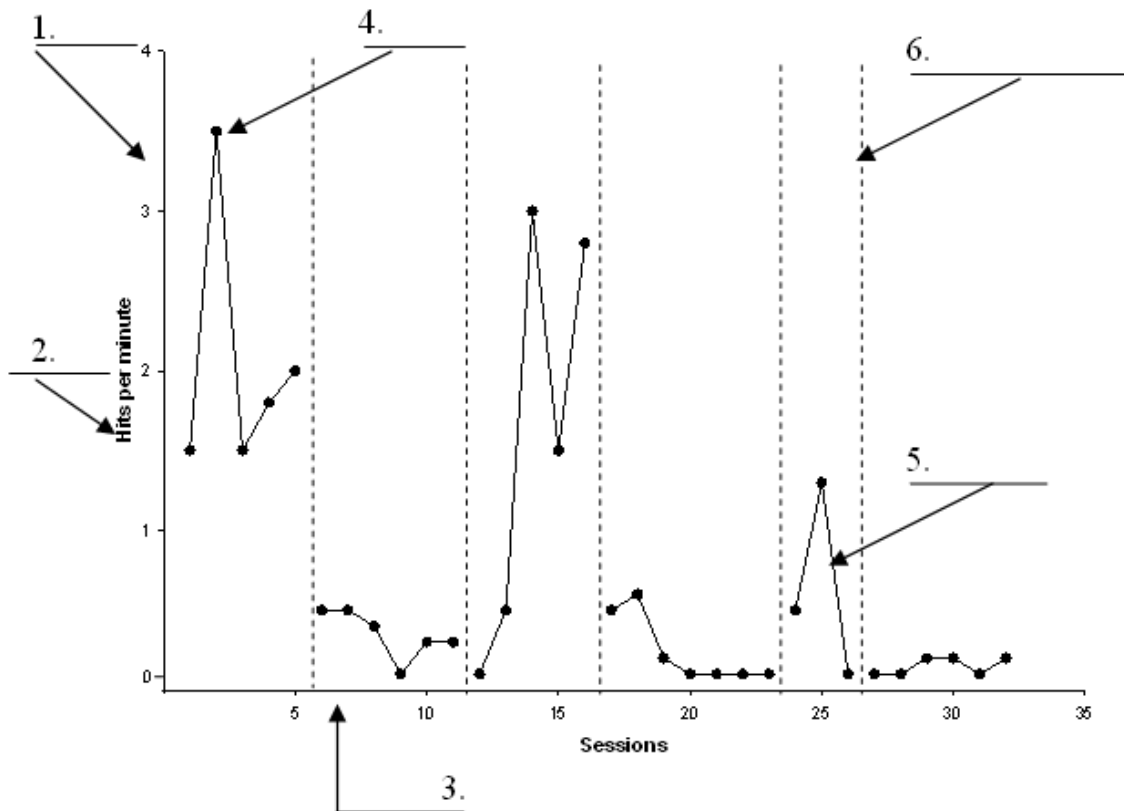
1. TRUE or FALSE. Graphs are not considered an effective source of feedback to the person whose behavior change is represented.
2. TRUE or FALSE. A cumulative record should be used if the target behavior can only occur once per measurement period.
3. TRUE or FALSE. The decision for whether or not to connect data paths over a phase change line depends on what the data look like.
4. TRUE or FALSE. Overall response rate refers to the average rate of responding over a given time period.
5. TRUE or FALSE. If you believe the data on a graph are distorted by the scaling of the axes you should re-plot the data on a new graph before continuing with visual analysis.
6. TRUE or FALSE. Data points on ratio charts are the same distance from one another on each axis.

Matching

Use the basic parts of a line graph listed below to label the graph that is provided.

- A. X-axis
- B. Y-axis
- C. condition/phase change line
- D. data point
- E. data path
- F. behavior of interest

1. ____
2. ____
3. ____
4. ____
5. ____
6. ____



For each scenario select the most appropriate data display to communicate quantitative relations.

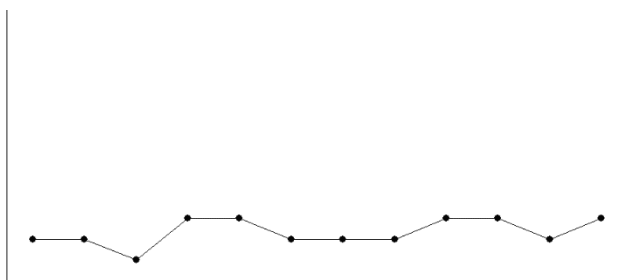
- A. equal-interval line graph
- B. bar graph
- C. cumulative record
- D. Standard Celeration Chart
- E. scatterplot

7. ____ During this analysis you are interested in evaluating the effects of the independent variable on a dependent variable that can only occur once per measurement period, for example the participant either engages in the behavior or does not, therefore your data collection is limited to recording a yes or a no.
8. ____ You are interested in comparing the effects of intervention A with intervention B on the aggressive behaviors displayed by one student in your classroom. In other words, you are interested in looking at the same behavior under different and alternating experimental conditions.
9. ____ You completed a study on the effects of peer tutoring on the acquisition of irregular sight words and would like to summarize the performance of the entire class under baseline and intervention conditions.

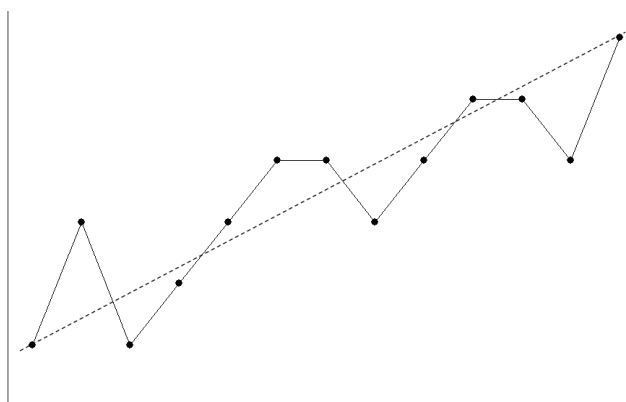
10. ____ You are conducting 1-minute timings with a student who is practicing multiplication facts. You are interested in the student's accuracy and speed in acquiring new multiplication facts – that is, you are interested in the student's multiplication fact fluency.
11. ____ You are interested in finding out if there is a correlation between your students' missing naptime and the display of afternoon problem behavior.
12. ____ You are interested in investigating the effects of a motivational system on a student's appropriate and inappropriate behavior.
13. ____ You've decided to create a personal behavior management system to increase the number of minutes you exercise each day. You would like to include a graphic feedback device for motivation.

Short Answer/Essay

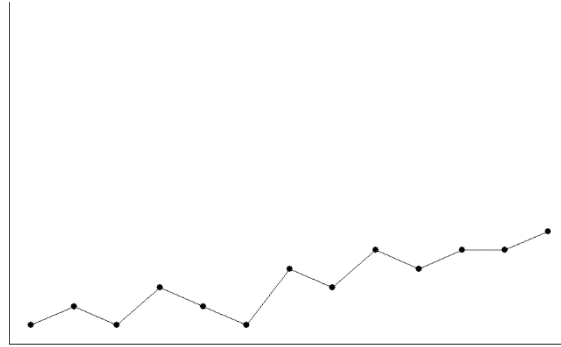
1. Write a brief statement describing the *level and variability* of responding depicted in the graph.



2. Write a brief statement summarizing the *trend and degree of variability* depicted in the graph.



3. Write a brief statement summarizing the trend and degree of variability depicted in the graph.



4. What is one benefit that graphic displays have over other displays of behavioral data?
5. List the three fundamental properties common to all behavioral data.
6. State one strength and one limitation of using bar graphs for displaying behavioral data.
7. Describe one situation in which a cumulative graph would be preferable to a noncumulative line graph.
8. State one reason why it is important for behavior analysts to maintain direct and continual contact with the behavior under investigation.
9. List three elements of the Standard Celeration Chart.

Chapter 7 Test Questions**Multiple Choice**

1. _____ enhances the understanding of natural phenomena by enabling scientists to describe behavior _____.
 - A. Systematic observation / accurately.
 - B. Independent observation / that is observable.
 - C. Systematic observation / in greater detail.
 - D. Subjective observation / more fully, but with generally less interobserver agreement.
2. The target behavior "head hits" is precisely defined, data are recorded accurately, and high interobserver agreement is achieved. A reversal design is employed and data indicate high levels during baseline conditions and significantly lower levels during treatment conditions, with abrupt changes at condition changes. This provides evidence of
 - A. experimental control, the highest level of scientific understanding.
 - B. experimental control and descriptive validity.
 - C. predictive validity, but not experimental control.
 - D. description, prediction, and experimental control, the second highest level of scientific understanding.
3. An experiment has a high degree of _____ when it shows convincingly that changes in behavior are a function of the independent variable and not the result of unknown variables.
 - A. interobserver agreement
 - B. external validity
 - C. stimulus generalization
 - D. internal validity
4. Single-subject and single-case designs are the same—they both apply experimental logic to a single subject in such a manner that each serves as their own control, even though there may be more than one subject. Which of the following is also true?
 - A. Within-subject designs and intra-subject designs are synonymous, but repeated-measures designs necessarily involve more than one subject.
 - B. Within-subject designs and repeated-measures designs always involve subjects serving as their own control, but they always have more than one subject.
 - C. Single-case designs and case studies are not the same thing.
 - D. Within-subject designs and $N = 1$ designs are synonymous and involve one or more subjects, but repeated-measures designs necessarily involve more than one subject.

5. A student's changing level of interest and background knowledge in algebra during a study on the effects of response-card quiz reviews on next-day quiz performance is a potential _____ to the investigation and should be monitored.
 - A. error source
 - B. systems variable
 - C. confounding variable
 - D. independent variable
6. A science of behavior contributes to a useful technology of behavior change to the extent that it discovers functional relations with _____ across individuals.
 - A. prediction
 - B. control
 - C. variability
 - D. generality
7. Among other things, a research question might involve learning about the
 - A. a) effects of one or more elements of a treatment package, or b) the effects of a varying amount of an intervention.
 - B. a) effects of an intervention on one response class versus a different response class, b) or the degree to which the null hypothesis is demonstrated to be false.
 - C. a) effect of a particular intervention on a particular behavior, or b) the effect of an intervention on a clinically relevant behavior relative to the effect on a clinically irrelevant behavior.
 - D. a) effect of an intervention on a clinically relevant behavior relative to the effect on a clinically irrelevant behavior, or b) the extent to which the amount of an intervention impacts a target behavior.
8. _____ are demonstrated when observed variations in behavior can be attributed to manipulations of the independent variable.
 - A. Functional correlations
 - B. Functional relations
 - C. Predictions
 - D. Experimental operations
9. You are evaluating the effect of a study strategy on students' ability to learn nonsense relations between stimuli. However, you learn that some students previously learned of an alternative strategy that, out of habit, they are using in your experiment in addition to the strategy you are evaluating. The alternative strategy is
 - A. an extraneous variable--it must be removed or controlled; otherwise, it may confound your results.
 - B. a confounding variable—it must be removed or controlled; otherwise, it jeopardizes internal validity.
 - C. a threat to both internal and external validity.
 - D. a confounding variable but not an extraneous variable.

10. The arrangement of conditions in a study so that meaningful comparisons of the effects of the independent variable can be made is a/an _____.
 - A. Intervention
 - B. Experimental design
 - C. Single-subject design
 - D. Group comparison design
11. A study seeks to discover the differential effects of 3-, 5-, and 10-minute durations of timeout. This is what kind of study?
 - A. Component analysis
 - B. Group analysis
 - C. Single-case
 - D. Parametric

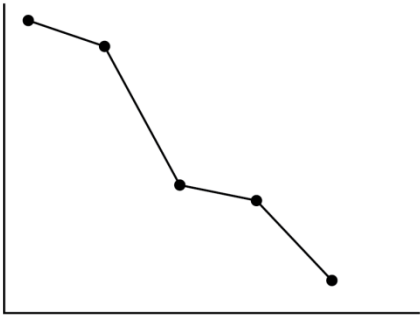
True or False

1. TRUE or FALSE. Single-subject research designs always involve only a single participant.
2. TRUE or FALSE. Baseline data collection is important because it results in a certain level of needed subjectivity.
3. TRUE or FALSE. Single-case experiments in ABA, conducted properly, will always yield a functional relation.
4. TRUE or FALSE. You are experimentally evaluating a treatment package that consists of a simultaneous physical rearrangement of the setting, adjusting the temperature of the room, and adjusting the lighting. You have manipulated more than one variable at a time, but that's acceptable as long as your conclusions are limited to the treatment package as a whole.
5. TRUE or FALSE. Nothing is gained by collecting long baselines of behavior that cannot reasonably be expected to be in a subject's repertoire.

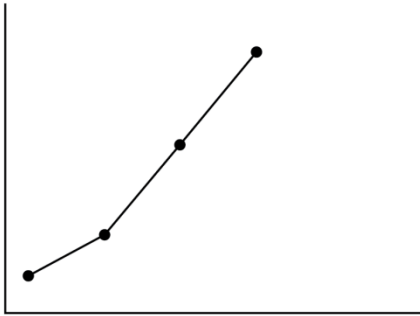
Matching

For each graph, indicate if the baseline data series is Ascending (A), Descending (D), Variable (V), Stable (S), Ascending and Variable (AV), or Descending and Variable (DV):

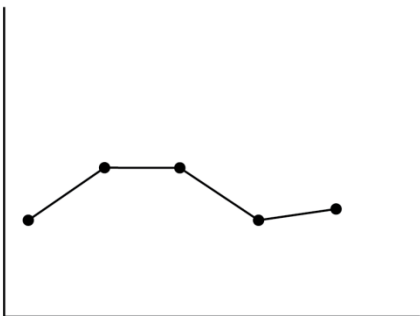
1. _____



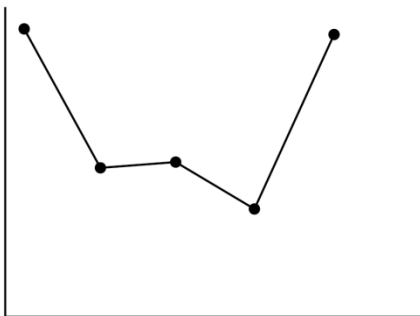
2. _____



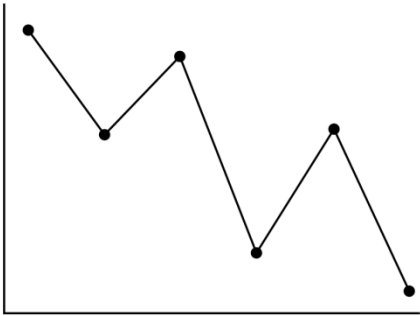
3. _____



4. _____



5. _____



Indicate if an independent (I) or dependent (D) variable is depicted in the bold type.

- _____ 6. The effects of study cards on the **rate of homework completion**.
- _____ 7. A **self-management intervention** increases students' task engagement.
- _____ 8. Use of an electronic signal device during classroom instruction increases the **number of praise statements** made by the teacher.
- _____ 9. The effects of a **token reinforcement plus praise treatment package** on student hand raising.
- _____ 10. **Number of words spelled correctly** following a spelling quiz review.

Short Answer/Essay

1. Describe what is meant by "analysis of behavior" with respect to its applied utility and how this differs from a complete analysis or understanding.
2. Name and give examples of three levels of scientific understanding.
3. Explain why it is important to replicate an intervention's effect on the dependent variable
4. Explain what is meant by, "Behavior is determined."
5. You could seemingly get rid of variability by averaging performance data across learners. What is the shortcoming of doing so?
6. What strategy do behavior analysts apply to address variability?
7. Write an explicit research question – be sure to identify the dependent and independent variables of interest.
8. Describe steady state responding and discuss its importance.
9. With consent, a teacher shares with you the data for several students. In each case, she shows you baseline data followed by a single intervention condition. She states, "See that in each case performance improved over baseline and this is replicated over several students; therefore, a functional relation is demonstrated." If the data do, in fact, indicate an abrupt and significant improvement relative to baseline, how would you respond to her assertion?

Chapter 8 Test Questions

Multiple Choice

1. Which of the following are synonymous or nearly synonymous terms?
 - A. reversal design and withdrawal design
 - B. reversal design and multielement design
 - C. multiple baseline design and multielement design
 - D. reversal design and single-phase multielement design
2. Which of the following is considered a limitation in the use of a multiple treatment reversal?
 - A. sequence effects
 - B. observer drift
 - C. rapid alternation effects
 - D. variability
3. With an alternating treatments design, the extent of any differential effects produced by two treatments is determined by the _____ distance between their respective data paths and quantified by the _____ axis scale.
 - A. horizontal, vertical
 - B. horizontal, horizontal
 - C. vertical, vertical
 - D. vertical, X
4. The effects on a subject's behavior in a given condition that are the result of the subject's experience with a prior condition are _____.
 - A. interference effects.
 - B. observer effects.
 - C. treatment effects.
 - D. sequence effects.
5. Which of the following statements is a practical rationale for using a B-A-B reversal design? (Select all that apply.)
 - A. Experimenter is interested in quickly understanding the effects of two different treatments.
 - B. Behavior of interest is dangerous and delaying an effective treatment would be unethical.
 - C. Treatment is already in place.
 - D. Treatment effects are unlikely to reverse.
6. When it is possible that reinforcement in the environment has effects independent of their presentation contingent upon a target behavior and this effect is to be ruled out, it is appropriate to use a/an
 - A. B-A-B design.
 - B. A-B-A-B design.
 - C. NCR reversal technique.
 - D. DRO reversal technique.

7. The phenomenon of behavior observed in an earlier phase not being able to be reproduced even though experimental conditions are the same as they were during earlier phases is an indication of
 - A. irreversibility.
 - B. a failure to implement the current condition until stability is achieved.
 - C. a shortcoming of using a multielement design.
 - D. sequencing.
8. Which of the following experimental questions is most appropriate for a reversal design? (Select all that apply.)
 - A. the effect of choice versus no choice on students' disruptive behavior
 - B. the effect of response cost on talk outs in an elementary classroom
 - C. the effect of math instruction on student engagement
 - D. the effect of using two different reinforcers in a discrete trial reading program
9. Which of the following is NOT an advantage of the multielement design?
 - A. can be used to compare one or more treatments
 - B. minimizes the possibility of multiple treatment interference
 - C. does not require treatment withdrawal
 - D. minimizes sequence effects

True/False

1. TRUE or FALSE. A concurrent chains (schedule) design is synonymous with an adapted alternating treatments design.
2. TRUE or FALSE. A properly conducted alternating treatments design minimizes the extent to which an experimenter's results are confounded by sequence effects.
3. TRUE or FALSE. Extended designs, such as an A-B-C-B-C-A-C-A-C-A-C multiple treatment reversal designs are most often preplanned by the experimenter.
4. TRUE or FALSE. A reversal design is an appropriate element of an experiment investigating the effects of a variable that cannot be withdrawn once it has been introduced (e.g., instruction).
5. TRUE or FALSE. With a multielement design, a functional relation is demonstrated when the behavior changes abruptly in level and trend at the onset of the treatment conditions.
6. TRUE or FALSE. "Reversal" in a reversal design most often refers to reversing the effect of the behavior, not the focus of treatment. Researchers who focus on a reversal of treatment sometimes use the term "withdrawal design."
7. TRUE or FALSE. A multielement design should not be used with unstable data.

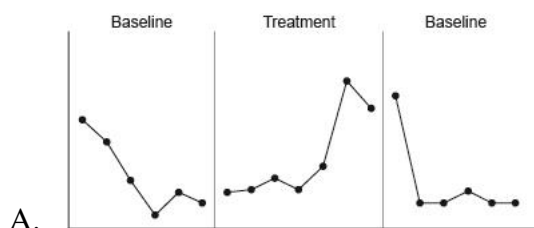
Matching

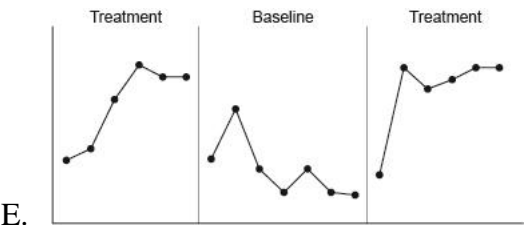
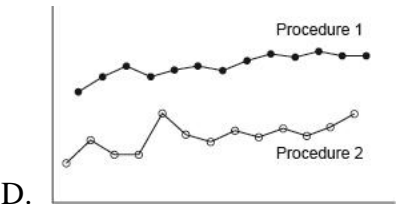
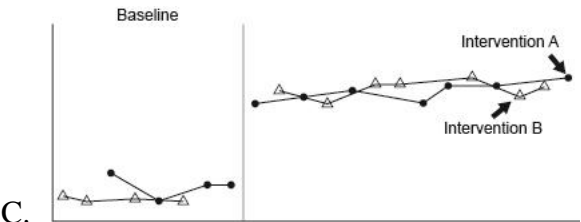
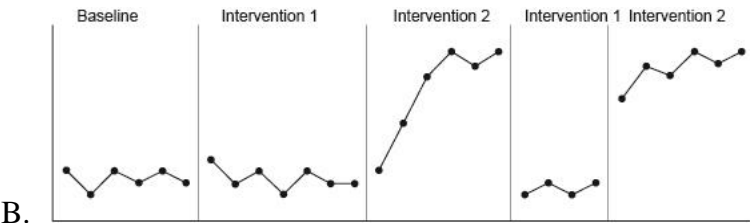
Match the name of the experimental tactic described in each of the following:

- A. A-B-A design
 - B. A-B-A-B design
 - C. multielement design
 - D. B-A-B design
 - E. DRI/DRA reversal technique
 - F. DRO reversal technique
 - G. adapted alternating treatments design
 - H. three-phase alternating treatments design
 - I. concurrent chains (or schedule) design
-
1. ____ This design allows for the quickest comparison of interventions.
 2. ____ Baseline, intervention, and a return to baseline phase.
 3. ____ This design begins with a baseline condition, proceeds to two or more conditions implemented simultaneously or in close alternation, then concludes with the most effective or preferred condition of those implemented previously.
 4. ____ With this design, two or more treatments are available at the same time and the participant selects their preference. One treatment option being consistently chosen over the other treatment option provides evidence of a functional relation.
 5. ____ After steady state responding is attained in the first (treatment) condition, the independent variable is withdrawn, then the treatment condition is reestablished in the final condition.
 6. ____ A major advantage of this design is that it does not require treatment withdrawal.
 7. ____ This design is widely used in applied behavior analysis due to its ability to expose variables for what they are – strong and reliable or weak and unstable. The behavior analyst is able to turn on and off the behavior of interest through repeated applications of the independent variable.
 8. ____ This design is useful in situations where a true baseline is required and two or more treatments are being compared on two or more similar skills.
 9. ____ Sequence effects cannot be ruled out when using this design because a preintervention condition is not conducted.

Short Answer/Essay

- Given the following experimental designs, draw a sample graph using hypothetical data and demonstrating a functional relation.
 - A-B-A
 - three-phase design
 - adapted alternating treatments design
 - A-B-A-B
 - two-phase design
 - multielement design
 - concurrent chain (schedule) design
 - single-phase design
- Given the following experimental designs, describe the logic and how experimental control would be demonstrated.
 - reversal design
 - multielement design
- Given the following experimental designs, state an advantage and a disadvantage of each.
 - A-B-A-B
 - multielement design
- Describe an appropriate research design for each of the following scenarios.
 - The teachers in the school where you consult are generally amenable to your suggestions. They question the utility of contingent praise on study behavior, however, and maintain that the positivity that they display in their classrooms provides sufficient motivation. Give the independent variable(s), dependent variable(s), and experimental design you would use to evaluate contingent praise in this situation.
 - You are interested in comparing the effects of two distinctly different study session procedures (Procedure X and Procedure Y) on next session quiz scores. Give the independent variable(s), dependent variable(s), and experimental design you would use to evaluate the two procedures.
 - You are interested in evaluating the effects of a response cost procedure on students' disruptive behaviors. Give an appropriate experimental design for this evaluation.
- For the following graphs, identify the experimental design and the presence or absence of a functional relationship.





Chapter 9 Test Questions

Multiple Choice

1. Which design is the most widely used experimental design in applied behavior analysis?
 - A. multiple baseline
 - B. reversal
 - C. changing criterion
 - D. multielement designs
2. If the dependent variable changes when, and only when, the independent variable is applied for each behavior in a multiple baseline design, _____ has been demonstrated.
 - A. extraneous control
 - B. experimental control
 - C. control of relevant variables
 - D. effective intervention
3. The multiple probe design is effective for situations in which
 - A. an intervention can be easily withdrawn from an environment.
 - B. the participant's skills are expected to increase incrementally over time.
 - C. prolonged baselines are not appropriate.
 - D. the participant is expected to acquire discrete behaviors.
4. Each of the following is a variation of the multiple baseline design EXCEPT a multiple baseline across
 - A. behaviors.
 - B. participants.
 - C. settings.
 - D. interventions.
5. Behaviors selected for study with a multiple baseline design should
 - A. be functionally independent.
 - B. be easy to change.
 - C. co-vary with each other.
 - D. be related to one another.
6. When utilizing a multiple baseline experimental design, the independent variable should initially be applied to the behavior that
 - A. shows the most stable level during baseline.
 - B. was identified first by the team.
 - C. is measured earlier in the client's day.
 - D. has the greatest likelihood of responding to the intervention.

7. Which variation of a multiple baseline design does not address the verification element of baseline logic?
 - A. delayed multiple baseline design
 - B. multiple probe design
 - C. multiple baseline across settings
 - D. nonconcurrent multiple baseline design
8. Which design can be used to evaluate the effects of treatment on the gradual improvement of behavior already in the participant's repertoire?
 - A. multiple baseline
 - B. reversal
 - C. changing criterion
 - D. multielement designs
9. In a changing criterion design, reinforcement is usually contingent upon the
 - A. duration of intervention.
 - B. establishment of experimental control.
 - C. number of experimental sessions.
 - D. performance at a specified level.
10. Experimental control is demonstrated in a changing criterion design, when
 - A. performance criteria closely follow the changes in the participant's behavior.
 - B. the participant's behavior closely conforms to the gradually changing performance criteria.
 - C. changes in the performance criteria happen with a consistent ascending pattern.
 - D. changes in the performance criteria happen with a consistent descending pattern.
11. All of the following are required to determine the potential of a changing criterion design to demonstrate experimental control EXCEPT the
 - A. length of each phase.
 - B. latency of criterion changes.
 - C. number of criterion changes.
 - D. magnitude of criterion changes.
12. Which of the following is an advantage of the changing criterion design? (mark all that apply)
 - A. It is the least complicated experimental design.
 - B. It does not require a withdrawal phase.
 - C. It allows for experimental analysis while gradually improving behavior.
 - D. It does not require any change to the intervention.

True/False

1. TRUE or FALSE. The length of the baseline phases for the different behaviors in a multiple baseline design should differ significantly.
2. TRUE or FALSE. One advantage of a multiple baseline design is the possibility of co-variation between different behaviors.
3. TRUE or FALSE. The believability of the changing criterion design is enhanced if a previous criterion is reinstated and the participant's behavior reverses to the previous level.
4. TRUE or FALSE. An advantage of the changing criterion design is that it can be used to develop new behavior.
5. TRUE or FALSE. Conducting a reversal phase in one or more tiers of a multiple baseline design can weaken the demonstration of experimental control.

Short Answer/Essay

1. Compare and contrast the three basic forms of the multiple baseline design.
2. Explain how experimental control is demonstrated in a multiple baseline across settings design.
3. Describe two conditions that make a multiple probe design appropriate for evaluating behavior change.
4. Describe three potential limitations to using a delayed multiple baseline design.
5. Describe the basic methodology of implementing a multiple baseline design across behaviors.
6. Describe the basic methodology of implementing a multiple probe design and the type of analysis for which it is particularly suited.
7. Explain the strengths and limitations of baseline measures for verifying predictions of subsequent behaviors in a delayed multiple baseline design.
8. What are three situations in which a delayed multiple baseline provides an appropriate tactic for analyzing behavior?
9. Describe the three features of a changing criterion design that combine to demonstrate experimental control.
10. What two problems can occur if the criterion changes are too large from one phase to another in a changing criterion design?

Chapter 10 Test Questions**Multiple Choice**

1. Which of these is NOT an accurate statement about between-group experimental designs?
 - A. group data may not represent the performance of individuals
 - B. variability in performance is managed statistically
 - C. performance averages represent behavioral processes
 - D. intrasubject replication is not present
2. A researcher designed an intervention package for reducing aggression that is both escape- and attention- maintained. The interventions included procedures for teaching and reinforcing “finished” and “talk” responses, taking three deep breaths, and sitting in a chair when directed. The intervention was implemented in its entirety and the researcher then systematically removed each element to determine which were essential to the effectiveness of the treatment. The researcher was using a
 - A. drop-out parametric analysis.
 - B. drop-out component analysis.
 - C. add-in parametric analysis
 - D. add-in component analysis.
3. All of the following are potential confounds to internal validity EXCEPT
 - A. generalization.
 - B. maturation.
 - C. observer drift.
 - D. treatment drift.
4. A study evaluating a treatment involving spaced-massed practice of “hand folding” and its generalized effectiveness as an interrupter for hand-to-head self-injury had been completed. When looking at the videotaped sessions, the researcher noticed toward the end of the project, the staff implementing the procedures was accepting “hands in lap” and “sitting on hands” as well as “folding hands” as a correct response. Additionally, the staff was only using verbal praise as a reinforcer and not the point system as in the original training phase. These changes challenge the _____ of the study, due to the lack of _____.
 - A. internal validity, treatment integrity.
 - B. external validity, procedural fidelity.
 - C. generality, treatment integrity.
 - D. social validity, procedure fidelity.
5. In designing an intervention to teach basic dog grooming to adults with intellectual and developmental disabilities, a researcher consulted a National Certified Master Groomer to identify the basic skills required of an apprentice groomer. This is an example of validating the social
 - A. acceptability of the intervention
 - B. importance of the behavior changes
 - C. importance of the behavior change goal

6. The generality of research findings in applied behavior analysis is assessed and established most frequently via
 - A. verification of baseline logic
 - B. systematic replication
 - C. social validation
 - D. internal validity
7. In order to evaluate the internal validity of applied behavior analysis research, all of the following should be considered, EXCEPT the
 - A. meaningfulness of baseline conditions.
 - B. experimental design.
 - C. measurement procedures.
 - D. consumer feedback.
8. Which of the following are examples of validating the social importance of behavior change? (mark all that apply)
 - A. Asking consumers to complete a survey inquiring whether the behavior change that occurred was beneficial to them.
 - B. Evaluating before and after measures on the frequency of SIB to determine whether there was a decrease in rate.
 - C. Using a Peabody Picture Vocabulary Test (PPVT) to see if there was an improvement in a child's vocabulary scores following functional communication training.
 - D. Asking a consumer's family to complete a questionnaire about their satisfaction with the intervention procedures.
9. To address nighttime wandering of an 80 year-old man with Alzheimer's disease, a practitioner researcher designed an intervention that included leaving a nightlight on in several rooms, limiting napping to one hour during the day, implementing a good sleep hygiene routine, and employing a protocol for returning to bed for incidents of wandering. This intervention is best described as a
 - A. component analysis.
 - B. direct replication.
 - C. placebo control.
 - D. treatment package.
10. A researcher wanted to strengthen the generality of a treatment addressing nighttime wandering of people with Alzheimer's disease. The researcher implemented the intervention exactly as before with a subject that was similar in age, the same sex, and at the same stage of Alzheimer's as the first subject. This is an example of
 - A. systematic replication across subjects.
 - B. intrasubject replication.
 - C. social validity across subjects.
 - D. intersubject replication.

True/False

1. TRUE or FALSE. Statistical manipulation can control the variables responsible for variability in the data.
2. TRUE or FALSE. With proper experimental design, the experimenter can control all aspects of a subject's behavior.
3. TRUE or FALSE. Placebo control is designed to separate treatment effects that may be produced by a subject's expectations from those resulting from the intervention.
4. TRUE or FALSE. External validity refers to the scientific generality of research findings.
5. TRUE or FALSE. Each study that demonstrates a functional relation between the independent variable and a socially important target behavior makes a significant contribution to the field of applied behavior analysis.
6. TRUE or FALSE. Visual analysis in behavioral data results in a low incidence of Type I errors but increases the commission of Type II errors.
7. TRUE or FALSE. Placebo controls such as double-blind controls cannot be used in behavior analytic single-subject experiments.

Short Answer/Essay

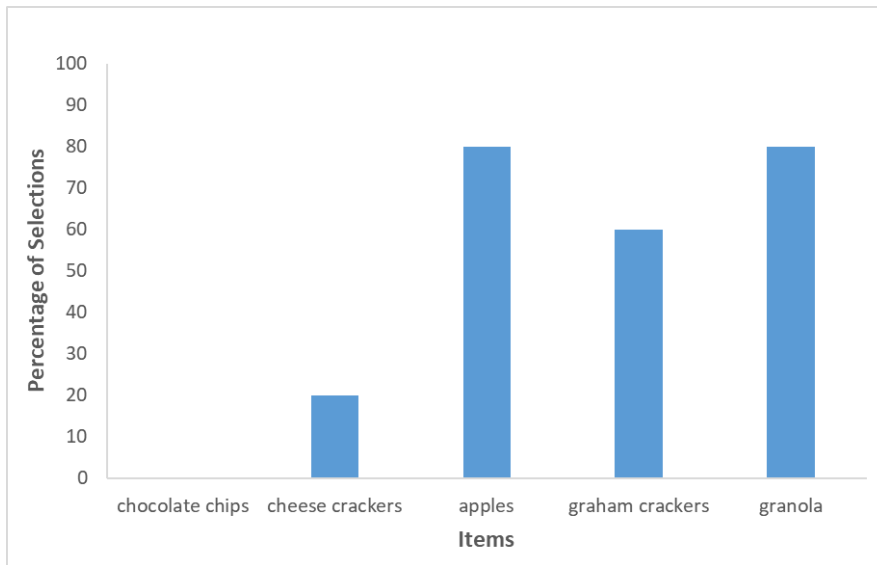
1. Explain why the behavior of individual subjects is of primary interest in applied behavior analysis.
2. Compare and contrast the different ways that variability in the data is treated in single subject versus group comparison designs.
3. Why is it important to know the individual tactics of experimental designs in behavior analysis even though there are no strict rules for experimental design?
4. Define treatment drift and explain the threat it poses to research outcomes.
5. Why is a precise operational definition of the target behavior critical in applied behavior analysis?
6. Define external validity and describe how the generality of research findings is established in applied behavior analysis.
7. Describe three methods for measuring social validity of a behavior change.
8. Identify and describe the four factors that favor visual analysis of data over tests of statistical significance in applied behavior analysis.
9. Baer, Wolf, and Risley (1987) argue that applied behavior analysis must shift its emphasis away from simply demonstrating behavior change. What is the more important focus in their opinion?

Chapter 11 Test Questions

Multiple Choice

- 1) One advantage of free operant preference assessments is
 - A. there is less potential for individuals to satiate on the stimuli than with the paired-stimulus and other approach-based assessments.
 - B. they can be less time consuming than the paired-stimulus and approach-based assessments.
 - C. they provide a rank order of preferences, unlike the paired-stimulus assessment.
 - D. (all of the above)
- 2) You conducted a paired-stimulus preference assessment with a student and computer time was ranked highest (it was selected most frequently). What can you say about computer time based on this information?
 - A. Computer time is a reinforcer for this student.
 - B. Computer time may be a reinforcer for this student.
 - C. Computer time is a punisher for this student.
 - D. Computer time is a non-preferred stimulus.
- 3) New parents put a child to bed. The child begins to cry, so the parents comfort the child and allow the child to sleep in bed with them. Thus, when they put the child to bed in the future, the child is more likely to cry. What has occurred in this situation?
 - A. The parents have positively reinforced crying by allowing the child to sleep in their bed.
 - B. The parents have negatively reinforced crying by comforting the child.
 - C. The parents have punished crying by putting the child back to bed.
 - D. There is not enough information to answer this question.
- 4) Two parents are very tired because they work hard and are trying to raise a young child. The child begins crying. When they put the child in their own bed, the child stops crying. Therefore, in the future, the parents are more likely to put the child in their own bed. What has occurred in this situation?
 - A. The parents have been reinforced for putting the child in their bed via positive reinforcement.
 - B. The parents have been reinforced for putting the child in their bed via negative reinforcement.
 - C. The parents have been punished for putting the child in their bed via punishment by removal.
 - D. The parents have been punished for putting the child in their bed via punishment by presentation.

- 5) According to the graph of preference assessments results,



- A. apples, graham crackers, and granola are highly preferred.
 B. apples and granola are highly preferred.
 C. chocolate chips are of low preference.
 D. chocolate chips and cheese crackers are not preferred.
- 6) Ben becomes severely aggressive whenever another student takes his toys away from him. When Ben hits them, the other children often return the toys they took from him. What can be said about this situation?
- A. Ben's aggression has likely been positively reinforced by the children returning the toy to him.
 B. Ben's aggression has likely been negatively reinforced by the children taking the toy away from him.
 C. Ben's aggression has likely been punished (via presentation) by the children returning the toy to him.
 D. Ben's aggression has likely been punished (via removal) by the children taking the toy away from him.
- 7) Which of the following represents the use of the Premack Principle?
- A. Telling a child to eat his vegetables or he must go to time out.
 B. Explaining to a child why it is a good thing to eat vegetables.
 C. Telling a child to eat his vegetables, then he can have dessert.
 D. Allowing a child to have dessert first if he promises to eat his vegetables later.
- 8) Which of the following is a/are conditioned reinforcer/s? (mark all that apply)
- A. food
 B. money
 C. tokens
 D. sleep
 E. praise

- 9) Unconditioned reinforcers are
- A. stimuli, such as praise, that individuals learn to like through pairing with other reinforcers.
 - B. stimuli, such as a bell ring, that cause the individual to engage in a reflex response due to pairing.
 - C. stimuli, like meat powder, that cause the individual to engage a reflex response without prior pairing.
 - D. stimuli, such as food and water that individuals inherently like in the absence of pairing with other reinforcers.
- 10) The Premack Principle is useful for
- A. increasing high probability behaviors.
 - B. decreasing high probability behaviors.
 - C. increasing low probability behaviors.
 - D. decreasing low probability behaviors.
- 11) What is the advantage of using generalized conditioned reinforcers?
- A. They are less susceptible to satiation.
 - B. They are easier to obtain than other forms of reinforcement.
 - C. They are more powerful than unconditioned reinforcers.
 - D. (all of the above)
- 12) Which statement regarding reinforcement does NOT depict circular reasoning?
- A. The rate of behavior increased because it was reinforced following the baseline condition.
 - B. The behavior was reinforced because it is occurring more often compared to baseline levels.
 - C. The behavior was reinforced because a stimulus followed the behavior and its rate increased.
 - D. The rate of behavior increased because it was contingently followed by a reinforcer.
- 13) Regarding survey methods of evaluating preference,
- A. an advantage is they are relatively uncomplicated to conduct.
 - B. an advantage is they are likely to yield accurate information.
 - C. a disadvantage is they can trigger disruptive behavior.
 - D. a disadvantage is they are relatively time consuming to conduct.
- 14) Elsa conducted a preference assessment for Jordan, a 5 year-old-boy. She arranged 8 stimuli on a table and allowed him a little time to interact with the stimuli prior to the assessment. Then, she began her assessment, allowing Jordan to select a stimulus and play with it for several seconds. When time was up, Elsa put the toy away and allowed Jordan to select another toy. She repeated this procedure until there were no toys left. What form of preference assessment is this?
- A. paired stimulus
 - B. survey
 - C. multiple stimulus without replacement
 - D. single stimulus
 - E. multiple stimulus with replacement

- 15) Which assessment method would be most appropriate to determine the efficacy of a stimulus as a reinforcer relative to another stimulus?
- A. concurrent schedule assessment
 - B. multiple schedule assessment
 - C. progressive-ratio schedule assessment
 - D. paired stimulus assessment
- 16) Which assessment/s would be most appropriate to determine the preference of a stimulus relative to other stimuli? (mark all that apply)
- A. single stimulus assessment
 - B. paired stimulus assessment
 - C. free operant assessment
 - D. multiple stimulus with replacement assessment
 - E. multiple stimulus without replacement assessment
- 17) Which assessment method compares the effects of a response dependent versus independent delivery of a stimulus to analyze whether or not the stimulus serves as a reinforcer?
- A. concurrent schedule assessment
 - B. multiple schedule assessment
 - C. progressive-ratio schedule assessment
 - D. paired stimulus assessment
- 18) Which assessment method is most appropriate when determining the efficacy of a stimulus as a reinforcer as the requirements to earn that reinforcer change over time?
- A. concurrent schedule assessment
 - B. multiple schedule assessment
 - C. progressive-ratio schedule assessment
 - D. paired stimulus assessment

True/False

- 1) TRUE or FALSE. The stimulus change responsible for increasing responding is called a reinforcer.
- 2) TRUE or FALSE. The behavior that occurs temporally closest to the presentation of a reinforcer will be strengthened by its presentation.
- 3) TRUE or FALSE. When implementing a reinforcement contingency, it is acceptable to wait 30 s following the emission of a target response to deliver the reinforcer.
- 4) TRUE or FALSE. Another word for the three-term contingency is the discriminated operant.
- 5) TRUE or FALSE. Establishing operations are relatively consistent and do not tend to change over time.
- 6) TRUE or FALSE. In order for reinforcement to work, the individual must be aware that reinforcement has occurred.

- 7) TRUE or FALSE. A primary reinforcer is an unconditioned reinforcer.
- 8) TRUE or FALSE. As a general rule, it is safer to assume that a high preference item identified through a trial-based method of assessment is more likely to serve as a reinforcer than one identified via a survey method of assessment.

Short Answer/Essay

- 1) Give a novel example of an argument that depicts circular reasoning. Give a novel example of an argument that is not circular. Explain why the first argument is circular and the second is not.
- 2) Diagram a novel example of a reinforcement contingency. Include all 4 terms of the contingency.
- 3) Explain why this statement is self-contradictory: “I have tried every reinforcement program in the book, and not one has worked. I still can’t get Joseph to sit in his chair for more than 3 minutes at a time.”
- 4) Explain the concept of the arbitrary nature of reinforcement.
- 5) Explain automatic reinforcement and provide a novel example of it.
- 6) Explain why the following statement is false: A conditioned reinforcer is called “generalized” because it reinforces a wide range of behaviors.
- 7) What is the difference between a preference assessment and a reinforcer assessment?
- 8) Compare and contrast concurrent, multiple, and progressive-ratio schedule assessment methods for evaluating the effectiveness of a stimulus’ function as a reinforcer.

Chapter 12 Test Questions

Multiple Choice

1. Negative reinforcement involves
 - A. presenting an aversive stimulus contingent upon a behavior.
 - B. removing an aversive stimulus contingent upon a behavior.
 - C. removing a desirable stimulus contingent upon a behavior.
 - D. presenting a desirable stimulus contingent upon a behavior.
2. Positive and negative reinforcement are similar in that they
 - A. both produce an increase in responding.
 - B. both involve a stimulus change following a target behavior.
 - C. can either be conditioned or unconditioned.
 - D. (all of the above)
3. The key distinction between positive and negative reinforcement is
 - A. the type of stimulus change that occurs following the response.
 - B. one is more effective at changing behavior than the other.
 - C. only one is sensitive to adjustments of a motivating operation.
 - D. the direction of the behavior change as a result of the process.
4. Negative reinforcement can be differentiated from punishment by attending to the role of the aversive stimulus. With negative reinforcement, the aversive stimulus is
 - A. presented following the target behavior. Whereas with punishment, the aversive stimulus is removed following the target behavior.
 - B. removed following the target behavior. Whereas with punishment, the aversive stimulus occurs before the target behavior.
 - C. present prior to the occurrence of the target behavior. Whereas with punishment, the aversive stimulus is removed following the target behavior.
 - D. present prior to the occurrence of the target behavior. Whereas with punishment, the aversive stimulus occurs following the target behavior.
5. Which is an example of avoidance?
 - A. Pressing the snooze button on the alarm while the alarm is beeping.
 - B. Turning the alarm off before it is time for the alarm to beep.
 - C. Turning off the alarm while the alarm is beeping.
 - D. (all of the above)
6. Which of the following examples illustrates socially mediated negative reinforcement?
 - A. Alice scratches her arm to alleviate an itch.
 - B. Alice closes her eyes when the wind blows on the beach to keep sand out.
 - C. Alice asks for help washing the dishes so she can finish her chores faster.
 - D. Alice uses the remote control to mute the commercials on the television.

True/False

1. TRUE or FALSE. An aversive stimulus can function as both a negative reinforcer and a punisher.
2. TRUE or FALSE. Joey forgot to clean his room before leaving for school. When he returned from school, he quickly cleaned his room before his mother came home to avoid a reprimand from her. The reprimand is an unconditioned negative reinforcer.
3. TRUE or FALSE. To maximize the efficacy of negative reinforcement the degree of change between the antecedent stimulus' onset and offset should be as large as possible.
4. TRUE or FALSE. Negative reinforcement can be used to teach both appropriate and inappropriate behaviors.
5. TRUE or FALSE. Research has demonstrated the duration of a work session universally increases the aversiveness of a task leading to increased rates of problem behavior.

Short Answer/Essay

1. Explain the difference between an escape contingency and an avoidance contingency.
2. Give a novel example of a four-term escape contingency. Include all elements of the contingency.
3. Give a novel example of a free-operant avoidance contingency. Include all elements of the contingency.
4. Negative reinforcement is often confused with punishment. Identify one potential source of confusion regarding these terms and explain why it is incorrect.
5. Compare and contrast positive and negative reinforcement.
6. Compare and contrast negative reinforcement and punishment.
7. Give a novel example of how negative reinforcement could be used to teach an appropriate behavior.
8. Explain this statement: Ethical concerns about the use of positive and negative reinforcement are similar and arise from the severity of the EO that occasions behavior maintained by a given consequence. Give a specific example for both positive and negative reinforcement in your explanation.
9. Give a novel example of an unconditioned negative reinforcer and of a conditioned negative reinforcer. Describe why they are appropriate exemplars.

Chapter 13 Test Questions**Multiple Choice**

1. A schedule of reinforcement is a rule that describes
 - A. the type of reinforcement to use.
 - B. a contingency of reinforcement.
 - C. the amount of reinforcement to deliver.
 - D. the boundaries of reinforcement.
2. The boundaries for all schedules of reinforcement are
 - A. social and automatic reinforcement.
 - B. fixed and variable reinforcement.
 - C. extinction and continuous reinforcement.
 - D. ratio and interval reinforcement.
3. Naji is participating in a research study where he plays a computer game for points that can be turned in later for cash. He is instructed to press the Y key to earn points. If Naji presses the Y key at the right time, a \$ briefly appears on the screen. The appearance of each \$ equals +20 points. Key presses are reinforced if they occur after a 6 s unmarked time period. The time resets after each reinforced key press. How should we expect Naji's response pattern to look?
 - A. fast and steady throughout all the intervals
 - B. initially fast followed by a slight pause
 - C. moderately consistent throughout the beginning and ends of each interval
 - D. slower at the beginning of the interval and gradually faster toward the end
4. A child's designated lunch time is from 12:00 PM - 12:25 PM. The child has access to all the contents in their packed lunch throughout the lunch session, with the exception of the sweet treat. Once the lunch session has taken place for 15 min, the child may have their treat when they ask for it. If the child asks for the treat prior to the 15 min, the child is directed to finish their meal or wait for it. If the child does not ask for the treat between 15 min and 25 min of the lunch session beginning, the child must wait until later in the day for it. This scenario most closely approximates a
 - A. fixed time 15 min schedule with a 10 min delay.
 - B. variable interval 12.5 min schedule.
 - C. multiple fixed interval 15 min and fixed interval 10 min schedule.
 - D. fixed interval 15 min schedule with a limited hold of 10 min.
5. Gary raises his hand a bit too often to get his teachers' attention during classes. Gary's math teacher began reinforcing hand raising with a DRL schedule and reduced his hand raising to a more appropriate level. Shortly after the reduction, Gary's science teacher mentioned that Gary was engaging in an increased level of hand raising during her class. The increase in hand raising during the science class is likely due to
 - A. behavioral contrast effects.
 - B. the effects of ratio strain.

- C. the matching law.
 - D. an extinction burst.
6. A post reinforcement pause is when a learner
- A. stops for a short period of time to think about the upcoming task.
 - B. has a decrease in their rate of responding due to ratio strain.
 - C. does not respond for a period of time following the reinforcement delivery.
 - D. takes a temporary break from responding due to satiation on the reinforcer.
7. With variable schedules of reinforcement, the number of responses required for reinforcement is the _____ for a group of schedule values.
- A. median
 - B. mode
 - C. minimum
 - D. mean
8. Variable ratio schedules of reinforcement tend to produce
- A. high rates of response.
 - B. moderate rates of response.
 - C. inconsistent rates of response.
 - D. low rates of response.
9. Interval schedules of reinforcement provide reinforcement for
- A. the first response that occurs during a predetermined interval.
 - B. a specific number of responses that occur during a predetermined interval.
 - C. the first response that occurs following the end of a predetermined interval.
 - D. a specific number of responses that occur following the end of a predetermined interval.
10. A fixed interval schedule typically produces a
- A. moderate and steady slope.
 - B. high and steady slope.
 - C. stair-step or rise and run pattern.
 - D. scalloped pattern.
11. A continuous reinforcement schedule is the same as a
- A. noncontingent reinforcement schedule.
 - B. fixed ratio one schedule.
 - C. variable ratio one schedule.
 - D. variable interval one schedule.

True/False

- 1. TRUE or FALSE. A post-reinforcement pause is typically associated with fixed interval and fixed ratio schedules of reinforcement.
- 2. TRUE or FALSE. Variable interval schedules of reinforcement tend to produce a constant, stable response rate.

3. TRUE or FALSE. Behavior analysts use lag schedules to promote response repetition.
4. TRUE or FALSE. Chained and tandem schedules are similar with the exception that tandem schedules do not have discriminative stimuli associated with the individual chain elements. Further, tandem schedules are not typically used in applied settings.
5. TRUE or FALSE. Ratio strain can result from abrupt decreases in ratio requirements when moving from denser to thinner reinforcement schedules.

Matching

- A. matching law
- B. fixed ratio
- C. fixed interval
- D. variable ratio
- E. variable interval
- F. DRL
- G. DRH
- H. compound schedules of reinforcement
- I. multiple schedules of reinforcement
- J. conjunctive schedules of reinforcement
- K. mixed schedules
- L. adjunctive behaviors

1. _____ A schedule of reinforcement consisting of the completion of two or more schedules of reinforcement.
2. _____ A schedule of reinforcement requiring a constant number of responses prior to receiving reinforcement.
3. _____ A schedule of reinforcement requiring an average number of responses prior to receiving reinforcement.
4. _____ A schedule of reinforcement in which reinforcement is provided at the end of an interval contingent on the number of responses emitted during the interval being greater than a predetermined criterion.
5. _____ A compound schedule of reinforcement consisting of two or more basic schedules of reinforcement that occur in an alternating, random sequence without discriminative stimuli correlated with the presence or absence of each schedule.
6. _____ A schedule of reinforcement in which reinforcement is provided at the end of an interval contingent on the number of responses being below a predetermined criterion.

7. _____ Idle behaviors that are schedule induced, independent of the specific schedule of reinforcement, and tend to occur when the target behavior is unlikely to receive reinforcement.
8. _____ The allocation of behavior with concurrent schedules of reinforcements, where rates of responding across choices are distributed in proportions that match the rates of reinforcement received when each schedule is independently in place or in a manner that produces the maximum amount of reinforcement.
9. _____ A compound schedule of reinforcement consisting of two or more basic schedules of reinforcement that occur in an alternating, random sequence; a discriminative stimulus is correlated with the presence or absence of each schedule.
10. _____ A schedule of reinforcement in which reinforcement is delivered for the first response emitted following the passage of a fixed duration of time since the last response was reinforced.
11. _____ A schedule of reinforcement consisting of two or more basic schedules of reinforcement. The schedules can occur successively or simultaneously and with or without discriminative stimuli. Reinforcement may be contingent on meeting the requirements of each component schedule independently or in combination.
12. _____ A schedule of reinforcement where the first correct response following the passage of variable durations of time is reinforced. The passage of time varies around a mean duration.

Short Answer/Essay

1. Define fixed and variable ratio schedules of reinforcement, as well as fixed and variable interval schedules of reinforcement. Compare and contrast the effects of these schedules of reinforcement on behavior.
2. Explain what is meant by a “scallop effect” and when you would expect to see it.
3. Give a real-life example of a ratio schedule of reinforcement and how ratio strain could occur as reinforcement is thinned. Clearly explain what ratio strain is with the example.

Chapter 14 Test Questions

Multiple Choice

1. Which best exemplifies positive punishment?
 - A. Shoy was eating a sandwich and walking down the boardwalk when a seagull flew over and pooped on her head. The next day, Shoy brought an umbrella with her to the boardwalk.
 - B. Shoy was holding a sandwich and walking on the boardwalk when a seagull flew down and plucked the sandwich out of her hand. The next day, Shoy ate her lunch before visiting the boardwalk.
 - C. Shoy was eating a sandwich and walking down the boardwalk when a seagull flew over and pooped on her head. The next day, Shoy stayed away from the boardwalk.
 - D. Shoy was holding a sandwich and walking on the boardwalk when a seagull flew down and plucked the sandwich out of her hand. The next day, Shoy bought the same type of sandwich.
2. Punisher assessments (mark all that apply)
 - A. enable the practitioner to identify the highest intensity punisher to achieve response suppression.
 - B. are conducted similarly to preference assessments, except they measure suppressive, negative, and avoidance behaviors associated with the aversive stimulus.
 - C. can be problematic, as their potential risks often outweigh their benefits to the individual.
 - D. make it possible for practitioners to more quickly identify and apply appropriate punishers to a problem behavior.
3. Which statement is included in the procedural guidelines for the use of punishment? (mark all that apply)
 - A. Conduct a punisher assessment.
 - B. Consider using varied punishers.
 - C. Use the highest intensity of punishment that is effective.
 - D. Record, graph, and evaluate the data daily.
4. Which are factors that influence the efficacy of punishment? (mark all that apply)
 - A. The punisher is delivered immediately after the target behavior.
 - B. Each occurrence of the target behavior is followed with the punisher.
 - C. The intensity of the punisher is high.
 - D. Punishment is available for the alternative behavior.
5. With contingent exercise, the individual is
 - A. prompted to perform high energy movements in repetition for a pre-specified amount of time.
 - B. prevented from completing the problem behavior and is prompted to engage in a high-probability behavior.
 - C. required to perform a response that is related to the problem behavior.
 - D. required to perform a response that has no topographical relation to the problem behavior.

6. After dumping the contents of his glue container on the floor, Matthew not only has to clean up his workspace. He must also clean the entire classroom floor. This procedure exemplifies
- A. contingent exercise.
 - B. positive practice overcorrection.
 - C. restitutorial overcorrection.
 - D. response interruption and redirection.

True/False

- 1. TRUE or FALSE. A decrease in the frequency of the behavior must be observed before a consequence-based intervention qualifies as a punishment procedure.
- 2. TRUE or FALSE. Positive punishment has occurred when the removal of an aversive stimulus increases the future occurrence of the behavior.
- 3. TRUE or FALSE. Negative punishment has occurred when the removal of an event decreases the future occurrence of a behavior.
- 4. TRUE or FALSE. Negative reinforcement and positive punishment are interchangeable terms.
- 5. TRUE or FALSE. Overcorrection procedures must include either or both positive practice and environmental restitution.

Matching

Choose the corresponding answer for each of the following statements.

- A. conditioned punisher
- B. unconditioned punisher
- C. overcorrection
- D. response blocking
- E. response interruption and redirection
- F. recovery from punishment
- G. behavioral contrast

- 1. _____ the contingent engagement of an effortful task that has some relevance to the specific problem behavior
- 2. _____ an increase in behavior following the removal of the punishment contingency
- 3. _____ a stimulus that acquires aversive properties due to being paired with other aversives
- 4. _____ a phenomenon in which the change in one component of a multiple schedule that increases or decreases the rate of responding on that component is accompanied by the response rate changing in the opposite direction on the other, unaltered component of the schedule.
- 5. _____ a stimulus whose aversive properties are the product of evolutionary history

6. _____ a procedure that involves interrupting stereotypic problem behavior and redirecting the individual to engage in high probability behaviors
7. _____ preventing the completion of a problem behavior by physically intervening as soon as the individual starts to engage in it

Short Answer/Essay

1. Describe three potential side effects of punishment.
2. What is the purpose of procedural guidelines when using a punishment procedure?
3. Describe the roles of functional analysis for identifying the function of a problem behavior and identifying and strengthening an alternative behavior in relation to the efficacy of a punishment procedure.
4. Compare and contrast positive practice and restitutive overcorrection.
5. Describe three ethical concerns related to the use of punishment.

Chapter 15 Test Questions

Multiple Choice

1. Negative punishment involves a decrease in the future rates of behavior due to the
 - A. withholding of an appetitive stimulus contingent on behavior.
 - B. removal of an aversive stimulus contingent on behavior.
 - C. addition of an aversive stimulus contingent on behavior.
 - D. withdrawal of an appetitive stimulus contingent on behavior.
2. The key difference between nonexclusion and exclusion time-out is
 - A. with nonexclusion time-out the individual remains at least partially in the instructional area, and with exclusion time-out the individual is removed from the area.
 - B. exclusion time-out is perceived by the general population as more acceptable than nonexclusion time-out.
 - C. with nonexclusion time-out the individual is removed from the instructional area, and with exclusion time-out the individual remains at least partially in the area.
 - D. exclusion time-out is easier to implement and is likely to occasion less emotional and reactive behavior from the individual compared to nonexclusion time-out.
3. In order for the withdrawal of a stimulus to successfully suppress an individual's behavior, the
 - A. stimulus must be a reinforcer.
 - B. rules regarding withdrawal and access must be explicitly stated.
 - C. individual must be able to regain access to the stimulus at a later time.
 - D. (all of the above).
4. Contingent observation involves the
 - A. individual's removal from the instructional setting for a short period of time.
 - B. individual remaining in the setting but not participating for a short period of time.
 - C. practitioner looking away from the individual for a brief amount of time.
 - D. practitioner briefly stopping an activity while the group waits for it to resume.
5. When using exclusion time-out, the time-out room should be (mark all that apply)
 - A. devoid of potential reinforcers.
 - B. located far away from the instructional setting.
 - C. constantly monitored and supervised.
 - D. free of tables and chairs.
6. Desirable aspects of nonexclusion time-out include (mark all that apply)
 - A. its ease of application.
 - B. its acceptability to the general public.
 - C. collateral decreases in non-targeted behaviors.
 - D. the rapid suppression of behavior.

7. When implementing response cost, the practitioner makes note of the individual's engagement in problem behavior each time while removing the relevant amount of the reinforcer. This may
 - A. reinforce the behavior with attention.
 - B. stigmatize the individual in the presence of their peers.
 - C. improve the individual's understanding of the rules for the procedure.
 - D. prompt the learner to engage in appropriate behavior.
8. The presence of minor lapses in treatment fidelity are likely to result in the response cost procedure
 - A. being unsuccessful.
 - B. worsening the problem behavior.
 - C. still being effective.
 - D. being discontinued.
9. A BCBA was recruited to work with a young boy who climbed on top of all the furniture at his home. The BCBA trained the young boy's mother on the following procedure. When the boy climbs on top of any piece of furniture, immediately pull him down. Tell him, "No climbing" and gently lead him to the chair at the corner of the room with the booster seat attached and sit him in the chair for 2 min. Do not talk to or look at him while he is sitting in the chair. Do not allow his siblings or others to interact with him. Also, turn off the television while he is in the chair. When 2 minutes have passed, the child may get up from the chair and resume his previous activities. The boy's rate of furniture climbing decreased shortly after his mother began implementing the procedure. This procedure most closely exemplifies
 - A. exclusion time-out, time-out room.
 - B. nonexclusion time-out, contingent observation.
 - C. nonexclusion time-out, select space time-out.
 - D. nonexclusion time-out, planned ignoring.
10. A BCBA was coaching a mother through a clean-up activity with her daughter. At one point, the mother instructed the daughter to give her an item and the daughter dropped to the floor and began crying. The BCBA asked the mother to get up, walk a few steps away from her daughter, and turn her back to the child. The mother did as asked and resumed interacting with her daughter after her daughter got up from the floor and stopped crying. This procedure most closely exemplifies
 - A. exclusion time-out, time-out room.
 - B. nonexclusion time-out, contingent observation.
 - C. nonexclusion time-out, select space time-out.
 - D. nonexclusion time-out, planned ignoring.

True/False

1. TRUE or FALSE. The greater the reinforcing value of the time-in setting, the more effective the time-out procedure.
2. TRUE or FALSE. A time-out procedure is still called time-out when it does not result in a decreased level of problem behavior.

3. TRUE or FALSE. Both existing cache response cost and bonus response cost are likely to be equally aversive to an individual.
4. TRUE or FALSE. With response cost, individual reinforcer withdrawals should be as large as possible to ensure they properly function as effective punishers.
5. TRUE or FALSE. Response cost is likely to suppress problem behavior to an acceptable level when there are a small number of omission and commission errors.

Matching

Choose the corresponding answer that best completes the following statements.

- A. Bonus response cost
 - B. Contingent observation
 - C. Planned ignoring
 - D. Exclusion time-out
 - E. Time-in
 - F. Terminate specific reinforcer contact
 - G. Existing cache response cost
 - H. Partition time-out
-
1. _____ involves turning away from the learner while withholding social reinforcers contingent on problem behavior.
 2. _____ involves removing a specific amount of reinforcers from the individual's current supply of previously earned reinforcers.
 3. _____ involves removing the individual from the reinforcing environment contingent on problem behavior.
 4. _____ involves removing a specific amount of reinforcers from the individual's noncontingently provided supply.
 5. _____ involves obstructing the view of the individual while they remain in the time-in setting.
 6. _____ involves allowing the individual to observe ongoing activities, but they are unable to participate or access reinforcers.
 7. _____ is a reinforcer rich setting and its removal is a conditioned aversive.
 8. _____ involves terminating an activity for a specific amount of time contingent on problem behavior.

Short Answer/Essay

1. Why should nonexclusion time-out be the first method of choice when implementing a time-out procedure?
2. What are three factors/perspectives inherent in the definition of time-out?
3. What are the advantages and disadvantages of using a time-out room?
4. Why is it important to enrich the “time-in” setting?
5. Describe the two types of response cost systems. What factors should be considered when choosing one system over the other?

Chapter 16 Test Questions

Multiple Choice

1. The term motivating operation is roughly synonymous with (mark all that apply)
 - A. abolishing operation.
 - B. setting event.
 - C. establishing operation.
 - D. discriminative stimulus.
2. An evocative effect refers to
 - A. a decrease in the current frequency of behavior that has been associated with a particular consequence.
 - B. an increase in the current frequency of behavior that has been associated with a particular consequence.
 - C. an increase in the future frequency of behavior that has been associated with a particular consequence.
 - D. an increase in the current frequency of behavior enabled by the presentation of a repertoire altering stimulus.
3. An abative effect refers to
 - A. an increase in the current frequency of behavior that has been associated with a particular consequence.
 - B. a decrease in the future frequency of behavior that has been associated with a particular consequence.
 - C. a decrease in the future frequency of behavior enabled by the presentation of a repertoire altering stimulus.
 - D. a decrease in the current frequency of behavior that has been associated with a particular consequence.
4. You are scrolling through a news app and stop to read an article that says flu season is here and it will be particularly bad this year. After reading the article, you immediately head out to buy a pack of disposable masks and some hand sanitizer. In relation to buying masks and hand sanitizer, the news article is
 - A. an SD.
 - B. a UMO.
 - C. a CMO.
 - D. a neutral stimulus.
5. You are scrolling through a news app and stop to read an article that says flu season is here and it will be particularly bad this year. After reading the article, you immediately head out to buy a pack of disposable masks and some hand sanitizer. Heading out to the store after reading the article exemplifies
 - A. a value altering establishing effect.
 - B. an evocative behavior altering effect.
 - C. a value altering abolishing effect.
 - D. an abative behavior altering effect.

6. You are scrolling through a news app and stop to read an article that says flu season is here and it will be particularly bad this year. After reading the article, you immediately head out to buy a pack of disposable masks and some hand sanitizer. The particularly bad flu season has a
 - A. behavior altering abative effect on having masks and hand sanitizer.
 - B. behavior altering evocative effect on having masks and hand sanitizer.
 - C. value altering abolishing effect on having masks and hand sanitizer.
 - D. value altering establishing effect on having masks and hand sanitizer.
7. Conditioned motivating operations have
 - A. value-altering effects that are unlearned.
 - B. behavior-altering effects that are a function of a learning history.
 - C. behavior-altering effects that are unlearned.
 - D. value-altering effects that are a function of a learning history.
8. Unconditioned motivating operations have
 - A. value-altering effects that are unlearned.
 - B. behavior-altering effects that are a function of a learning history.
 - C. behavior-altering effects that are unlearned.
 - D. value-altering effects that are a function of a learning history.
9. When the amount of clothes in your dirty clothes hamper reaches a specific height, you wash clothes the next day. Otherwise, if the amount of dirty clothes gets too high, you have to wash more than one load, which requires spending several hours over the weekend at the crowded laundromat. In relation to washing the clothes, the dirty clothes going above a specific height in the hamper is a
 - A. UMO.
 - B. CMO-R.
 - C. CMO-T.
 - D. CMO-S.
10. Your dog sits at the front door indicating he wants to go outside. You immediately begin looking for the dog's leash, so you can take him for a walk. In relation to looking for the leash, your dog sitting at the front door is a
 - A. UMO.
 - B. CMO-R.
 - C. CMO-T.
 - D. CMO-S.
11. You are driving in your car on a sunny clear day when the sun starts to shine in your eyes. You immediately reach for your sunglasses and put them on. In relation to putting on the sunglasses, the sun shining in your eyes is a
 - A. UMO.
 - B. CMO-R.
 - C. CMO-T.
 - D. CMO-S.

True/False

1. TRUE or FALSE. The behavior altering effect of an EO for both reinforcers and punishers results in an increased frequency of behavior.
2. TRUE or FALSE. Value-altering and behavior-altering effects are described as the defining features in the original definition of an establishing operation.
3. TRUE or FALSE. An abolishing operation has a behavior-altering effect which decreases the reinforcement efficacy of a stimulus.
4. TRUE or FALSE. Behavior-altering effects refer solely to the change in frequency or rate of a behavior.
5. TRUE or FALSE. All conditioned motivating operations (CMOs) are motivationally neutral prior to their relation with another MO or stimulus.

Short Answer/Essay

1. Define the two effects that accompany motivating operations. Explain the effects in detail as they relate to reinforcers and punishers.
2. Define behavior altering and functional altering effects. What type of effect is relevant to antecedent stimuli? How are MOs relevant to functional altering effects?
3. Define and provide a novel example of each conditioned motivating operation.
4. Provide three examples of UMOs. Discuss the role of satiation and deprivation as it relates to the example when relevant.
5. Compare and contrast the S^D and MO. Include an example of a four-term contingency to illustrate the similarities and differences between the two concepts.

Chapter 17 Test Questions**Multiple Choice**

1. A discriminative stimulus or S^D is a stimulus in the presence of which a response will
 - A. be reinforced.
 - B. not be reinforced.
 - C. be placed on extinction.
 - D. elicit respondent behavior.
2. Operant stimulus control has been achieved when a response occurs
 - A. in the presence of a specific stimulus and in the presence of stimuli similar to the specific stimulus.
 - B. in the presence of a conditioned stimulus that has been paired with another antecedent stimulus.
 - C. more frequently in the presence of a specific stimulus but rarely occurs in the absence of that stimulus.
 - D. more frequently in the presence of a specific stimulus and often in the absence of that stimulus.
3. Which of the following describe stimulus generalization?
 - A. A response occurs more frequently in the presence of a specific stimulus but rarely occurs in the absence of the stimulus.
 - B. A response occurs in the presence of a specific stimulus and in the presence of stimuli similar to the specific stimulus.
 - C. One response occurs in the presence of a specific stimulus, and a different response occurs in the presence of a different stimulus.
 - D. One stimulus evokes a number of different, but similar, responses.
4. A young child living on a farm is learning about cows. When the child sees a black and white Holstein cow, the child says “cow”. When the child sees a brown Jersey cow, the child does not say cow. When the child sees a dalmatian dog, the child says “cow”. This is an example of
 - A. faulty stimulus control.
 - B. conditional discrimination.
 - C. arbitrary stimulus class.
 - D. stimulus overgeneralization.
5. Which must-have feature would need to be included in order for a fowl to be in the feature stimulus class of “duck” ?
 - A. wings
 - B. webbed feet
 - C. lays eggs
 - D. beak

6. Which group of stimuli exemplify those making up an arbitrary stimulus class?
 - A. seeing a Red Delicious, Empire, Fuji, and Granny Smith, which all evoke the word “apple”
 - B. pictures of a sweater, jersey, sweatshirt, and tank top, which all evoke the word “shirt”
 - C. photographs of a banana, watermelon, strawberry, and pineapple, which all evoke the word “fruit”
 - D. (all of the above)
7. Stimulus salience
 - A. can affect the development of stimulus control.
 - B. refers to the prominence of the stimulus in the person’s environment.
 - C. can depend on the sensory capabilities of the learner.
 - D. (all of the above).
8. An individual with disabilities was being taught to pour milk into a cup. Which of the following constitutes a response prompt?
 - A. The staff demonstrated pouring a small amount of milk into a cup and then set the milk carton in front of the individual.
 - B. The staff covered all the writing on the milk carton so that only the word “milk” was visible and then ask the individual to take the milk out of the refrigerator.
 - C. Prior to teaching, staff explained the steps and rationale involved in “pouring milk” to the individual.
 - D. (all of the above)
9. Which of the following is a stimulus prompt?
 - A. Mary is trying to do laundry but has forgotten the next step. Ashley says to Mary, “Remember, next you need to put the soap in the washing machine.”
 - B. Mary puts the soap in the machine but does not begin putting the clothes in the washing machine. Ashley picks up an article of clothing and puts in the washer, saying “Do this next.”
 - C. After putting the clothes in the washer, Mary attempts to close the lid to the washer. Due to her limited vision, she keeps missing the lid when she reaches for it. Ashley physically guides her hand to the washer lid and puts her hand on the lid.
 - D. After closing the lid, Mary turns the dial to the correct cycle by aligning two red arrows that had been painted on the washer and dial before the session. Mary successfully sets the dial to the correct setting without additional assistance.
10. Which of the following is an example of stimulus shape transformation?
 - A. Taking a line drawing of a bed and slowly changing it into the letters b-e-d to help a child learn to read the word bed.
 - B. Using most-to-least prompting to teach a child to independently write the word “dog”.
 - C. Teaching name writing by tracing the letters in the name and gradually fading out the lines in the model.
 - D. Teaching a child to read the word cat by pairing the word with a picture of a cat and gradually fading out the letters of the word.

True/False

1. TRUE or FALSE. Operant and respondent antecedent stimulus control function in the same manner.
2. TRUE or FALSE. Stimulus generalization and stimulus discrimination are opposite operations.
3. TRUE or FALSE. The controlling function of an antecedent is acquired from pairing with stimulus changes following the behavior in operant behavior and pairing with antecedent stimuli in respondent behavior.
4. TRUE or FALSE. The more similar two stimuli are, the more likely stimulus generalization will occur.
5. TRUE or FALSE. In discrimination training, the S-delta is specifically used to show the condition of zero reinforcement or extinction.
6. TRUE or FALSE. Conditional discriminations operate at the level of a three-term contingency.
7. TRUE or FALSE. Concept development requires discrimination between stimulus classes and generalization between stimulus classes.

Short Answer/Essay

1. Describe how motivating operations and discriminative stimuli are similar and how they differ.
2. Describe the stimulus discrimination training process and provide an example of discrimination training.
3. Provide an example of concept formation and how stimulus discrimination and generalization help build the concept class.
4. Identify and describe four ways to transfer stimulus control from prompts to natural stimuli.

Chapter 18 Test Questions

Multiple Choice

1. In Skinner's analysis of verbal behavior, the meaning of words are classified based on their
 - A. phonemes.
 - B. form.
 - C. morphemes.
 - D. functions.
2. Mands relations depend on
 - A. non-verbal S^Ds and generalized reinforcement.
 - B. verbal S^Ds and specific reinforcement.
 - C. MOs and specific reinforcement.
 - D. MOs and generalized reinforcement.
3. The child is the speaker. Which example/s of the child's verbal behavior is/are mand(s)? (mark all that apply)
 - A. While working on a project, a child asked the teacher, "How do you spell aardvark?"
 - B. While walking through the sanctuary, the child saw a Bengal tiger and said, "big cat".
 - C. The toddler said "beep" while pinching another child's nose and then the other child said, "beep".
 - D. After taking fresh cookies out of the oven, the father asks the child, "Do you want a cookie?" and the child said, "Cookie".
 - E. The dog was barking loudly, and the child told the dog, "Stop it!".
 - F. The child told the toddler, "Don't touch that stove because it is hot".
 - G. The mother says, "Ready. Steady." And then the child said, "Go"!
 - H. After running in the hot sun, the child asked the nanny, "Can I have some water?"
4. Tact relations depend on
 - A. non-verbal S^Ds and generalized reinforcement.
 - B. verbal S^Ds and specific reinforcement.
 - C. MOs and specific reinforcement.
 - D. MOs and generalized reinforcement.
5. The child is the speaker. Which example/s of the child's verbal behavior is/are tact(s)? (mark all that apply)
 - A. While working on a project, a child asked the teacher, "How do you spell aardvark?"
 - B. While walking through the sanctuary, the child saw a Bengal tiger and said, "big cat".
 - C. The toddler said, "beep" while pinching another child's nose and then the other child said "beep".
 - D. After taking fresh cookies out of the oven, the father asks the child, "Do you want a cookie?" and the child said, "Cookie".
 - E. The dog was barking loudly, and the child told the dog, "Stop it!".

- F. The child told the toddler, “Don’t touch that stove because it is hot”.
- G. The mother says “Ready. Steady.” And then the child said, “Go”!
- H. After running in the hot sun, the child asked the nanny, “Can I have some water?”
6. Which type of verbal operant is controlled by verbal S^Ds?
 - A. mand
 - B. tact
 - C. intraverbal
 - D. (all of the above)
 7. In the very early stages of teaching a child to sign, the teacher would model a sign in the presence of the referent object and prompt the child as needed to replicate the sign. The child’s sign is under the control of the teacher’s sign. What type of verbal operant is the child’s response?
 - A. mand
 - B. echoic
 - C. tact
 - D. intraverbal
 8. Which of the following is/are role(s) that a listener plays in a verbal episode? The listener may
 - A. serve as an audience.
 - B. consequence a speaker’s behavior.
 - C. become the speaker.
 - D. (all of the above)
 9. A parent is working with their child on manding for toys. The child likes to feed a stuffed lamb with a baby bottle. The parent gives the child the lamb but not the baby bottle to motivate the child to mand for the bottle. This strategy involves
 - A. creating a UMO.
 - B. creating a CMO-T.
 - C. capturing a CMO-S.
 - D. capturing a CMO-R.
 10. A behavior therapist working with a student asks the student to select the picture of an apple from a comparison array. This type of training procedure is an example of teaching
 - A. auditory conditional discriminations.
 - B. simple verbal discriminations.
 - C. verbal conditional discriminations.
 - D. compound verbal discrimination.

True/False

1. TRUE or FALSE. Formal properties of language involve the topography of the verbal response whereas the functional properties involve the causes of the response.
2. TRUE or FALSE. Verbal behavior makes a distinction between the behavior of the speaker and that of the listener.

3. TRUE or FALSE. The verbal behavior approach is not useful for people who have lost their verbal behavior through disease or injury.
4. TRUE or FALSE. The tact repertoire is extensive and often the primary focus of many language programs.
5. TRUE or FALSE. The textual operant has point-to-point correspondence but not formal similarity between the stimulus and the response product.

Matching

Match the term to the corresponding definition.

- A. mand
- B. tact
- C. echoic
- D. copying text
- E. intraverbal
- F. textual
- G. autoclitic
- H. taking dictation

- 1_____ A type of verbal behavior in which a written verbal stimulus has point-to-point correspondence and formal similarity with a written verbal response.
- 2_____ A type of verbal operant in which a speaker differentially responds to the verbal behavior of others.
- 3_____ Behavior of reading, without any implications that the reader understands what is being read.
- 4_____ A spoken verbal operant that evokes a written, typed, or finger spelled response with point-to-point correspondence and a history of reinforcement.
- 5_____ A verbal operant in which a speaker asks for (or states, demands, implies, etc.) what he needs or wants.
- 6_____ A type of verbal operant that occurs when a speaker repeats the verbal behavior of another speaker.
- 7_____ A type of verbal operant in which a speaker names things and actions that the speaker has direct contact with through any of the sense modes.
- 8_____ A type of verbal behavior where two levels are emitted in one utterance which benefits the listener by providing additional information.

Short Answer/Essay

1. Describe and provide examples of two methods for identifying and controlling value changes in the MO for mand training.
2. Define and provide an example of an “autoclitic relation.”

Chapter 19 Test Questions

Multiple Choice

1. When a person responds accurately to untrained and non-reinforced stimulus-stimulus relations following training on different stimulus-stimulus relations _____ has been demonstrated.
 - A. stimulus control
 - B. conditional discrimination
 - C. stimulus equivalence
 - D. matching-to-sample
2. All of the matching questions on this test require
 - A. conditional discrimination.
 - B. stimulus equivalence.
 - C. simple discrimination.
 - D. motivating operations.
3. When arranging training trials during equivalence-based instruction, sequence effects can be avoided by arranging trial types in a _____ manner.
 - A. random
 - B. balanced
 - C. mass
 - D. alternating
4. You are looking to form classes of synonyms using equivalence-based instruction. You are planning on teaching five different classes. The minimum number of synonyms for each class should be
 - A. 2.
 - B. 3.
 - C. 4.
 - D. 5.
5. Which is the critical test for equivalence?
 - A. training
 - B. reflexivity
 - C. symmetry
 - D. transitivity
6. Behaviorists, such as Sidman, who conducted the early experiments on stimulus equivalence were attempting to explain which phenomenon?
 - A. concept formation
 - B. one-to-one correspondence
 - C. object permanence
 - D. symbolic functioning

7. Observing responses are included in match-to-sample procedures to ensure attending to the
 - A. instructions.
 - B. correct stimulus.
 - C. sample stimulus.
 - D. comparison stimuli.
8. A student is taught to select a quarter when the sample stimulus, \$.25, is presented and to select \$.25 when the sample stimulus is twenty-five pennies. Transitivity would be demonstrated when the sample stimulus is a quarter and they select
 - A. \$.25.
 - B. a quarter.
 - C. twenty-five pennies.
 - D. the sample stimulus.
9. A student is taught to select a quarter when the sample stimulus, \$.25, is presented and to select \$.25 when the sample stimulus is twenty-five pennies. Reflexivity would be demonstrated when the sample stimulus is a quarter and they select
 - A. \$.25.
 - B. a quarter.
 - C. twenty-five pennies.
 - D. the sample stimulus.
10. A student is taught to select a quarter when the sample stimulus, \$.25, is presented and to select \$.25 when the sample stimulus is twenty-five pennies. Symmetry would be demonstrated when the sample stimulus is a quarter and they select
 - A. \$.25.
 - B. a quarter.
 - C. twenty-five pennies.
 - D. the sample stimulus.
11. Which of the following explains why stimuli can be members of multiple stimulus classes?
 - A. discrimination
 - B. motivating operations
 - C. contextual control
 - D. stimulus generalization

True/False

1. TRUE or FALSE. Through equivalence-based instruction, a learner forms four classes of three visual stimuli each. If you teach them to tact one of those stimuli, you would expect each of the other stimuli in the class to evoke the same response.
2. TRUE or FALSE. When training matching-to-sample, the minimum recommended number of comparison stimuli is two.
3. TRUE or FALSE. Reflexivity, symmetry, and transitivity are trained during equivalence-based instruction.

4. TRUE or FALSE. Stimulus equivalence is responsible for the formation of arbitrary stimulus classes, and stimulus generalization does the same for feature stimulus classes.
5. TRUE or FALSE. Relational frame theorists oppose stimulus equivalence as an experimentally validated procedure.

Matching

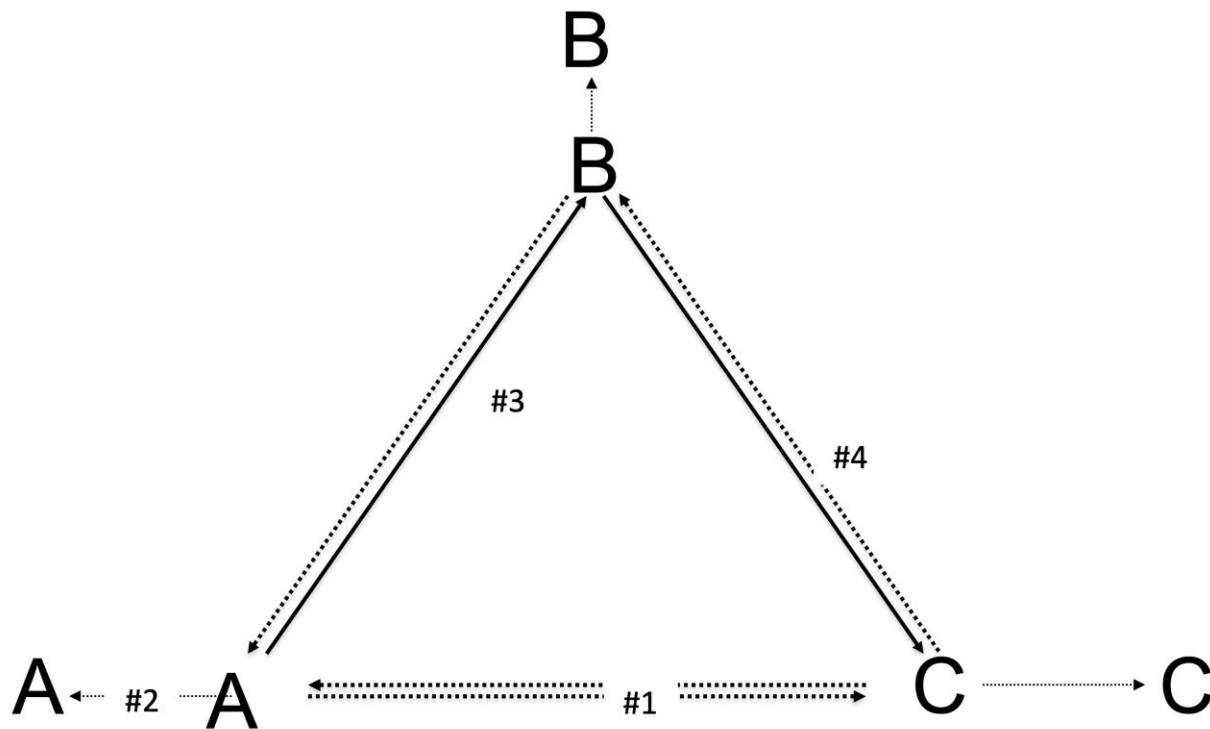
You want to make sure your students know all forms of letters. You think you are going to need to teach a bunch of different forms of each letter. However, you decided to use matching. You taught students to select /a/ when the sample of /A/ was given and /A/ when the sample of /a/ given. You were surprised when the students knew that /a/ was the same as /A/. In this case, which does each of the following represent?

- A. trained
- B. reflexive
- C. symmetrical
- D. transitive

1. ____ Select /a/ when the sample stimulus is /a/.
2. ____ Select /a/ when the sample stimulus is /a/.
3. ____ Select /a/ was the same as /A/.
4. ____ Select /a/ was the same as /A/.

Match the type of relation to the visual representation of the relation in the stimulus equivalence paradigm.

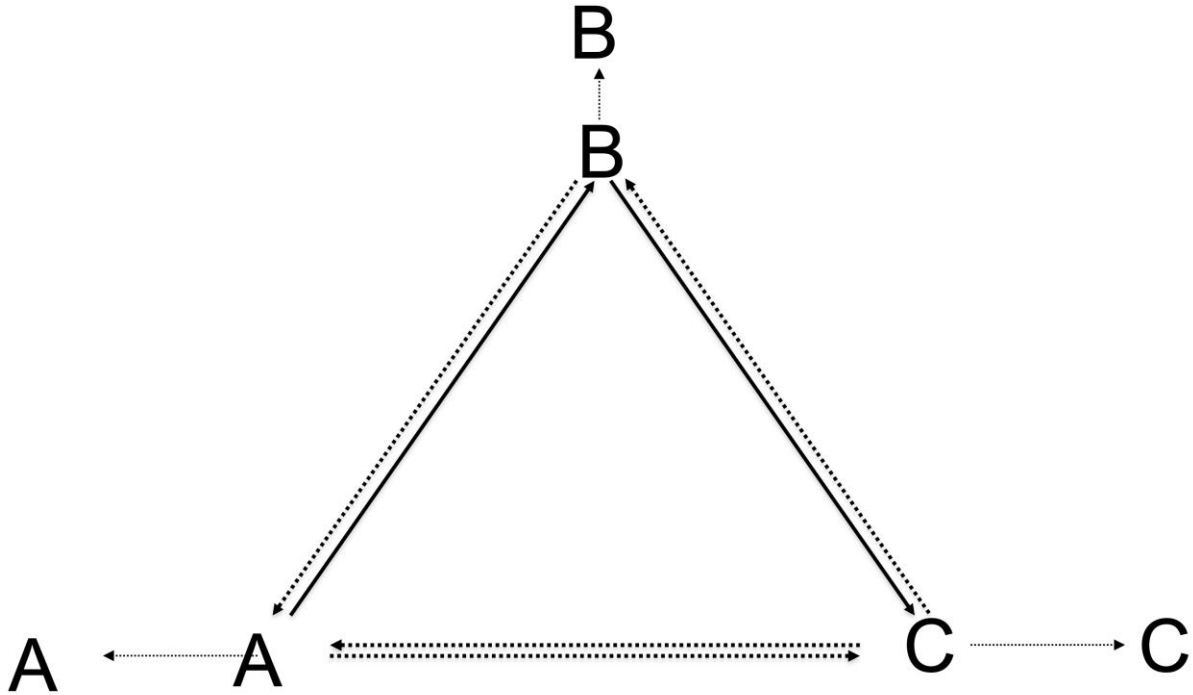
- A. trained
- B. reflexive
- C. symmetrical
- D. transitive



5. ____ #1
6. ____ #2
7. ____ #3
8. ____ #4

Short Answer/Essay

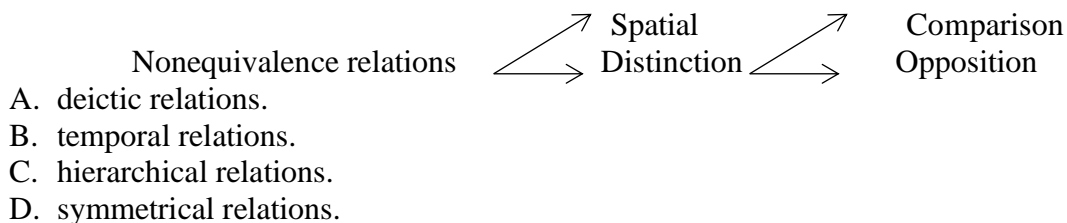
1. In a match-to-sample task, a learner is taught to select an emoji of a sad face when the sample stimulus SAD is presented, and to select SAD when the sample stimulus is a picture of a person crying. They have not demonstrated any other relations prior to training. List ALL of the relations you would expect to emerge through stimulus equivalence.
2. Describe one variation from the traditional match-to-sample procedure that could be implemented when using EBI.
3. List the components of EBI that contribute to the effectiveness of the procedure.
4. Label each of the following elements on the stimulus equivalence paradigm: 1) the dotted lines, 2) the solid lines, and 3) the A, B, and C



Chapter 20 Test Questions

Multiple Choice

- When learners respond to untaught stimuli as though they were interchangeable with taught stimuli, these responses represent (select all that apply)
 - derived relations.
 - emergent relations.
 - distinction relations.
 - generative effects.
- Stimuli become arbitrarily treated as a class based on (select all that apply)
 - topographical features.
 - semantic networks.
 - social-verbal customs.
 - contextually-specific contingencies.
 - psychological flexibility.
- Derived stimulus relations are inherently
 - verbal relations.
 - hierarchical relations.
 - nonequivalence relations.
 - functional relations.
- The diagram below depicts



- Referring to the diagram above, the statement that “distinction includes opposition, but opposition does not include distinction” represents the type of categorization known as
 - asymmetrical class containment.
 - transitive class containment.
 - unilateral property induction.
- If “Comparison” is a member of “Distinction” relations, and “Distinction” is a member of “Nonequivalence” relations, then classifying “Comparison” as a member of “Nonequivalence” is an example of
 - asymmetrical class containment.
 - transitive class containment.
 - unilateral property induction.

7. Deictic relations are associated with (select all that apply)
 - A. hierarchical relations.
 - B. temporal relations.
 - C. perspective shifting.
 - D. incoherent classes.
 - E. spatial relations.
8. A child has learned that *splark* is bigger than *flang*, and *flang* is bigger than *skrunk*. Without additional instruction she could identify that *splark* is bigger than *skrunk*. This derived response is evidence of (select all that apply)
 - A. combinatorial entailment.
 - B. transitivity.
 - C. transfer of function.
 - D. mutual entailment.
 - E. a distinction relation.
9. Little Albert, an infant, became frightened of a white rat when he repeatedly experienced an aversive auditory stimulus in its presence; subsequently he exhibited fear in response to a variety of furry things, including a bearded Santa Claus mask. In behavioral terms, the change in Albert's behavior is an example of
 - A. transformation of function and stimulus generalization.
 - B. stimulus generalization and transfer of function.
 - C. transformation of function and not stimulus generalization.
 - D. stimulus generalization and not transfer of function.
10. In Acceptance and Commitment Therapy, verbal exercises are employed to (select all that apply)
 - A. alter the aversiveness of private events.
 - B. promote mindlessness.
 - C. disrupt the control of private events.
 - D. discourage behavioral flexibility.

Matching

- A. symmetry
- B. transitivity
- C. transfer of function
- D. transformation of function
- E. mutual entailment
- F. combinatorial entailment

1. _____ A general type of derived relation that includes but is not limited to transitivity.
2. _____ When a learner spontaneously can treat stimuli B and C as interchangeable because they have both previously been related as "same" to stimulus A.

3. _____ An example of this particular derived relation would be responding with happiness to stimulus A if it is related as an opposite to stimulus B, which becomes conditioned as aversive.
4. _____ A general term for any derived bidirectional relation in which only one direction has been learned directly.
5. _____ The propagation of a single behavioral function across stimuli that are members of an equivalence class.
6. _____ After learning to respond to stimulus B as if it were stimulus A, a learner can do the reverse without additional instruction.

True/False

1. TRUE or FALSE. Creating new reinforcers via transformation of functions relies on stimulus pairing with existing reinforcers.
2. TRUE or FALSE. Engineering derived relations is attractive for both classroom and clinic because, if well-planned, it can result in “free learning.”
3. TRUE or FALSE. Sidman’s account of derived relations shares with Relational Frame Theory (RFT) the notion that relational responding becomes a generalized operant, analogous to imitation.
4. TRUE or FALSE. The evidence that relating stimuli, as an operant, is a verbal phenomenon is circumstantial, supported in part by the results of research with non-humans.
5. TRUE or FALSE. Research has shown that active responding and feedback are two indispensable features of instruction that is intended to establish stimulus classes.
6. TRUE or FALSE. The term “arbitrarily applicable relational responding” refers to a specific type of relation within a relational frame.
7. TRUE or FALSE. Deictic relations are innate, often manifesting in children before other forms of derived relations.
8. TRUE or FALSE. Simple deictic relations are not examples of perspective shifting.
9. TRUE or FALSE. Arbitrarily applicable relational responding is a behavioral manifestation of what may be subsumed under the construct “intelligence.”
10. TRUE or FALSE. Rule-governed behavior is associated with psychological flexibility because it is sensitive to change by local contingencies.

Short Answer/Essay

1. Citing at least one example from chapter 20 of research on transformation of function, explain how the notion of arbitrarily applicable relational responding forces a reconsideration of the fundamentals of behavior theory?
2. Private events may interfere with personal well-being in at least three ways. Name and provide an example of at least two of these ways.

3. Give an example of a behavior that may disrupt well-being, and explain two possible behavioral mechanisms by which ACT's verbal exercises may disrupt that behavior.
4. Compare and contrast, with respect to an example, the Acceptance and Commitment Therapy (ACT) approach to applied problems with the approach of conventional Applied Behavior Analysis.

Chapter 21 Test Questions

Multiple Choice

1. An antecedent stimulus that evokes the imitative behavior is
 - A. imitation.
 - B. a chain.
 - C. an operant.
 - D. a model.
2. To be considered imitation, a model and the behavior it evokes must have
 - A. formal similarity.
 - B. environmental relations.
 - C. behavioral relations.
 - D. imitative behaviors.
3. All antecedent stimuli with the capacity to evoke imitation are potentially
 - A. planned echoic stimuli.
 - B. unplanned echoic stimuli.
 - C. planned models.
 - D. unplanned models.
4. Teaching learners to do what the model does regardless of the behavior modeled is the major objective of what?
 - A. imitation training
 - B. antecedent control
 - C. formal modeling
 - D. formal similarity
5. If progress breaks down while conducting imitation training, the practitioner should
 - A. reduce the speed of the lesson.
 - B. back up and move ahead slowly.
 - C. change to alternate behaviors then return.
 - D. remove that behavior from the repertoire.
6. A teacher was sitting with a student while they were eating their snack. The teacher rubbed their nose and sniffed. Within one second the student rubbed their nose and sniffed in the same way. Since the student's nose rubbing and sniffing was physically the same as the teacher's, they shared
 - A. formal control.
 - B. antecedent control.
 - C. formal similarity.
 - D. antecedent similarity.

7. Observational learning may or may not involve
 - A. prompting.
 - B. discrimination.
 - C. imitation.
 - D. observing.
8. Two people are walking into a building with their hands full. The first person hits the door with their hip, and the door swings back and hits them in the face. The second person does not hit the door with their hip. This is an example of
 - A. observational learning.
 - B. imitation training.
 - C. vicarious reinforcement.
 - D. response prompts.
9. When learners do what the model does regardless of the behavior modeled without direct training, _____ has been demonstrated.
 - A. extended imitation
 - B. generalized imitation
 - C. discriminated modeling
 - D. novel modeling
10. Observational learning can be differentiated from imitation because observational learning includes observing the
 - A. model.
 - B. prompt.
 - C. consequence of the model.
 - D. MO of the model.

True/False

1. TRUE or FALSE. When the topography of a previous imitation occurs in the absence of the model it is not imitative behavior.
2. TRUE or FALSE. A controlling relation between the behavior of a model and the behavior of the imitator is inferred when a novel model evokes a similar behavior in the absence of a history of reinforcement.
3. TRUE or FALSE. Once an imitative behavior has been demonstrated that behavior comes under the influence of modeled behavior.
4. TRUE or FALSE. Typically developing children and children with developmental disabilities initially acquire many skills by imitating planned and unplanned models.
5. TRUE or FALSE. Delayed behaviors using the topography of an imitative behavior, by definition, are imitative.
6. TRUE or FALSE. In the early stages of imitation training, practitioners should reinforce each occurrence of either a prompted or true imitation.

7. TRUE or FALSE. In order for video-modeling to be effective, the model must be an individual other than the learner.
8. TRUE or FALSE. An imitative repertoire is required for modelling to be an effective prompt.

Short Answer/Essay

1. List the five elements of Striefel's (1974) imitation training program.
2. Compare and contrast a behavior occurring due to controls of a discriminated operant and a behavior occurring due to modeling and imitation. Provide examples to help clarify your answer.
3. List and describe the elements of Striefel's (1974) imitation training program.
4. Provide an example of observational learning.

Chapter 22 Test Questions

Multiple Choice

1. Which is an example of shaping? Teaching someone to sign, “please” by
 - A. first reinforcing lifting the hand, then reinforcing lifting the hand to the chest, then reinforcing lifting the hand to the chest and moving it slightly, and finally - lifting the hand to the chest and moving it in a circular motion.
 - B. first providing full physical assistance to lift the hand to the chest and make a circular motion. Next, provide partial physical assistance to lift the hand to the chest and make a circular motion. Next, show them how you lift your hand to the chest and make a circular motion. Finally, tell them to, “sign please.”
 - C. first telling them to, “sign please”. Next, show them how you lift your hand to the chest and make a circular motion. Then provide partial physical assistance to lift the hand to the chest and make a circular motion. Finally, provide full physical assistance to lift the hand to chest and make a circular motion.
 - D. first teaching lifting the hand, then teaching lifting the hand to the chest, then teaching moving the hand slightly near the chest, then teaching moving the hand in a circular motion near the chest, and finally – putting all the motions together so the person is lifting the hand to the chest and moving it in a circular motion.

2. Laura would like to shape her roommate’s tidiness. The roommate tends to leave her clothes strewn around the house instead of putting them in the clothes hamper in the laundry room. Laura begins by providing praise and cooking dinner when her roommate puts her clothes in the laundry room instead of on the floor around the house. Now, the roommate is consistently piling her clothes on the laundry room floor. Next, Laura plans to praise and cook dinner only when her roommate sorts the laundry into whites and colors into the appropriate laundry basket. (mark all that apply)
 - A. Given how well the roommate is doing, Laura should continue with her plan.
 - B. Laura should proceed in more gradual steps to increase the likelihood of her roommate’s success.
 - C. Laura should stay on the current step and attempt to fade out the cooking dinner reinforcer.
 - D. Laura should stop the intervention at this point, as this is the most she should expect from a roommate.
 - E. The roommate is likely to receive little to no reinforcement for quite some time.

3. Gretchen has been trying to teach Glen, a preschooler, to pull up his pants by himself via shaping. She began by delivering reinforcement for bending over and touching his waistband. Glen is now doing that consistently. Next, Gretchen targeted Glen pulling his pants up a little bit. However, Glen continues to simply touch his pants instead of pulling them up a bit.
 - A. Gretchen should pull up Glen’s pants for him. Glen is not yet ready for the next behavior and will grow into it over time.
 - B. Gretchen should intermittently reinforce touching his waistband to make sure Glen does not lose the skill.

- C. Gretchen should reanalyze her task analysis and chunk the skills into bigger steps.
 - D. Gretchen should add a prompt to pull up the pants to help make the shaping process more efficient.
4. A swim coach gradually increases the amount of time swimmers must hold their breath under water before signaling them to come up. This is an example of
 - A. shaping within response topography.
 - B. shaping across response topographies.
 - C. stimulus fading.
 - D. behavior chaining.
 5. A man is helping his son memorize a poem for class. The son must first correctly recite the first line from memory in order to receive his father's praise. Once the son can recite the first line without error, the father tells him to add on the next line of the poem. This process continues until the son can recite the entire poem by heart. This is an example of
 - A. shaping within response topography.
 - B. shaping across response topographies.
 - C. stimulus fading.
 - D. behavior chaining.
 6. Guidelines from The Modern Principles of Shaping include (mark all that apply)
 - A. break behavior down into large enough pieces to promote the most efficient learning.
 - B. temporarily relax the old criterion when introducing new criterion.
 - C. stick with the procedure until the learner has successfully learned the skill.
 - D. end each session while the learner is still doing well and is eager to learn more.
 - E. go back to the previous criterion if the learner's responding begins to deteriorate.
 7. When nonreinforcement of a response class results in the learner engaging in a topographically different response we call this
 - A. differential reinforcement.
 - B. a successive approximation.
 - C. extinction-induced variability.
 - D. response differentiation.
 8. Throughout the shaping process, the instructor provides reinforcement when the learner emits a response that is slightly different from others within the response class and places other response topographies on extinction until the learner emits another slightly different response. These slightly different responses exemplify
 - A. differential reinforcement.
 - B. a successive approximation.
 - C. extinction-induced variability.
 - D. response differentiation.
 9. Select the necessary term(s) involved in shaping. (mark all that apply)
 - A. task analysis
 - B. differential reinforcement
 - C. extinction induced variability

- D. successive approximations
- E. response differentiation
- F. stimulus generalization

True/False

1. TRUE or FALSE. The process of differential reinforcement during shaping results in response differentiation.
2. TRUE or FALSE. Mavis has been working with a child to shape his handwriting. When Mavis started working with the child, he could hold his pencil and write the letters of his name, but the marks were so faint that one could hardly see them. Over time, Mavis taught the boy to press his pencil hard enough so people could easily see the marks he had made. The shaping procedure Mavis used is an example of shaping across a response topography.
3. TRUE or FALSE. It is not uncommon for problem behaviors to be learned via shaping.
4. TRUE or FALSE. With fading, behavior is changed by gradually changing the antecedent stimulus. Whereas, with shaping, behavior is changed by gradually changing the response requirement.
5. TRUE or FALSE. One way to make the shaping process more efficient is to incorporate response prompts along with the procedure.
6. TRUE or FALSE. When an instructor uses response prompts during shaping, it is not necessary to fade out those prompts over time. The shaping process will automatically eliminate the need for prompts.
7. TRUE or FALSE. When a learner is no longer advancing during shaping (i.e., the learner is not meeting the new criteria for obtaining reinforcement), the instructor should continue to the next successive response approximation within the shaping sequence to ensure the learner continues to contact some reinforcement.
8. TRUE or FALSE. The shaping process will proceed more quickly if the instructor ensures that each successive approximation to the terminal behavior is similar in size.
9. TRUE or FALSE. It is important for trainers to ensure that a successive approximation is well established in the client's repertoire before increasing the criteria for reinforcement.
10. TRUE or FALSE. If a learner is making frequent mistakes during the shaping procedure, the criteria for reinforcement may be getting raised too quickly.

Short Answer/Essay:

1. You are consulting with a caregiver who is implementing shaping to teach a young adult to brush their own hair. The caregiver asks if you think they are changing the criteria for reinforcement "too quickly, too slowly, or just right." You review the data on the learner's performance. What will you look for in order to answer the caregiver's question? How will the data influence your answer?
2. Ma Yao wants to use shaping to teach her dog, Shardu, to play dead. In order to play dead, Shardu must lay on the floor with his feet up in the air for at least 5 s following the command, "play dead". Shardu can already sit, lay down, and roll over on command.

However, he will only sit and lay down for a couple of seconds. What factors should Ma Yao consider when selecting the initial behavior to reinforce and why? What is the best behavior to initially reinforce?

3. Describe a shaping procedure from start to finish. Select the terminal behavior. List the initial behavior to reinforce and the successive approximations (no less than three) to the terminal response. Specify the reinforcer and which behaviors will be reinforced throughout the process.
4. Give a novel example of shaping across a response topography and shaping within a response topography. What are the similarities and differences between the two procedures?
5. Given a novel example of how shaping can be misapplied to inadvertently shape an inappropriate behavior.

Chapter 23 Test Questions**Multiple Choice**

1. Christoph is teaching Sandie to make boxed macaroni and cheese. Christoph helps Sandie perform all steps of the task, except the last one: serve the macaroni and cheese on a plate. Christoph prompts this last step until Sandie can do it independently. Once Sandie has mastered serving the macaroni and cheese on a plate, Christoph helps Sandie preform all steps of the task, except stirring and serving the macaroni and cheese (the last two steps). Christoph is teaching Sandie via
 - A. forward chaining.
 - B. backward chaining.
 - C. total-task chaining.
 - D. shaping.
2. An advantage of backward chaining is the learner
 - A. performs the final behavior that contacts the terminal reinforcer during every instructional trial.
 - B. gets to practice every step of the behavior chain during every instructional trial.
 - C. starts with the first step of the behavior chain during every instructional trial.
 - D. (all of the above)
3. An advantage of forward chaining is
 - A. it may require fewer total responses during some instructional trials due to passive engagement in earlier steps of the behavior chain.
 - B. the learner performs the final behavior that contacts the terminal reinforcer during every instructional trial.
 - C. the learner gets equal practice with every step of the behavior chain during every instructional trial.
 - D. it is easier to link smaller behavior chains together, forming the larger behavior chain necessary to perform a new skill.
4. An advantage of total-task chaining is
 - A. it may require fewer total responses during some instructional trials due to passive engagement in earlier steps of the behavior chain.
 - B. the learner performs the final behavior that contacts the terminal reinforcer during every instructional trial.
 - C. the learner gets equal practice with every step of the behavior chain during every instructional trial.
 - D. it is easier to link smaller behavior chains together, forming the larger behavior chains necessary to perform a new skill.
5. Sunil is teaching Matthew to do his laundry. Sunil has written a 36-step task analysis of the skill. He conducted an initial assessment to identify which steps Matthew could already do and discovered that Matthew is only able to independently open and close the lid of the washing machine. Based on this information, which statement is accurate?

- A. Total task chaining is likely to be inappropriate because the learner has very few of the component skills in his repertoire.
 - B. Backward chaining with leap aheads is likely to be very efficient when the instructor also incorporates the completion of unfinished chains.
 - C. Forward chaining and backward chaining are equally likely to effectively teach the new skill.
 - D. (all of the above)
6. How does one conduct a task analysis of a skill?
- A. Make a sequential list of all the component steps of the skill.
 - B. Write out all individual steps involved in the teaching procedure.
 - C. Create a list of benefits and potential risks associated with learning the skill.
 - D. Make a list of all successive approximations to the terminal behavior.
7. Which represents total-task chaining?
- A. The trainer completes all steps, except the last one (putting the bread together). The learner is taught to put the bread together. Once the learner has mastered that step, the trainer completes all but the last two steps and teaches the learner to complete them. This continues until the learner has mastered all steps in the chain.
 - B. The learner is taught to complete the first step (getting two slices of bread) and the trainer completes the remaining steps. Once the student has mastered that step, the trainer teaches the learner how to complete the first two steps and the trainer completes the remaining steps. This continues until the learner has mastered all steps in the chain.
 - C. The trainer gives the learner an opportunity to complete the first step of the task (getting two slices of bread). If the learner performs the first step correctly, they move on to the next step. If the learner errors, the instructor prompts the response at the necessary level and moves on to the next step. This continues until the learner performs all steps in the chain.
 - D. The trainer gives the learner an opportunity to complete the first step of the task (getting two slices of bread). If the learner performs the first step correctly, they move on to the next step. This continues until the learner makes an error. After the learner makes an error, the trainer ends the task.
8. During an aerobics class, the instructor introduces the class to a new routine. He has everyone perform one step of the routine multiple times and asks, "Has everyone got it?" The students yell, "Yeah!" The instructor responds, "Adding on!" and shows the class another step. Once they have learned that step, the instructor has the class perform the first step, followed by the second step, and "adds on" again. The instructor repeats this process until the class is performing a long, complex routine at the end of the hour. The instructor's procedure exemplifies
- A. total task presentation.
 - B. forward chaining.
 - C. backward chaining.
 - D. stimulus shaping.

True/False

1. TRUE or FALSE. Each stimulus change in a behavior chain serves as an S^D for the subsequent response and as a conditioned reinforcer for the preceding response.
2. TRUE or FALSE. A behavior chain with a limited hold results in performance that is fluent.
3. TRUE or FALSE. Behavior chains make up a small portion of the behaviors we engage in on a daily basis.
4. TRUE or FALSE. If a learner already has a number of behaviors within their repertoire, one might use chaining to teach new skills by arranging those behaviors into unique sequences.
5. TRUE or FALSE. One method for constructing and validating a task analysis is to perform the behavior yourself and write down each step as you perform the skill.
6. TRUE or FALSE. Once you have developed a task analysis, it is not recommended to change the sequence of steps, add steps, or remove steps within the TA, as this may invalidate the TA.
7. TRUE or FALSE. Task analyses should break up the skill into the smallest increments possible (resulting in an increased number of steps). This ensures the TA will be complete and increase the likelihood of the learner's success.
8. TRUE or FALSE. The single-opportunity method of assessing an individual's performance on task analysis behaviors allows the individual one chance to perform the behavior chain prior to training. Whereas the multiple-opportunity method of assessment allows the individual to perform the behavior chain multiple times before initiating training sessions.
9. TRUE or FALSE. When using the multiple-opportunity method to assess a task analyzed skill, there is greater risk of learning during the assessment than there is for the single-opportunity method.
10. TRUE or FALSE. The research literature has repeatedly shown that the total-task chaining procedure is the most effective method of chaining.
11. TRUE or FALSE. With backward chaining, the learner completes the steps of a task in reverse order.

Short Answer/Essay

1. Define a behavior chain and use a novel example to clearly explain the role each component of the chain serves relative to the other components of the chain.
2. What is the advantage of adding a limited hold to a behavior chain?
3. Assume you are teaching an individual how to prepare a bowl of cereal with the following TA. Describe how you would implement forward, backward, and total-task chaining for this skill.
 - i. Collect the materials (box of cereal, container of milk, appropriately sized bowl, and spoon)
 - ii. Open box of cereal
 - iii. Pour correct amount of cereal in bowl
 - iv. Close box of cereal

- v. Open container of milk
 - vi. Pour correct amount of milk in bowl
 - vii. Close milk container
 - viii. Put away container of milk and box of cereal
 - ix. Slightly stir cereal and milk with spoon
4. Consider the task analysis listed in essay question 3 above. Compare and contrast how you would conduct a baseline assessment of a person's performance on this task analysis using the single- versus multiple-opportunity method. Be sure to indicate how the two assessments would be similar and different.
 5. When would you want to interrupt a behavior chain? How would you go about implementing a behavior chain interruption strategy?
 6. Describe five (5) ways S^Ds might contribute to problematic responding in a behavior chain? Describe the strategies to address each problem.
 7. List five (5) factors that can impact an individual's performance on a behavior chain. Describe each factor and how it impacts performance.

Chapter 24 Test Questions**Multiple Choice**

1. Which of the following is NOT a secondary effect of extinction?
 - A. spontaneous recovery
 - B. aggression
 - C. extinction burst
 - D. avoiding the punisher
2. Which of the following are common misuses of the term extinction? (mark all that apply)
 - A. referring to any decrease in behavior
 - B. confusing forgetting and extinction
 - C. using extinction interchangeably with negative reinforcement
 - D. confusing noncontingent reinforcement and extinction
3. When thirsty, a toddler screamed until a sibling finally brought the toddler a drink. Which form of an extinction procedure would be the most appropriate to use in this circumstance?
Extinction of behavior maintained by
 - A. positive reinforcement.
 - B. negative reinforcement.
 - C. automatic reinforcement.
4. When a student was given a work sheet in class, the child whined and crawled under the desk. The student remained under the desk until the teacher removed the work sheet and provided no other work. Which form of an extinction procedure would be the most appropriate to use in this circumstance? Extinction of behavior maintained by
 - A. positive reinforcement.
 - B. negative reinforcement.
 - C. automatic reinforcement.
5. A child spent most of the classroom free time sitting on the floor rocking while waving a toy fan at eye level making the light coming from the window appear to “flicker”. Which form of an extinction procedure would be the most appropriate to use in this circumstance?
Extinction of behavior maintained by
 - A. positive reinforcement.
 - B. negative reinforcement.
 - C. automatic reinforcement.
6. Which statement describes extinction from the perspective of a behavior change tactic?
 - A. provides zero probability of reinforcement for a previously reinforced behavior.
 - B. the diminishing rate of a previously reinforced behavior when it no longer produces reinforcement.
 - C. the functional relation between withholding the reinforcer and the diminishing rate of a behavior.

7. An adult with intellectual and developmental disabilities gets up frequently during the night to talk and check on awake overnight staff in the group home. When an extinction procedure is implemented and staff no longer talk with the individual during the night, the individual gets up even more frequently for the first three nights. This secondary effect of extinction is referred to as a/an
 - A. extinction-induced variability.
 - B. behavioral resurgence.
 - C. extinction burst.
 - D. spontaneous recovery.
8. Which behavior is likely to have the greatest resistance to extinction?
 - A. Making jokes in math class is now being ignored like it had been in science, social studies, and writing class.
 - B. The youth liked the peer attention but creating funny picture memes about the teacher was tedious.
 - C. Crying to get a toy that was being used by another student began when the child started preschool last week.
 - D. Tantrums had allowed the child to obtain candy from grandparents periodically for the past year or so.
9. An adult client with a traumatic brain injury held and rubbed the hands of other people while talking with them. Since this was causing social problems, an extinction program was implemented where others would not speak or make eye contact while the client held or rubbed their hands. In the initial stages of the intervention, the client began to forcefully hold and rub the hands of others and grab people by the face to try to get them to make eye contact. These behaviors represent which secondary effect(s) of extinction?
 - A. behavioral resurgence, response variation
 - B. increased response magnitude, extinction-induced variability
 - C. extinction-induced variability, increased response rate
 - D. extinction burst
10. A behavior analyst developed an intervention which included extinction to decrease uncooperative behavior in a three-year old. Since the behavior had an attention function, the intervention involved withholding attention until the child complied with a request. Which of the following are examples of what the behavior analyst would include to increase the effectiveness of the extinction procedure (mark all that apply)?
 - A. Family members were instructed to ignore most of the child's uncooperative behavior.
 - B. All family members were trained in the procedure and implemented the intervention.
 - C. The intervention included a component to reinforce cooperative behavior.
 - D. The family was instructed to not tell the child about the contingency that was in place for uncooperative behavior.
 - E. There were procedures included to manage induced aggression if it occurred.

True/False

1. TRUE or FALSE. Extinction produces a rapid decrease in the target behavior.
2. TRUE or FALSE. An extinction burst is the reoccurrence of a previously reinforced behavior when reinforcement for an alternative behavior is terminated.
3. TRUE or FALSE. Extinction procedures are contraindicated with behaviors that cause serious injury to the client.
4. TRUE or FALSE. If the behavior analyst does not have the ability to control all the client's access to reinforcement, an extinction procedure should not be implemented.
5. TRUE or FALSE. Spontaneous recovery of the target behavior will be short lived as long as the extinction procedure remains in effect.

Matching

- A. spontaneous recovery
- B. escape extinction
- C. extinction
- D. extinction burst
- E. resistance to extinction
- F. sensory extinction
- G. extinction induced variability
- H. behavioral resurgence

1. _____ A secondary effect of extinction where diverse and novel forms of behavior are emitted.
2. _____ The discontinuing of the reinforcement of a previously reinforced behavior (i.e., responses no longer produce reinforcement.)
3. _____ A behavioral effect associated with extinction in which the behavior suddenly begins to occur after its frequency has decreased to its pre-reinforcement level or stopped entirely.
4. _____ The reoccurrence of a previously reinforced behavior when the reinforcement for an alternative behavior is terminated or significantly decreased.
5. _____ The process by which behaviors maintained by automatic reinforcement are placed on extinction by masking or removing the sensory consequence.
6. _____ The process by which behaviors maintained by negative reinforcement are placed on extinction and no longer produce a removal of the aversive stimulus.

- 7. _____ An increase in the frequency of responding when an extinction procedure is initially implemented.
- 8. _____ Continued responding during an extinction procedure.

Short Answer/Essay

- 1. Explain how extinction of a behavior maintained by positive reinforcement would be different procedurally than extinction of a behavior maintained by negative reinforcement. Give an example of each.

Chapter 25 Test Questions**Multiple Choice**

1. All differential reinforcement procedures use what two principles of behavior?
 - A. reinforcement and extinction
 - B. reinforcement and punishment
 - C. punishment and extinction
 - D. positive and negative reinforcement
2. You are teaching a large group of students who are disrupting class by talking out of turn, laughing, and throwing things at each other. You want to improve their behavior, so you decide to implement a DRA intervention. To do this, you will reinforce
 - A. an appropriate behavior that is incompatible with disruption.
 - B. a rate of behavior that is lower than what is currently occurring.
 - C. any behavior other than disruption.
 - D. an appropriate behavior that is an alternative to the disruptive behaviors.
3. You are working with a student who frequently gets out of the desk seat. You decide to provide reinforcement every time the student is in the desk seat for 5 consecutive minutes and to withhold the reinforcer if the student gets out of seat at any time during the 5 minutes. What type of intervention have you implemented?
 - A. DRI
 - B. FI-DRO
 - C. DRL
 - D. FM-DRO
4. You would like to decrease the number of times a student sharpens pencils during class. However, you do not want to completely eliminate this behavior. Which type of reinforcement procedure should you use?
 - A. DRO
 - B. DRA
 - C. DRI
 - D. DRL
5. You would like to implement an interval DRO procedure with a student with autism to decrease hand flapping so that you can get the student to attend to work more consistently. You conduct baseline observations and find that the student stops hand flapping for about 2 minutes on average. What would an appropriate initial DRO interval be?
 - A. 1 minute
 - B. 2 minutes, 30 seconds
 - C. 1 minute, 45 seconds
 - D. 4 minutes
6. A disadvantage of using DRO is that (mark all that apply)
 - A. it does not teach any new skills.
 - B. there is an initial increase in problem behavior.

- C. it can be very labor intensive for very frequent behaviors.
 - D. unwanted behaviors may be inadvertently reinforced.
 - E. incompatible behaviors may not be in the learner's repertoire.
7. You are working with a young child with Rett syndrome who engages in very frequent self-injurious finger picking, hair pulling, and face scratching. You have observed that sitting on mom's lap while playing with toys is reinforcing, so you decide to use this as the reinforcer. You implement a fixed-momentary DRO using a 5 second interval based on baseline data. Which of the following describes a fixed-momentary DRO procedure most accurately?
- A. Teach the child to mand for "mom". Set a timer for 5 seconds and at the end of 5 seconds, prompt this response. If the child says "mom", allow play time with mom and toys.
 - B. Set a timer for 5 seconds. At the end of 5 seconds, the child can play with mom and toys if there is not finger picking, hair pulling, or face scratching at the that exact moment.
 - C. Set a timer for 5 seconds. At the end of 5 seconds the child can play with mom if there were very few instances of finger picking, hair pulling, or face scratching,
 - D. Teach the child to respond to a "fold hands" cue. Set a timer for 5 seconds and at the end of 5 seconds, prompt this response. If the child engages in "folds hands" correctly, allow play time with mom and toys.
 - E. Set a timer for 5 seconds. At the end of 5 seconds, the child can play with mom if there has been no finger picking, hair pulling, or face scratching during the 5 seconds.
8. What is the difference between DRI and DRA?
- A. DRI involves reinforcing a behavior that is incompatible with the problem behavior, whereas DRA involves reinforcing an alternative behavior that may not be incompatible.
 - B. DRA involves reinforcing anything other than the problem behavior, whereas DRI involves reinforcing any behavior that is incompatible with the problem behavior.
 - C. DRI involves reinforcing an alternative behavior that may not be incompatible with the problem behavior, whereas DRA involves reinforcing a behavior that is incompatible with the problem behavior.
 - D. There is no difference between DRI and DRA.
9. Andrea, a 4-year-old nonverbal child, exhibits noncompliant behavior in the form of refusing to participate when asked to work on art activities at a table. You found that this is not a preferred activity and therefore, breaks from the task would be an effective reinforcer. Which of the following exemplifies an appropriate DRA procedure to use?
- A. Andrea is taught to say "break". Andrea can leave the art table after she has completed the project and then says "break".
 - B. Set a timer for 10 seconds. Andrea can leave the art table if any behavior other than noncompliance occurs. If noncompliance occurs, Andrea must stay at the art table.
 - C. Set a limit on the number of times Andrea is allowed to refuse. If refusals are at or below the limit, Andrea can leave the art table. When the limit is exceeded, Andrea must stay at the art table.
 - D. Andrea can take a break and leave the table after one step of an art task is completed. Andrea must stay at the table if refusals occur.

10. If using DRI to decrease Melinda's hitting other children in the hallway, which behavior would be reinforced as Melinda walks down the hall?
 - A. keeping hands in pockets.
 - B. saying "hi" to peers.
 - C. smiling at peers.
 - D. doing anything other than hitting peers.
11. What is the difference between momentary DRO and interval DRO?
 - A. A momentary DRO is usually conducted for shorter time intervals than an interval DRO.
 - B. In a momentary DRO, the individual is required to engage in an incompatible behavior at the moment the interval ends, and in an interval DRO the target behavior must be absent throughout the whole interval.
 - C. In a momentary DRO, the observer looks for the behavior at the moment the interval ends, and in an interval DRO, the observer looks for the behavior throughout the entire interval.
 - D. A momentary DRO is usually more effective early on in its implementation, and an interval DRO is more effective later in its implementation.

True/False

1. TRUE or FALSE. One advantage to DRI and DRA interventions is that they teach new, desired replacement behaviors.
2. TRUE or FALSE. Reinforcing in-seat behavior for a child who frequently engages in out-of-seat behavior is an example of DRI.
3. TRUE or FALSE. When selecting a DRA or DRI replacement response, one should select a behavior that is not in the learner's current repertoire in order to avoid accidentally reinforcing something associated with the problem behavior.
4. TRUE or FALSE. When designing a DRA or DRI intervention, it is a good idea to use the reinforcers that maintain problem behavior as the reinforcers for the alternative or incompatible behaviors.
5. TRUE or FALSE. Generally speaking, it is a good idea to use momentary DRO to begin your intervention and move to an interval DRO for maintenance purposes.
6. TRUE or FALSE. DRL is the intervention of choice when you do not want to totally eliminate the target behavior.

Short Answer/Essay

1. Explain how a behavior is *decreased* through differential reinforcement.
2. Give an example of DRA using negative reinforcement and identify the consequence for the alternative response and the consequence for the target behavior.
3. When implementing a DRO procedure, explain how you would determine the initial duration of the interval.

4. Explain three (3) different ways a DRO interval can be increased.
5. Explain the difference between full-session and interval DRL and give an example of each.
6. Provide an example of when a practitioner might want to use a spaced-responding DRL contingency.

Chapter 26 Test Questions**Multiple Choice**

1. Contingency independent antecedent strategies
 - A. do not depend on differential consequences for the problem behavior.
 - B. depend on differential consequences for the problem behavior.
 - C. are the same as default antecedent interventions.
 - D. include stimulus control procedures.
2. A client with intellectual and developmental disabilities engages in low level aggression in the form of pushing and squeezing the arm of others because it has resulted in attention in the past. To address these behaviors, the behavior analyst would use NCR for which type of reinforcement?
 - A. automatic
 - B. positive
 - C. escape
3. During instructional time, a teenager who was deaf-blind poked his eye repeatedly to activate his optic nerve and generate a visual sensation. In addition to interventions to prevent injury to the eye, the behavior analyst could consider which of the following NCR reinforcers?
 - A. social physical attention such as using a massager
 - B. visually stimulating objects such as flashing glow sticks
 - C. breaks from the current instructional activity
 - D. sounds from an app that plays different instruments
4. How does a high-probability instructional sequence reduce problem behavior?
 - A. through the abative effects of an AO
 - B. by reducing the potency of reinforcement for noncompliance
 - C. through behavior momentum
 - D. (all of the above)
5. Which is an example of a high-p procedure?
 - A. The teacher asked the child to “touch your nose” and allowed a break from the activity if the child complied.
 - B. The teacher asked the child to count the blocks and after the child complied, gave three simple rapid requests.
 - C. The teacher asked the child to touch three different body parts in rapid succession, and after the child complied, asked the child to sit in a chair.
 - D. The teacher gave simple requests to the child throughout circle time at random intervals and reinforced the child for compliance.
6. Functional communication training is an application of
 - A. DRA.
 - B. DRO.
 - C. DRH.
 - D. (all of the above)

7. Effective use of functional communication training includes
 - A. dense schedules of reinforcement.
 - B. decreased use of verbal prompts.
 - C. behavior reduction procedures.
 - D. schedule thinning.
 - E. (all of the above)
8. A functional analysis showed that a young child with developmental verbal dyspraxia pinched children during free time to get their attention. As part of an intervention package using FCT, the behavior analyst taught the child to
 - A. solicit praise from the teacher by showing the teacher completed work.
 - B. tell the teacher “help me” when the child wanted to approach a group of peers.
 - C. sign and say “play” when approaching other children during free time.
 - D. walk away from groups of children instead of pinching using a DRA.
9. Prior to working on counting skills with a young student who engaged in self-stimulatory hand flapping, the behavior analyst would vigorously ride scooters with the child up and down the driveway for 10 minutes. Then they would begin the session. This is an example of using which antecedent strategy?
 - A. contingent effort
 - B. high-p instructional sequence
 - C. enriched environment
 - D. antecedent exercise

True/False

1. TRUE or FALSE. Contingency dependent antecedent interventions rely on differential consequences for the target or alternative behavior.
2. TRUE or FALSE. Noncontingent reinforcement is an intervention in which stimuli with known reinforcing properties are delivered on a fixed-ratio (FR) or variable-ratio (VR) schedule independent of the learner’s behavior.
3. TRUE or FALSE. Noncontingent reinforcement uses two distinct reinforcement contingencies: positive and negative reinforcement.
4. TRUE or FALSE. Behavioral effects of high-p sequence suggest the abative effects of an abolishing operation (AO) that increases the current value of the reinforcer for non-compliance to low-p requests.
5. TRUE or FALSE. When using a high-p instructional sequences, behaviors should be selected from the current repertoire and the inter-request interval should be short.
6. TRUE or FALSE. Functional communication training establishes an appropriate communication behavior to compete with problem behaviors evoked by an establishing operation.
7. TRUE or FALSE. Functional communication training develops alternative behaviors that are sensitive to establishing operations as is the case in noncontingent reinforcement and high-p request sequences.

Short Answer/Essay

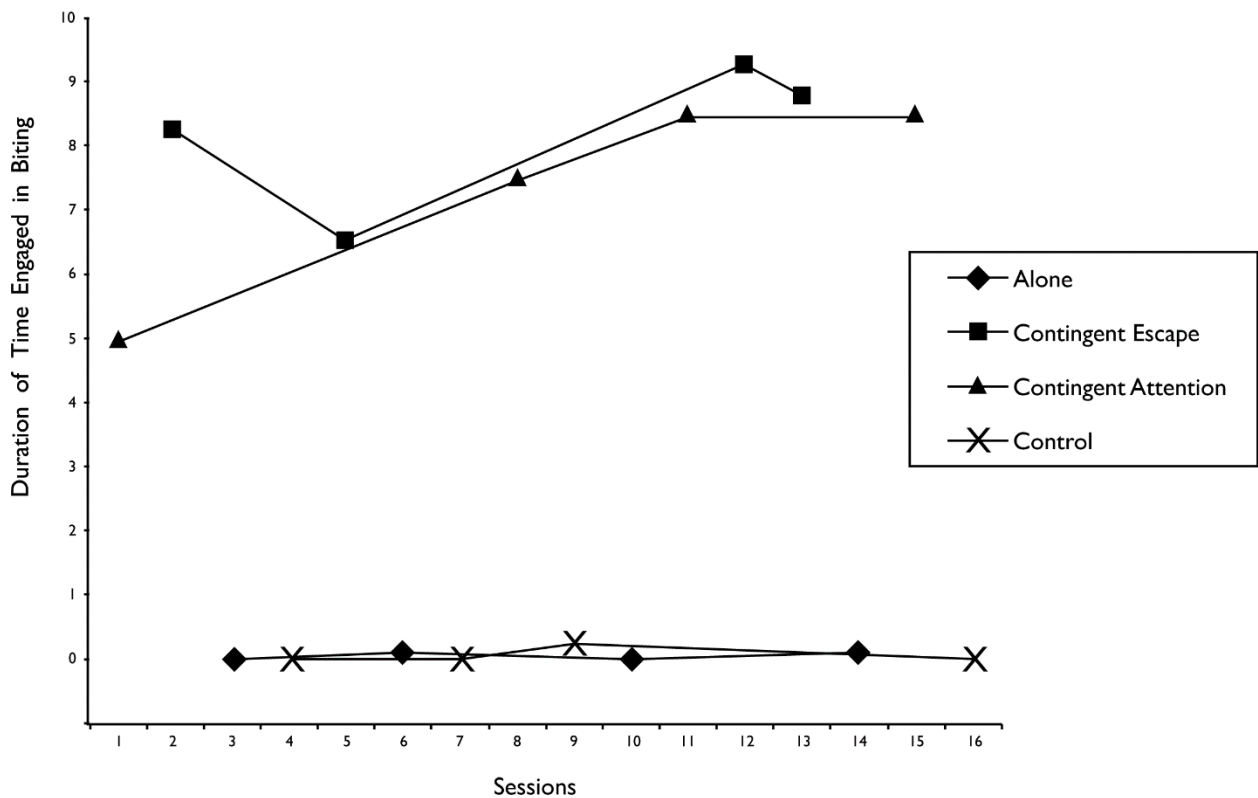
1. Define and describe noncontingent reinforcement and considerations for effective implementation.
2. Define and describe high-p instructional sequence and considerations for effective implementation.
3. Define and describe functional communication training, considerations for effective implementation, and how this procedure differs from other antecedent interventions.

Chapter 27 Test Questions

Multiple Choice

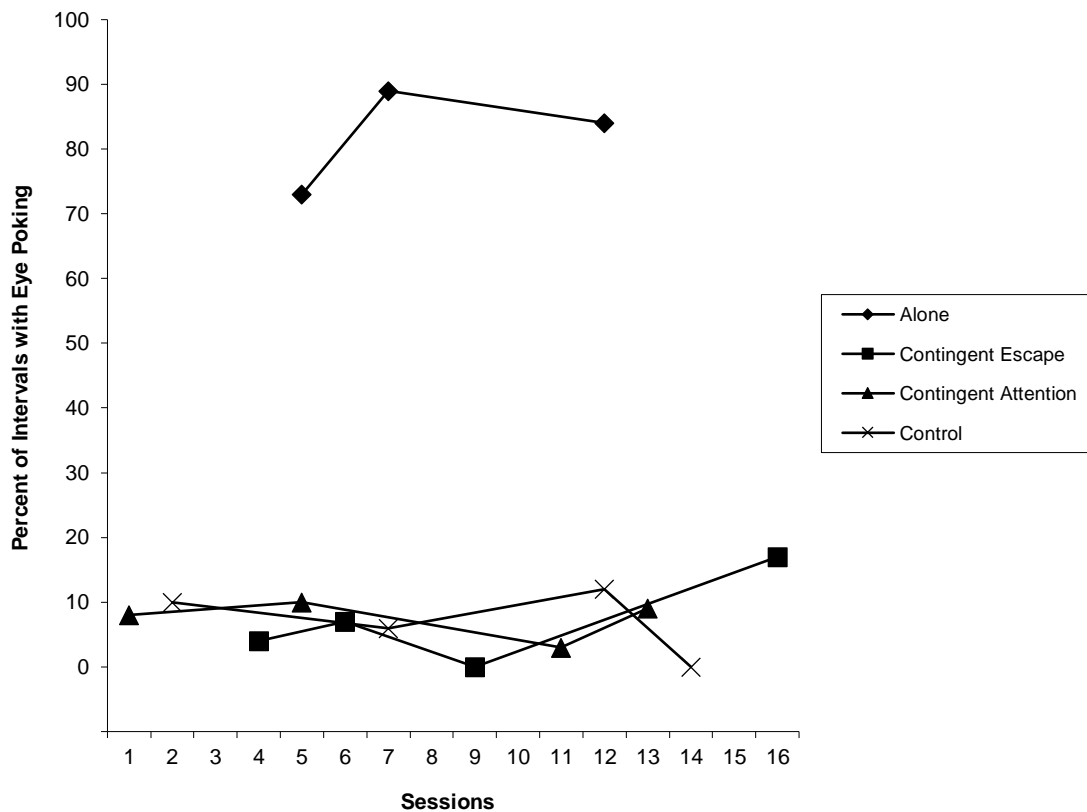
1. Two overarching classes of conditions that maintain problem behavior are
 - A. positive reinforcement and sensory reinforcement.
 - B. socially mediated and automatic reinforcement.
 - C. social reinforcement and tangible reinforcement.
 - D. automatic and negative reinforcement.
2. Once an FBA has been completed, what strategic approach(es) to intervention may be based upon it (select all that apply)?
 - A. teaching alternative behaviors
 - B. altering antecedent variables
 - C. teaching reinforcement and punishment strategies
 - D. altering consequent variables
3. Analog conditions are used in a functional analysis because
 - A. they are easy to contrive, implement, and maintain when attempting to discover the function of a behavior.
 - B. they allow the practitioner to better control the individual exhibiting the problem behavior than in the naturally occurring routine.
 - C. they allow the practitioner to better control the environmental variables that may be related to the problem behavior.
 - D. they are the safest means of discovering the function of problem behavior.
4. Conducting a descriptive functional behavior assessment may involve (select all that apply)
 - A. providing a narrative description of the problem behavior in the environment in which it occurs.
 - B. performing on-going assessment of a problem behavior by interviewing the individuals who most commonly see the problem behavior occurring.
 - C. Continuous recording of the problem behavior in relation to naturally occurring events.
 - D. implementing a scatterplot.
5. Appropriate functional alternatives to problem behavior
 - A. produce the same reinforcer for the individual.
 - B. involve skills already in the individual's repertoire.
 - C. have the same topography as the problem behavior.
 - D. require the same amount of response effort as the problem behavior.

6. A default technology is
- the term used to refer to easy techniques that practitioners use to increase the frequency of alternative appropriate behaviors.
 - the term used for the types of functional assessment that can be readily conducted in a classroom.
 - the process involved in creating the various phases of a functional analysis.
 - the term used to refer to the interventions that individuals may resort to using that are increasingly intrusive, coercive, and punishment-based.
7. Look at the following graph from a functional analysis of Sammy's biting. What would you conclude is the function of Sammy's biting? Select all that apply

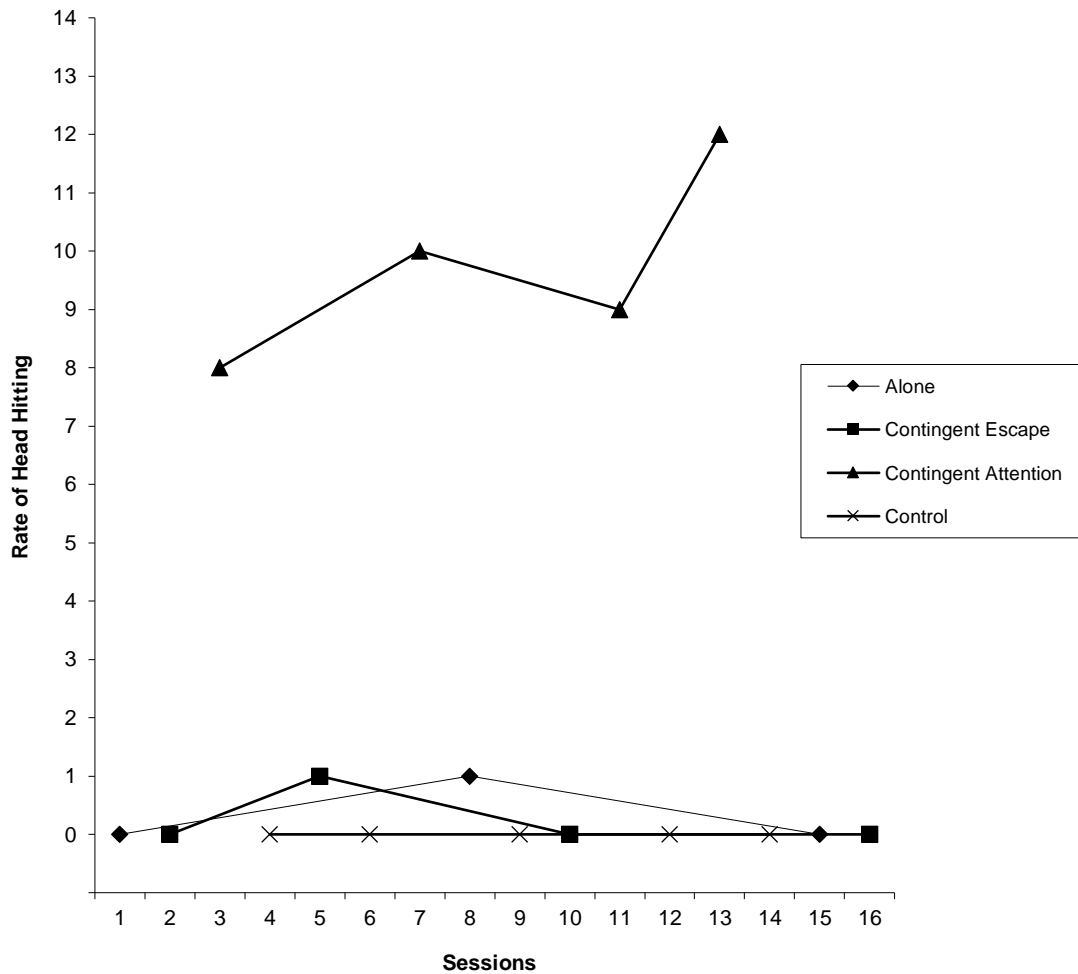


- social positive reinforcement
- automatic reinforcement
- social negative reinforcement
- both social positive reinforcement and social negative reinforcement
- both social negative reinforcement and automatic reinforcement
- undifferentiated pattern

8. Look at the following graph from a functional analysis of Brittany's eye poking. What would you conclude is probably the function of Brittany's eye poking?

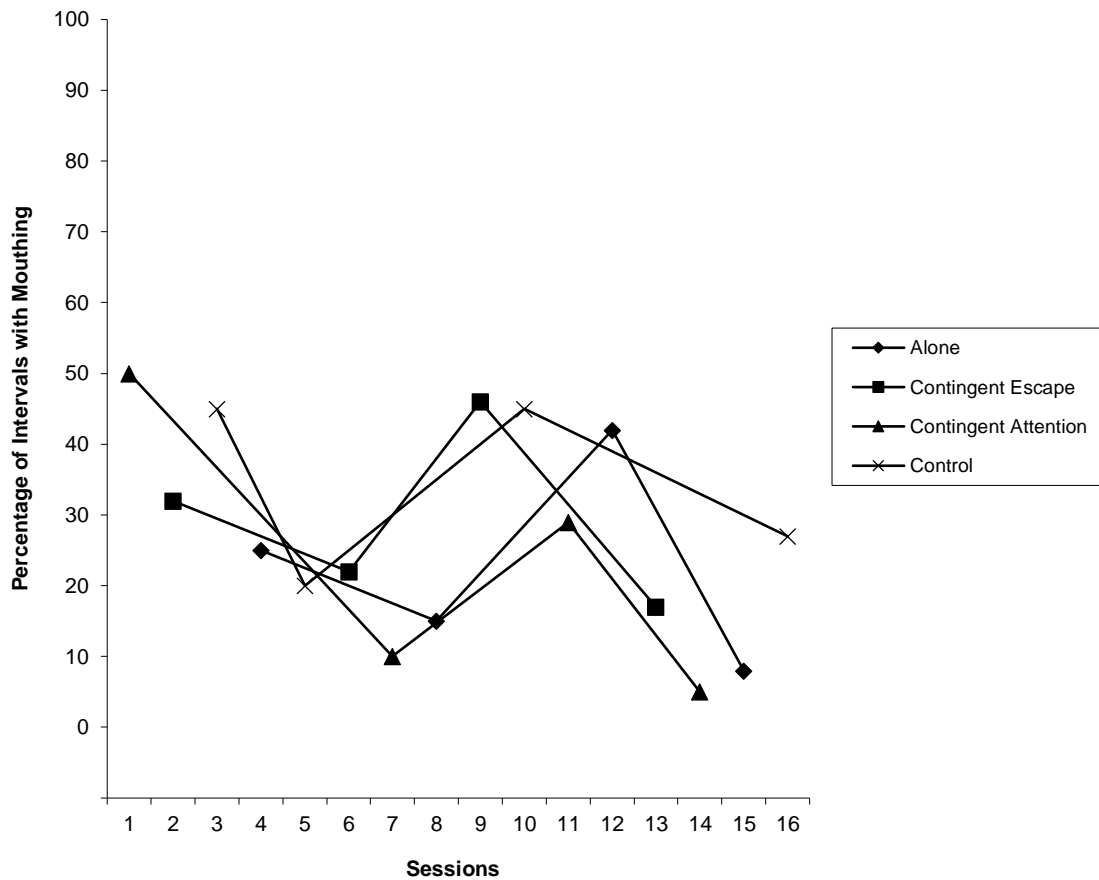


- A. social positive reinforcement
 B. automatic reinforcement
 C. social negative reinforcement
 D. both social positive reinforcement and social negative reinforcement
 E. both social negative reinforcement and automatic reinforcement
9. Look at the following graph from a functional analysis of Michael's head hitting. Based on your conclusions about its maintaining conditions, an intervention most likely to be effective in reducing self-injury would be

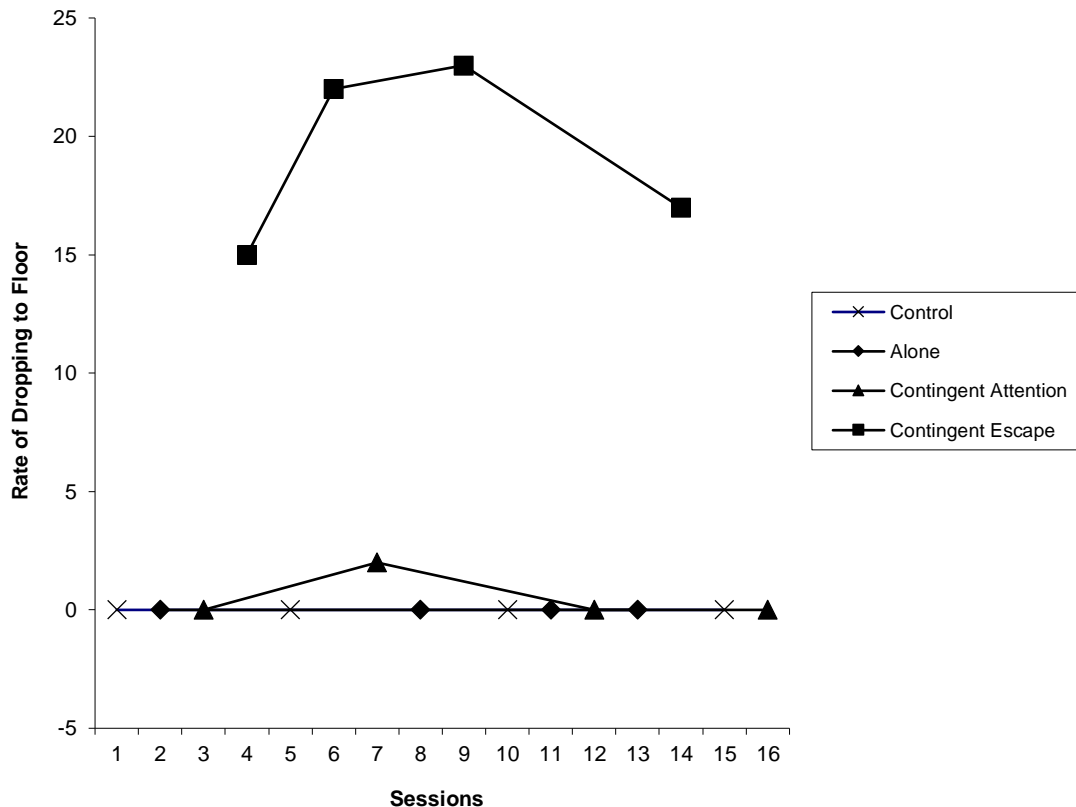


- A. escape extinction and noncontingent attention.
- B. noncontingent attention and learning to request a break.
- C. differential reinforcement of refraining from self-injury.
- D. noncontingent attention and learning to request attention.

10. Look at the following graph from a functional analysis of Laurie's mouthing of clothing and other inedible objects. Based on the results so far, the next step you might take would be to



- A. run 3-5 more analog sessions of each condition.
 B. conduct a precursor analysis.
 C. conduct a trial-based analysis.
 D. consider developing an intervention for automatically reinforced behavior.
11. Look at the following graph from a functional analysis of Tony's dropping to the floor. Based on your conclusions about its maintaining conditions, an intervention most likely to be effective in reducing dropping would be



- A. teaching Tony to exchange an icon when he wants to lie down.
- B. providing Tony with a gait belt and limiting his transitions.
- C. reducing task effort and teaching Tony to sign “Break” during non-preferred activities.
- D. offering Tony alternative choices for getting sensory input.

True/False

1. TRUE or FALSE. Assessment of the function of a behavior can yield useful information with respect to intervention strategies that are likely to be effective.
2. TRUE or FALSE. FBA methods can be classified into two types: 1) functional analysis and 2) descriptive assessment.
3. TRUE or FALSE. One concern about functional analysis that is not a concern with descriptive assessment is the chance of getting a false positive.
4. TRUE or FALSE. Behavior analysts may get interesting information from descriptive and indirect assessments, but these do not provide a basis for developing functional hypotheses.
5. TRUE or FALSE. An FBA can be considered a form of reinforcer assessment.

Matching

For each numbered statement, select all answers that may apply.

- A. ABC continuous recording
- B. Behavior rating scales
- C. Scatterplots
- D. Behavioral interviews
- E. ABC narrative recording

1. ____ Recording procedure used to record the extent to which a target behavior occurs more often at a particular time than others.
2. ____ Type(s) of descriptive functional behavior assessment.
3. ____ Observers record occurrences of the targeted problem behaviors and selected environmental events in the natural routine during a period of time.
4. ____ Data are collected only when behaviors of interest are observed.
5. ____ Uses precise measures and in some cases the correlations may reflect causal relations.
6. ____ Type(s) of indirect functional behavior assessment.
7. ____ Recording is open ended.
8. ____ Data are collected for several days and then analyzed for patterns across time periods.
9. ____ May best be used as a means of collecting preliminary information.
10. ____ Asks informants to estimate the extent to which behavior occurs under specified conditions.

Short Answer/Essay

1. What are at least 2 benefits of conducting functional behavior assessment (FBA) as part of the process for treating problem behavior?
2. Why is it important to identify the conditions that account for a behavior rather than just the topography?
3. Why is it important to understand *why* a behavior occurs before implementing a treatment to change it? Provide an example of how treating a problem behavior before understanding its function can be problematic.
4. Completing an FBA can lead to three main strategies for modifying environmental variables associated with problem behavior. Give an example of each type of modification, with respect to a single hypothetical behavior.
5. What are the advantages and limitations of analog functional analysis?

6. What are default technologies, and the concerns associated with them? How might they be employed, with respect to a specific problem behavior, and how, in that example, might FBA reduce their use?
7. With respect to a specific example, what safety concerns may be associated with functional analysis, and how can they be addressed?

Chapter 28 Test Questions

Multiple Choice

1. In a token economy, the tokens should
 - A. possess intrinsic value to a learner.
 - B. be tangible items like coupons or poker chips.
 - C. be generalized, conditioned reinforcers.
 - D. all of the above
2. When setting up a token economy, it is best to
 - A. define a large number of behaviors for which tokens will be delivered so that the economy has the broadest application.
 - B. be certain that the learners possess the prerequisite skills for any target behaviors.
 - C. apply the same criteria to all learners in the environment.
 - D. avoid luxury backup items because they evoke counter-control.
3. When determining exchange ratio in a token economy, one guideline is that
 - A. the initial ratio between the number of tokens earned and the price of backup items should be small.
 - B. the initial ratio between the number of tokens earned and the price of backup items should be large.
 - C. as token earning increases, the cost of backup items should decrease.
 - D. if token earning decreases, the cost of backup items should increase.
4. A method for withdrawing a token system is to gradually
 - A. increase the number of responses required to earn a token.
 - B. decrease the length of time the token economy is in effect.
 - C. make more of activities and privileges used as backup items be those found in the untrained setting.
 - D. all of the above.
5. The Good Behavior Game could be useful when a practitioner
 - A. wishes to avoid developing multiple individual plans.
 - B. suspects it will take a long time to change a behavior.
 - C. fears that learners may place undue pressure on their peers.
 - D. isn't interested in social behavior.
6. A teacher uses a group contingency with her students. She states the following rule: "If everyone gets 100% on their spelling test this week, I will turn cartwheels down the hall for you." This is an example of a(n)
 - A. independent group contingency.
 - B. dependent group contingency.
 - C. interdependent group contingency.

7. A parent tells their children, "Anyone who earns all 'A's on his or her report card will get \$50 at the end of the semester." This is an example of a(n)
 - A. independent group contingency.
 - B. dependent group contingency.
 - C. interdependent group contingency.
8. A teacher says: "Everyone, you have math homework tonight. Tomorrow, I will draw a name from a hat. If that person has completed his/her homework and remembered to bring it back to school, everyone will get extra recess." This is an example of a(n)
 - A. independent group contingency.
 - B. dependent group contingency.
 - C. interdependent group contingency.
9. Problems with scapegoating in group contingencies may be avoided if the behavior analyst
 - A. sets high performance criteria for all students.
 - B. provides noncontingent reinforcement to the victim.
 - C. implements contingency elements randomly.
 - D. uses interdependent contingencies.
10. When implementing a group contingency, one should
 - A. focus on problem behavior.
 - B. avoid the use of feedback.
 - C. suspend individual behavior change programs.
 - D. monitor both individual and group performance.
11. Important features of a contingency contract include (mark all that apply)
 - A. description of the reward(s).
 - B. method of recording whether or not the learner has engaged in the required task.
 - C. procedure for exchanging tokens for backup reinforcers.
 - D. criterion for the required task.
12. Ms. Aguilera developed a contingency contract with the intention of helping her teenager to complete his chores. After a week he has only met the criterion twice. Of the following changes she could make, the one most likely to remedy this problem would be to
 - A. add a performance record to the contract and post it near the areas of the chores.
 - B. post the contract near the areas of the chores and raise the reward.
 - C. add a performance record to the contract and raise the criterion.
 - D. post the contract near the areas of the chores and reduce the reward for each missed chore.

True/False

1. TRUE or FALSE. The effectiveness of a token as a reinforcer depends largely on the variety of backup reinforcers for which they can be exchanged.
2. TRUE or FALSE. One should avoid combining token systems with other procedures, such as level systems. The procedure becomes too complicated and cumbersome to be effective when one does this.
3. TRUE or FALSE. At least initially, tokens should be delivered at the end of the day rather than immediately following a target behavior. This teaches children to delay reinforcement.
4. TRUE or FALSE. Initially, token stores should be open frequently.
5. TRUE or FALSE. If set up correctly, a group contingency can facilitate positive social interactions with peers.
6. TRUE or FALSE. When writing a contingency contract, it is okay for the contract to be a verbal agreement and not written down anywhere.
7. TRUE or FALSE. Contingency contracts are often combined with other procedures.
8. TRUE or FALSE. Contingency contracts are most effective in school settings. Their application in other settings is somewhat limited.
9. TRUE or FALSE. A contract you write with yourself is a valid form of contingency contracting.
10. TRUE or FALSE. Contingency contracts should be displayed visibly.

Short Answer/Essay

1. Give an example of how a level system can be used with a token economy.
2. When a learner doesn't earn tokens or tests the system, how should a behavior analyst respond to the situation?
3. Explain 3 things you should consider if you decide to include a response cost component in a token economy.
4. With reference to a hypothetical example, name and explain at least 3 management issues you must consider when implementing a token economy.
5. An interdependent group contingency can be implemented in at least 3 different ways. Describe at least 2 of them and give a novel example of each.
6. Describe three different situations for which you might use group contingencies, one for each type (independent, dependent, interdependent), and explain your choice.
7. Describe a situation for which a contingency contract might be useful and write a sample contract that includes all the necessary components.
8. You are consulting to parents whose 10-year-old daughter has been increasingly noncompliant and aggressive to her younger sibling. Describe the process you would go through with the family to help them develop the contingency contract for their daughter.

Chapter 29 Test Questions

Multiple Choice

1. Self-management is best defined as the personal application of behavior change tactics
 - A. that produces a desired improvement in behavior.
 - B. that optimizes access to reinforcement.
 - C. in order to replace bad habits with good ones.
 - D. that improves self-control.
2. When behavior analysts discuss “self-control,” the term refers to (select all that apply)
 - A. a possible outcome of self-management, not the means by which it is achieved.
 - B. self-management, with which it is interchangeable.
 - C. the independent variable in a self-management program, not the dependent variable.
 - D. impulse control as a target of intervention.
3. The use of progressive delay, intervening activities, or commitments can
 - A. reduce the likelihood of choosing a larger, later reward.
 - B. increase the likelihood of choosing a smaller, sooner reward.
 - C. reduce delay discounting.
 - D. increase delay discounting.
4. Advantages of self-management include (select all that apply)
 - A. promoting the generalization and maintenance of behavior change.
 - B. reducing work for teachers and parents having to do with students/children.
 - C. suitability for targeting private events.
 - D. the fact that a small repertoire of self-management skills can control many behaviors.
 - E. the fact that once in place, it requires little oversight or evaluation.
5. Antecedent based self-management tactics include
 - A. removing materials for a desired behavior.
 - B. performing the final steps of a behavior chain.
 - C. providing response prompts.
 - D. (all of the above.)
6. Self-monitoring can be made more effective (select all that apply)
 - A. by monitoring the most important dimension of the target behavior.
 - B. if it is easy to do.
 - C. if monitoring responses occurs as little as possible.
 - D. when the need for supplementary cues or prompts can be avoided.
 - E. when accurate self-recording is guaranteed.

7. Self-monitoring is often part of an intervention package that may include
 - A. self-assessment.
 - B. reinforcement delivered by others.
 - C. self-administered consequences.
 - D. (all of the above.)
8. Performance-management contingencies are best viewed as
 - A. primarily a function of self-administered operant reinforcement.
 - B. rule-governed analogs of reinforcement and punishment contingencies.
 - C. largely a matter of negatively reinforced guilt avoidance.
 - D. simple and well-understood.
9. The self-management tactic to which Skinner referred to as “doing something else” is a key element of
 - A. habit reversal.
 - B. massed practice.
 - C. self-instruction.
 - D. self-directed systematic desensitization.
10. If self-instruction among children is not producing desirable results, it may be because they
 - A. already possess the target response in their repertoire.
 - B. have a history of being reinforced for following self-instructions.
 - C. are focusing on behavior most subject to consequences.
 - D. are not fully implementing the procedure.

True/False

1. TRUE or FALSE. A desired change in the target behavior must occur for self-management to be demonstrated.
2. TRUE or FALSE. Discounting the value of delayed rewards is a phenomenon associated with greater impulse control.
3. TRUE or FALSE. Antecedent-based self-management tactics include provision of stimulus prompts and bringing challenging work under an array of stimulus conditions.
4. TRUE or FALSE. Manipulating motivating operations involves behaving in a way that creates a certain state of motivation that, in turn increases (or decreases as desired) the subsequent frequency of the target behavior.
5. TRUE or FALSE. Self-monitoring is a tactic that was originally conceived as a method of instructional assessment.
6. TRUE or FALSE. Self-evaluation involves the comparison of a person’s performance by himself/herself with goals or standards of other individuals.

Short Answer/Essay

1. Many schools have codes of conduct that include some variation on being safe, respectful, and responsible. Operationalize one of these terms as it might apply to an elementary or middle school child, and briefly describe a self-monitoring program to support that behavior. Be sure to explain how your program meets recommended guidelines; for example, describe how you will make self-monitoring easy for the child to do, the schedule for doing it, etc.
2. A client enlists your help to improve a health-related behavior (weight loss, smoking cessation, exercise, etc.). Choose and define a behavior and design a self-management treatment package for this individual that includes at least one antecedent and one consequence-based tactic. What additional steps might you take to promote the success of the program?

Chapter 30 Test Questions

Multiple Choice

1. The extent to which a learner emits the target behavior in conditions that are different from those that were present during instruction is known as
 - A. setting/situation maintenance.
 - B. response generalization.
 - C. setting/situation generalization.
 - D. response maintenance.
2. The extent to which a learner continues to perform the target behavior after a portion or all of the intervention responsible for the behavior's initial appearance in the learner's repertoire has been withdrawn is
 - A. setting/situation maintenance.
 - B. response generalization.
 - C. setting/situation generalization.
 - D. response maintenance.
3. The extent to which a learner emits untrained responses that are functionally equivalent to the trained target behavior is
 - A. setting/situation maintenance.
 - B. response generalization.
 - C. setting/situation generalization.
 - D. response maintenance.
4. Behavior that was initially selected and shaped under one set of conditions may be recruited and recombined by a different set of contingencies, and take on a new function in a person's repertoire, in a process known as
 - A. contingency adduction.
 - B. stimulus equivalence.
 - C. faulty stimulus control.
 - D. overgeneralization.
5. The strategy for promoting generalized behavior change by teaching the full range of relevant stimulus conditions and response requirements is
 - A. teaching sufficient stimulus examples.
 - B. teaching sufficient response examples.
 - C. conducting a general case analysis.
 - D. programming common stimuli.
6. Making the instructional setting similar to the generalization setting involves (mark all that apply)
 - A. teaching self-management skills.
 - B. employing "don't do it" examples.
 - C. programming common stimuli.
 - D. all of the above.

7. The rationale for teaching sufficient stimulus examples is that
 - A. the fewer examples used during instruction, the more likely the learner will respond correctly to untrained examples or situations.
 - B. the more examples used during instruction, the more likely the learner will respond correctly to untrained examples or situations.
 - C. the more examples used during instruction, the less likely the learner will respond correctly with untrained response topographies.
 - D. the fewer examples used during instruction, the less likely the learner will respond correctly with untrained response topographies.
8. The success of using delayed rewards depends on (mark all that apply)
 - A. the indiscriminability of the contingency.
 - B. the learner learning the rule regarding emitting the target behavior at one time and receiving a reward later.
 - C. the person delivering the reward.
 - D. signaling the reinforcement schedule in effect.
9. Generalization across subjects is also referred to as
 - A. vicarious reinforcement.
 - B. ripple effect.
 - C. spillover effect.
 - D. all of the above.
10. John was taught by his teacher to say, "Hello" when greeting people. Now when he meets people he not only says "hello," but also says: "hi," "good to see you" and "hey there." John's behavior change is an example of
 - A. response elaboration.
 - B. response generalization.
 - C. response adduction.
 - D. response maintenance.

True/False

1. TRUE or FALSE. The total environment where instruction occurs, including any aspects of the environment, planned or unplanned, that may influence the learner's acquisition and generalization of the target behavior is referred to as the generalization setting.
2. TRUE or FALSE. Faulty stimulus control occurs when a target behavior comes under the restricted control of an irrelevant antecedent stimulus.
3. TRUE or FALSE. Contingency adduction is the emergence of accurate responding to untrained and unreinforced stimulus-stimulus relations following the reinforcement of responses to some other stimulus-stimulus relations.
4. TRUE or FALSE. Changes in the behavior of people not directly treated by an intervention as a function of treatment contingencies applied to other people is known as generalization across subjects.

5. TRUE or FALSE. A generalization map involves the combination of generalized treatment effects across time, settings, behaviors, and subjects.
6. TRUE or FALSE. A naturally occurring contingency includes any contingency of reinforcement (or punishment) designed and implemented by a behavior analyst or practitioner to achieve acquisition, maintenance, and/or generalization of a targeted behavior change.
7. TRUE or FALSE. An indiscriminable contingency is one in which the learner cannot predict whether the next response will produce reinforcement; in this respect it is similar to intermittent reinforcement.
8. TRUE or FALSE. CRF should only be utilized during initial acquisition of a skill for a learner.
9. TRUE or FALSE. A “behavior trap” is defined as the process of selecting teaching examples that represent the full range of stimulus variations in the generalization setting.
10. TRUE or FALSE. The ripple effect and spillover effect refer to generalization across settings for an individual subject or participant.

Short Answer/Essay

1. Choose an example of a skill you would like to teach, and explain how you would promote each of the three major types of generalized behavior change.
2. List and discuss two potential advantages/benefits of programming common stimuli.
3. A number of suggestions for teaching loosely were made by Baer (1999). Name five of these recommendations for teaching loosely and provide a rationale as to why each suggestion may be pertinent to a learner’s performance of a target behavior(s).
4. When teaching sufficient stimulus examples, the actual number of examples needed varies as a function of a number of factors. List and discuss three of these factors, with respect to a hypothetical example.

Chapter 31 Test Questions

Multiple Choice

1. When a behavior analyst is considering an intervention, which of the following options addresses the question “what is worth doing”? Whether
 - A. the goals of intervention are closely aligned with those of the staff working with the client.
 - B. the cost of implementing the intervention is balanced with the potential benefits to the client.
 - C. the intervention is consistent with the practitioner’s values, culture, and preferred treatment practices.
 - D. the decisions being made reflect ethical self-regulation of the practitioner.
2. A client is engaging in such significant and serious behaviors that the practitioner feels the need to act quickly and implement an intervention that will result in rapid reduction of the problem behavior. Expediency at the expense of considering the long-term ramifications of this decision represents which type of ethics?
 - A. deontological
 - B. utilitarian
 - C. situational
 - D. teleological
3. Which of the following documents outlines standards for professional conduct and ethical practices of behavior analysts? (mark all that apply)
 - A. Statement on the use of Time-out and Edible Reinforcement
 - B. The Professional and Ethical Compliance Code for Behavior Analysts
 - C. The Right to Effective Education
 - D. Statement on Restraint and Seclusion
4. Which of the following is NOT a right to effective behavioral treatment, as outlined by the Association for Behavior Analysis International in 1989?
 - A. The right to treatments based on positive reinforcement.
 - B. The right to a therapeutic environment.
 - C. The right to treatment by a competent behavior analyst.
 - D. The right to the most effective treatment procedures available.
5. Which behavior analyst is practicing within their area of competence?
 - A. José was trained as a behavior analyst working with children with autism. He is currently practicing behavior analysis in a facility for adults with intellectual and developmental disabilities.
 - B. Sally was trained as a behavior analyst working in organizational behavior management. Recently, she was offered and accepted a job as a behavior specialist in a local school district.

- C. Shu Lin was trained in experimental analysis of behavior, specializing in the effects of cannabinoids on food restriction and food choices in rats. She was recently asked to consult on the food refusal behavior of a young child at risk for failure to thrive.
 - D. Rahul, who is a BCBA-D, has worked with young children and adults assessing and developing treatments for their severe problem behaviors. He was recently hired to serve as a behavior consultant in his local school district.
6. Informed consent requires (mark all that apply)
 - A. explicit permission before any assessment or treatment begins.
 - B. full disclosure of the assessment and treatment procedures.
 - C. that the person receiving services has the capacity to decide.
 - D. that the person receiving services gives consent voluntarily.
 7. When an individual is deemed incapacitated and cannot provide informed consent a behavior analyst should (mark all that apply)
 - A. proceed with an assessment and intervention without obtaining consent.
 - B. ask staff who work with the individual to provide consent.
 - C. obtain the consent from a surrogate or guardian of the client.
 - D. refuse to continue with the case and give notice to the client.
 8. A BCBA received a referral for an individual with profound disabilities and no vocal, verbal repertoire, who engages in serious self-injurious behavior in the form of head hitting. Staff report that the behavior emerged rather suddenly about a month ago and has been increasing in frequency and intensity. After obtaining consent, the BCBA
 - A. designs a punishment-based intervention because the behavior is self-injurious and requires immediate, rapid reduction.
 - B. recommends seeking a consultation to evaluate potential medical or biological influences underlying the self-injury.
 - C. begins training and reinforcing “hands in lap” and “hands in pocket” as behaviors incompatible with hand-to-head.
 - D. begins implementing a functional analysis of head hitting.
 9. Which sources should behavior analysts rely upon to guide their practice? (mark all that apply)
 - A. peer-reviewed articles in reputable journals
 - B. direct and frequent measures of behavior
 - C. published case studies of successful interventions
 - D. scientific articles in nonpeer reviewed journals
 10. A behavior analyst works with a young child named Ben with ASD who engages in delayed echolalic speech. During free play, the practitioner observes the child reprimanding a doll for having wet pants, referring to the doll as “Ben”. Then the child grabs the doll and shakes it repeatedly. Additionally, there appears to be some bruising on the Ben’s arm. The behavior analysts should
 - A. contact the parents and discuss the observations and get their side of the story.
 - B. speak with the classroom teacher so the teacher can check into the issue.

- C. make a report of potential abuse to the authorities.
 - D. develop a data collection procedure to establish a pattern of behavior.
11. A behavior analyst is participating in a treatment forum on social media for children with diagnoses on the autism spectrum. One of the ABA students on the forum describes a toilet training protocol being used in the classroom and issues that are occurring with prompt dependency in cueing a child to the bathroom. An appropriate way for the behavior analyst to respond to this student would be to (mark all that apply)
- A. describe strategies the practitioner has experience with for correcting prompt dependency.
 - B. provide a recommendation for a treatment article that may be helpful.
 - C. provide a protocol for preventing prompt dependency for children with ASD.
 - D. provide search topics for the student to find relevant information.

True/False

1. TRUE OR FALSE. “*Ethics*” is a fluid concept where the definition of “right” and “wrong” change over time in a culture and may be different from one culture to another.
2. TRUE OR FALSE. Some practices and actions may be legal but unethical.
3. TRUE OR FALSE. Shortly after initiating service, behavior analysts should discuss the limitations to confidentiality with clients and document this discussion.
4. TRUE OR FALSE. Major violations of professional codes of conduct are typically “frowned upon” by an organization but rarely result in expulsion from the organization or revocation of certifications or licenses.
5. TRUE OR FALSE. It is acceptable to state that you have a license that you do not yet possess if you feel you have the same skills as a credentialed person and it will make you more credible with a family or client.
6. TRUE OR FALSE. There are some limited occasions where it is appropriate to proceed with treatment in the absence of consent.
7. TRUE OR FALSE. Behavior analysts are especially at risk for conflicts of interest in the form of multiple relationships.

Short Answer/Essay

1. Explain what it means to be “self-regulating” in relation to ethics. What does one need to do to be self-regulating?
2. Identify and explain at least 4 ways a behavior analyst can maintain and expand professional competence.
3. Describe the factors that guide deciding whether an individual has the capacity to make an informed decision.

4. When informing a client about a proposed treatment, what are the salient aspects of treatment that must be shared?
5. List at least 2 questions you should ask yourself in order to evaluate whether you are treating clients with dignity.
6. Identify four factors you should consider when evaluating whether a proposed intervention is likely to be successful.
7. Identify and describe at least 3 recommended practices for behavior analysts to follow on social media to maintain client confidentiality and be consistent with the Compliance Code.

Chapter 1 Answer Key

Multiple Choice

1. C
2. A
3. C
4. B
5. A
6. B
7. D
8. D
9. A
10. B
11. D
12. D
13. C
14. B, C, F

True/False

1. TRUE.
2. TRUE.
3. FALSE. The highest level of scientific understanding is control, and when functional or causal relationships are able to be demonstrated.
4. FALSE. Determinism is the assumption upon which science is predicted, that the universe is a lawful and orderly place, and events occur as the result of other events.
5. FALSE. It is known as “translational” research.
6. FALSE. Psychology in the early 1900’s was dominated with the study of consciousness, images, and other mental processes.
7. TRUE.

Short Answer/Essay

1. Answers should include some variation of the following response: there are three levels of understanding within science: prediction, description, and control. Each level of understanding contributes to the overall knowledge base within a given field. Description is the level of science involving the collection of facts about observed events that can be quantified, classified, & examined for possible relations with other known facts. Description often suggests hypotheses or questions for additional research. Prediction is the relative probability that when one event occurs, another event will or will not occur. Prediction is

primarily based on repeated observation revealing relationships between various events. Prediction demonstrates correlation between events and enables preparation. Control is the highest level of scientific understanding in which functional relations can be derived. The overarching purpose/goal of science is to achieve a thorough understanding of the phenomenon under investigation by seeking to discover real truths about the phenomenon.

2. Answers will vary. Answers should include information about a functional relation such as: A functional relation is only achieved through control and involves a specific change in one event (dependent variable), that can reliably be produced by specific manipulations of another event (independent variable), and the change in the dependent variable was unlikely to be the result of other extraneous factors (confounding variables). In addition, answers should include an example of a functional relation for a human organism.
3. Answers will vary. Answers should include a brief description of radical behaviorism, mentalism, and methodological behaviorism. Learners may also include explanations of Watsonian psychology or S-R psychology and behavior as it was viewed in the early 1900's. Answers should elaborate on each of the explanations of behavior by comparing and contrasting and/or providing concrete examples of how an individual with this philosophy would view behavior.

Chapter 2 Answer Key

Multiple Choice

1. C
2. B
3. A
4. D
5. B
6. A
7. C
8. D
9. A, D, E
10. A, B, D
11. B
12. C
13. D

True/False

1. TRUE.
2. FALSE, operant conditioning is a stimulus-response-stimulus relationship in which stimuli *evoke* responses.
3. FALSE, Reinforcement and punishment are principles of behavior, not specific behavior-change tactics.
4. TRUE.
5. FALSE, extinction is not defined as removing a preferred item, but as withholding reinforcement for a previously reinforced response the effect of which is a gradual decrease in the occurrence of the behavior.

Short Answer/Essay

1. A response is a specific instance of behavior. Behavior usually refers to a larger set or class of responses that share certain topographical dimensions or functions. Examples will vary.
2. Two basic effects stimulus changes have on behavior
 - (a) An immediate but temporary effect of increasing or decreasing the current frequency of the behavior and/or,
 - (b) A delayed but relatively permanent effect in terms of the frequency of that type of behavior in the future

Fill-ins

3. A. Positive Reinforcement
4. B. Positive Punishment
5. C. Negative Reinforcement
6. D. Negative Punishment
7. Examples will vary but each must include (a) the terms “antecedent,” “behavior,” and “consequence,” (b) specific examples of each (e.g., teacher says, “Line up,” student lines up, teacher says “Points for everyone!”), and (c) reference to the future probability of that type of response (students more likely to line up—or perhaps follow similar directions—when asked).
8. A history of reinforcement is a unique set of experiences each individual accumulates over his or her lifetime. The history of reinforcement culminates into a unique repertoire of responses that have been selected, shaped, and maintained. Individual differences in responding to current stimulus conditions can be analyzed in terms of each individual’s unique history of reinforcement and repertoire. Individuals also present “varying sensitivities” to stimuli and differences in response mechanisms which should also be taken into account when discussing individual differences.
9. Ontogeny describes how selection by consequences (contingencies of reinforcement) *operates during the lifetime* of an individual organism and is considered a “*conceptual parallel*” to Darwin’s natural selection (phylogeny, innate characteristics selected by the contingencies of survival over successive generations). Examples will vary but should reflect understanding of the fact that ontogenic behaviors are operant (i.e., learned, or a function of a history of reinforcement) and phylogenetic behavior is respondent/reflexive.
10. Positive and negative reinforcement are similar in that both operations increase the future probability of behavior under comparable circumstances. A difference between positive and negative reinforcement is that their effect is brought about by a different type of stimulus change: positive reinforcement involves the presenting or increasing the intensity of a consequent stimulus; negative reinforcement involves withdrawing or decreasing the intensity of a consequent stimulus. Examples should reflect the distinction between doing something that has produced positive consequences as opposed to doing it to avoid aversive consequences (e.g., writing a paper on a topic of interest—or even to get a good grade or impress someone—as opposed to writing the paper to avoid failing a class or getting a bad grade or as an alternative to, for some, the less preferred option of taking a test),
11. Positive and negative punishment are similar in that both operations result in a reduced probability of a given response class in the future, under comparable circumstances. A difference between the operations is that positive punishment involves presenting or increasing the intensity of a consequent stimulus, while negative punishment involves withdrawing or decreasing the intensity of a consequent stimulus. Examples should involve a given type of response that occurs because it has resulted in producing an aversive stimulus event in the past, or occurs to avoid the loss of preferred stimuli (e.g., not speeding because in the past it resulted in a painful accident, as opposed to not speeding because in the past it has resulted in the loss of money in the form of a fine).

12. A principle of behavior (e.g., positive reinforcement) is a description of a functional relationship between behavior and one or more of its controlling variables that has thorough generality across organisms, species, settings, and behaviors.

A behavior-change tactic (e.g., time-out from positive reinforcement; differential reinforcement of other behavior [DRO]) is a technologically consistent method of changing behavior that has been derived from one or more basic principles of behavior.

13. Motivating operations are events that alter the current *value* of stimulus changes as reinforcement or punishment. For example, an increase in sodium intake may make water more effective as reinforcement. Discriminative stimuli, in contrast, are antecedent events that signal the *availability* of reinforcement contingent upon a specific response. When thirsty, features of a vending machine or water cooler are discriminative for responses that have produced liquid refreshment.
14. Stimulus control refers to the differential rates of operant responding observed in the presence or absence of antecedent stimuli. In operant conditioning, the antecedent stimuli acquire the ability to control operant behavior by having been paired with certain consequences in the past. For example, carrying an umbrella is much more likely to occur when we see grey clouds or hear a forecast for inclement weather than when the sun is shining or the weather report calls for blue skies.

Chapter 3 Answer Key

Multiple Choice

1. A
2. B
3. D
4. C
5. D
6. A
7. D
8. B
9. B
10. B
11. A
12. B
13. C
14. A

True/False

1. TRUE.
2. FALSE. A topographical definition classifies behavior in terms of the shape or form of the behavior.
3. TRUE.
4. FALSE. An ecological assessment provides descriptive data about the person's environment but does not address the basic purpose of behavioral assessment.

Short Answer/Essay

1. Benefits of interviews include generating lists of potential behaviors of concern, direct assessment of verbal behavior, identification of environmental antecedents and consequences, and determining the extent to which significant others are willing and able to assist in interventions.
2. Standardized tests are administered in a specific way with consistent scoring procedures. Some tests assess behavior in relation to population norms. Many are indirect measures of behavior and most do not produce results that can be directly translated into target behavior. Curriculum-based assessments can be direct measure of academic behavior. Administration of standardized tests is often controlled by licensing requirements. Direct observation consists of direct and repeated observation of the client's behavior in their natural environment. Observation requires the full attention of the observer on the person of interest

for a specified period of time. Direct observation yields a descriptive, temporally sequenced account of antecedents, behaviors, and consequences. Observations contain descriptions of target behaviors that can be used for intervention.

3. Reactivity refers to the effects of an assessment procedure on the behavior being assessed. It is more likely to occur when observations are obtrusive, and the person is aware of the observation. The presence of the observer in the setting is a potential source of reactivity. Unobtrusive observation procedures reduce the likelihood of reactivity. Behavior analysts should use observation methods that are as unobtrusive as possible. Repeating observations reduces the effects of reactivity. Effects of reactivity should be considered when interpreting data.
4. Habilitation is the degree to which a client's repertoire maximizes short- and long-term reinforcers and minimizes short- and long-term punishers for both the person and others. Behavior analysts can use this principle to guide the selection of target behavior by prioritizing behavior that will increase a client's access to reinforcers and decrease their exposure to punishers. The behavior analyst must try to identify behavior that will be the most useful to the client.
5. Normalization refers to the use of progressively more typical environments, expectations, and procedures to develop behavior in clients that is as close to the cultural norm as possible. It is a philosophy rather than a specific technique. Normalization impacts how behavior analysts select behavior and interventions. Age and setting appropriate behavior and interventions should be selected and outcomes should focus on the normalization of the client's experience in relation to their community. This may result in different behavior or interventions being selected than would be chosen in a clinical environment.
6. Ethical considerations for the behavior analyst include whether they have the right to intervene, the individual or a surrogate has the authority to grant permission for assessment and intervention, that permission has been granted, the target behavior is socially valid, and the client's functional needs will be met through intervention. The effects of the intervention on the client and stakeholders should also be considered.
7. Observable and measurable terms are beneficial because they promote agreement among practitioners and stakeholders regarding the target behavior, the nature of the intervention, the replacement behavior, and the environmental variables related to the behavior. This agreement promotes greater understanding and can build consensus in relation to identifying target behaviors, determining outcomes, and evaluating progress towards those outcomes.
8. If a problem behavior is to be eliminated or reduced, the practitioner must identify an adaptive replacement behavior and develop contingencies in the intervention plan to ensure the new behavior is learned. This is important because problem behavior serves a function for the client and to eliminate the behavior without replacing it means that access to reinforcement or escape from punishers will be denied.

9. A general goal can result in the focus of intervention being placed on related and indirect behaviors that are not really the intended outcomes of the intervention. A more specific outcome goal should be used that addresses the specific, observable behavior which, when mastered, will result in the more global goal being achieved. For example, a general goal of on-task behavior can be achieved by directly targeting attention to materials, task completion, and remaining seated.
10. A behavior cusp is a behavior that exposes the person to new environments, specifically to new reinforcers and punishers, new responses, new stimulus controls, and new communities of maintaining or destructive contingencies. An example is learning to read. A pivotal behavior is a behavior that produces corresponding modifications or co-variations in other adaptive, untrained behaviors (e.g., attending behavior).
11. Including clients, family, and/or staff in the goal determination process can minimize and resolve conflicts in the priorities of different stakeholders. Active participation can avoid and resolve goal conflicts by increasing communication and awareness of assessment outcomes.

Chapter 4 Answer Key

Multiple Choice

1. B
2. D
3. A
4. B
5. A
6. B
7. C
8. B
9. D
10. C
11. B

True/False

1. FALSE. Measurement is the process of applying quantitative labels to events.
2. TRUE.
3. TRUE.
4. FALSE. The amount of time that elapses between two consecutive instances of a response class is called interresponse time.
5. TRUE.

Matching

1. D
2. A
3. F
4. B
5. G
6. E
7. C

Short Answer/Essay

1. Answer should include: To obtain answers to questions about the existence and nature of functional relations between socially significant behavior and environmental variables.
2. Answer should include: Optimizing effectiveness; verify the legitimacy of practices touted as “evidence-based”; identify treatments based on pseudoscience, fad, fashion, or ideology; be accountable to clients, consumers, employers, and society; or achieve ethical standards.
3. Answer should include: A variety of procedures for detecting and recording the number of times a behavior of interest is observed. Devices include wrist counter, digital counters, abacus wrist and shoestring counters, masking tape, pennies, buttons, paper clips, and pocket calculators.
4. Answer should include: Whole-interval recording divides the observation into a series of equal time intervals and at the end of each interval, the target behavior is recorded if it occurred throughout the entire interval. Partial-interval recording divides the observation period into a series of equal time intervals and at the end of each interval the behavior is recorded if it occurred at any point during the interval.
5. Answer should include: Comparing the relative efficiency of two or more treatments or instructional methods, assessing learner competence in acquiring a set of concepts, or as a dependent measure of a specific skill.
6. Answer should include: Topography, which refers to the physical form or shape of a behavior, and magnitude, which refers to the force or intensity with which a response is emitted.
7. Answer should include: Duration is appropriate for behavior which occurs continuously over extended periods of time (e.g., play). It is also appropriate if the goal of intervention is to increase or decrease the length of time a target behavior occurs.
8. Answer should include: The procedures were developed because it is not possible or feasible to observe behavior continuously and therefore frequent, brief intervals for observation are more manageable.
9. Answer should include: The main advantage of momentary time sampling procedures is that the observer does not have to attend to the participant(s) or behavior continuously as they must with other measurement systems. They are only required to attend for a brief, specific moment in time.
10. Answer should include: The variability in data that exists because of the way that it is measured and examined. All time sampling procedures provide an estimate of the actual occurrence of behavior. The procedure used will affect the data collected.
11. Answer should include: Measurement by permanent product measures the impact of a behavior on the environment by examining a durable product that remains after the behavior is finished. It is not a specific procedure but refers to the time that the behavior is measured (i.e., after instead of during). Permanent products can be natural, like completed worksheets, or contrived, like video tape.

12. Answer should include: The behavior change goals and expected direction of behavior change, the relative ease of detecting occurrences of the behavior, the environments where and times when the behavior will be measured, and the availability and skills of personnel who will observe and record the behavior

Chapter 5 Answer Key

Multiple Choice

1. C
2. D
3. B
4. C
5. A
6. C
7. D
8. D
9. D
10. A
11. D

True/False

1. TRUE.
2. FALSE. Observers should receive systematic training prior to data collection.
3. FALSE. Observers should be naïve and should not receive feedback about the extent to which their data confirm or run counter to hypothesized results or treatment goals.
4. TRUE.
5. FALSE. A mean of 80% agreement does not imply accuracy – IOA simply means that 2 or more observers agreed that the behavior occurred or did not occur. Accuracy must be evaluated against a true value.

Matching

Equations

1. B
2. C
3. D
4. A

Terms

1. F
2. A
3. E

4. C
5. D
6. B
7. H
8. G

Short Answer/Essay

1. Valid measurement requires the following elements: measuring socially significant target behaviors directly, measuring a dimensions of the target behavior relevant to the question or concern about the behavior, and ensuring that the data are representative of the behavior's occurrence under conditions and during times that are most relevant to the question or concern about behavior. Validity is compromised when any of these elements are suspect.
2. Three threats to measurement validity in Applied Behavior Analysis include the following: when measurement is indirect, when the wrong dimension of the target behavior is measured, and/or when measurement is conducted in such a way that the data it produces are an artifact of actual events.
3. Three common causes of measurement artifacts include: discontinuous measurement, poorly scheduled measurement periods, and using insensitive or limiting measurement scales.
4. Factors that contribute to human measurement error: poorly designed measurement systems, inadequate observer training, and expectations about what the data should look like.
5. Ways to reduce the negative effects of a complex measurement system include decreasing the number of simultaneously observed individuals or behaviors, decreasing the duration of observation sessions, and increasing the duration of time intervals. Consider requiring additional practice during observer training, establish a high criterion for mastery of the observational code, and provide frequent feedback to observers.
6. Observer skills include learning the following: definitions for each response class or event to be measured, a code or symbol for each variable, a common set of recording procedures, and a method for correcting mistakes.
7. Observer drift usually entails a shift in the observer's interpretation of the definition of the target behavior from that used in training. The drift causes unintended changes in the way data are collected and may produce measurement error. Observer reactivity may also cause measurement errors; however, these errors are the result of the observer's awareness that others are evaluating the data.
8. Four purposes for conducting accuracy assessments include: 1) to determine early on in an analysis whether the data are good enough to serve as the basis for making experimental or treatment decisions; 2) to enable the discovery and correction of specific instances of measurement error; 3) to reveal consistent patterns of measurement error, which should lead to the overall improvement of the measurement system; and 4) to assure consumers that the data are accurate.

9. Calibrating measurement instruments entails comparing the data obtained by the measurement tool against a true value. It is important to calibrate a measurement instrument, a human or mechanical device, so that measures are more accurate. Calibration of timing devices such as a stopwatch or countdown timer could be made against a known standard such as the “atomic clock.”
10. Four benefits for calculating interobserver agreement (IOA): 1) IOA may be used as a basis for determining the competence of new observers, 2) IOA over the course of an experiment can assist in the detection of observer drift, 3) A high level of interobserver agreement increases the confidence that the definition of the target behavior was clear and unambiguous and the measurement system not too difficult, 4) Consistently high levels of IOA across multiple observers increases the confidence that variability in the data is not a function of which observers are collecting data
11. In research, interobserver agreement should be assessed during each condition and phase of a study and be distributed across days of the week, times of day, settings, and observers.
12. Researchers should obtain and report IOA for all measures of each dependent variable, during each condition of a study.
13. More stringent and conservative methods of calculating IOA should be used over methods that are likely to overestimate actual agreement as a result of chance. In addition, the degree of behavior change revealed by the data should also be considered when determining an acceptable level of IOA.

Chapter 6 Answer Key

Multiple Choice

1. C
2. D
3. A
4. D
5. C
6. B
7. A
8. C
9. D
10. B
11. C
12. D
13. A

True/False

1. FALSE. Graphs are considered an excellent tool for feedback and use during personal behavior management programs.
2. TRUE.
3. FALSE. You should not connect data points across condition change lines, when a significant span of time has passed without data collection, across discontinuities of time, if data were lost or destroyed, or if data represent follow-up or post-check measurements.
4. TRUE.
5. TRUE.
6. FALSE. Line graphs on which the data points are the same distance from one another are equal-interval graphs.

Matching

1. B
2. F
3. A
4. D
5. E
6. C

7. C
8. A
9. B
10. D
11. E
12. A
13. C

Short Answer/Essay

1. a low, stable level of responding
2. rapidly increasing, variable trend
3. gradually increasing, stable trend
4. The benefits of graphic displays over other displays of behavioral data include: provides practitioner with immediate access to ongoing and dynamic behavior change; allows for the exploration of interesting variations in behavior; provides a device to aid in the interpretation of behavior change; provides a conservative method for determining the significance of behavior change; encourages and enables independent judgments about behavior change; and serves as an effective source of feedback in personal behavior management plans.
5. The fundamental properties common to all behavioral data include level, trend, and variability.
6. Strengths of using bar graphs include: quick and easy comparison of performance across participants or conditions; useful for displaying and comparing discrete sets of data that are not related to one another by a common underlying dimension by which the horizontal axis can be scaled; and provides visual summary of different conditions of an experiment (e.g., baseline/intervention for a group of participants).

Limitations of using bar graphs include: does not have distinct data points representing successive response measures through time; and unable to discuss variability or trends in data paths.

7. Cumulative graphs are preferable when the total number of responses made over time is important, when progress toward a specific goal can be measured in cumulative units of behavior, when the graph is used as a source of feedback for the participant, and when the target behavior can occur or not occur only once per observation session.
8. It is important for behavior analysts to maintain direct and continual contact with the behavior under investigation because behavior is a dynamic and on-going process. Changes in the behavior under investigation/targeted for change forms the empirical basis for important decision making, for example, whether to continue with the current procedure, to try a different intervention, or to reinstitute a previous condition.

9. The answer may include: six x10 cycles on vertical axis, response rates ranging from .000695 per minute to 1,000 per minute can be charted, time on horizontal axis, and consistent display of celeration.

Chapter 7 Answer Key

Multiple Choice

1. A
2. A
3. D
4. C
5. C
6. D
7. A
8. B
9. B
10. B
11. D

True/False

1. FALSE. Although at least one subject is involved, most studies involve more than one participant.
2. FALSE. Subjectivity is not warranted; a needed level of objectivity will result from collecting baseline data.
3. FALSE. For example, an ineffective intervention will yield no change from baseline, thus no opportunity for a functional relationship exists.
4. TRUE.
5. TRUE.

Matching

1. D
2. A
3. S
4. V
5. D, V
6. D
7. I

- 8. D
- 9. I
- 10. D

Short Answer/Essay

1. An analysis of behavior involves identifying a relation between an environmental variable (or intervention package) that is reliably associated with control over the behavior—i.e., a functional relation. As such, this variable or intervention package can serve as a reliable treatment. This differs from a complete analysis (or understanding) of the behavior because it doesn't explain all variables that could account for it. Just because you've identified one effective intervention doesn't mean that there aren't others (i.e., other sets of variables that yield the same reliable control).
2. Description—Systematic observation yields a collection of objective facts about observed events. Personal bias is controlled. Prediction—Objective measurement results in the discovery that two or more events consistently covary. This relation may or may not be causal. Experimental control—Highest level of understanding, achieved when a predictable change in behavior can be reliably produced by the systematic manipulation of some aspect of the person's environment. In other words, it is demonstrated that the independent variable caused the measurable change in the dependent variable.
3. Replication is necessary to provide convincing evidence that the independent variable reliably controls the dependent variable. With replication, the probability of the behavior change coinciding with the onset and offset of the intervention being the result of another variable is drastically reduced; thus lending credibility to the influence of the independent variable over the dependent variable.
4. Answers should include the lawfulness of behavior and the fact that it is a natural phenomenon.
5. Masking variability hides the factors that influence behavior. Sometimes these influences can be significant and even more interesting than the intervention being studied. For instance, variability evident in daily graphs of tantrums may be averaged over months with the result of drastically reducing variability. However, it may also mask the fact that events occurring on a monthly cycle are exerting control over behavior. Such events may include a monthly paycheck, menses, regular monthly outings, etc. Identification of these events, evident on a daily graph, would lead to alternative intervention strategies.
6. Variability indicates a lack of control—and therefore understanding—with respect to the factors that influence the behavior of interest. Behavior analysts attempt to identify the determinants of variability and eliminate or control them.
7. Student answers will vary. Within the context of a question, student should identify a measurable and observable dependent variable and an independent variable able to be manipulated.
8. Steady state strategy requires repeatedly exposing a participant to a given condition while trying to eliminate or control extraneous influence on the behavior and obtaining a stable pattern of responding before introducing the new condition. Achieving steady state

responding is a prerequisite to comparing a subsequent intervention condition. Without first achieving steady state responding, one could not predict the level of future responding absent an intervention; hence, one could not predict or even convincingly demonstrate the impact of the intervention.

9. The data suggest a possible relation between the intervention and the change in behavior. However, because there are possibly other changes that coincided with the onset of the intervention, we cannot yet assert a functional relation; to make such a claim would require replications with the same effect in the context of an experimental design.

Chapter 8 Answer Key**Multiple Choice**

1. A
2. A
3. C
4. D
5. B, C
6. C
7. A
8. A, B
9. B

True/False

1. FALSE. They are not synonymous. A concurrent chains (schedule) design has the two interventions literally in place simultaneously. The learner chooses (in some fashion) the intervention. With an alternating treatments design, the interventions are alternated in rapid fashion (e.g., switched every session or two).
2. TRUE.
3. FALSE. They usually occur as a result of the initial treatment not being as effective as expected. Subsequent treatments tend to be a variation or alternative to the original.
4. FALSE. Demonstrating a functional relation using a reversal design is dependent upon the behavior deteriorating in the reversal condition.
5. FALSE. With a multielement design, a functional relation is demonstrated when the data series representing one treatment is consistently higher than the data series representing another treatment.
6. TRUE.
7. FALSE. Unlike most experimental designs, the multielement design is somewhat tolerant of unstable data. A functional relation can still be demonstrated as long as one data series remains above the other.

Matching

1. C
2. A
3. H
4. I

5. D
6. C
7. B
8. G
9. D

Short Answer/Essay

1. (Graphs should accurately represent the various experimental designs.)
2. Reversal & multielement design
 - A. If a behavior is occurring at a particular level it is likely to continue at that level unless something changes. If the behavior level changes (i.e., deviates from the baseline level) with the onset of an intervention and this effect is reversed with the offset of the intervention and then changes again with a second onset, then evidence is provided of a functional relation between the intervention and the change in behavior.
 - B. In a multielement design, the rapid alternation of treatments, along with different SDs under the two (or more) treatment conditions and other counterbalancing measures (e.g., time of day) ensures that any differential responding that occurs under the various conditions will be the result of those conditions. This is made evident by a graphical display of responding under one condition (graphed as one data series) being consistently higher than responding under another condition (graphed as a different data series).
3. Given the following experimental designs state an advantage and disadvantage of each.
 - A. A-B-A-B
 Advantage: Most powerful single-subject design for demonstrating functional relationships
 Disadvantages: Cannot be used in evaluating the effectiveness of treatment variables that cannot be withdrawn; behaviors may not reverse to baseline levels (irreversibility); social, educational, and ethical concerns may not allow for the withdrawal of an effective treatment; sequence effects
 - B. Multielement Design
 Advantages: Does not require treatment withdrawal; allows for quick comparison of the relative effects of treatments; minimizes sequence effects; can be used with unstable data patterns; can be used to assess generalization of effects; intervention can begin immediately
 Disadvantages: susceptible to multiple treatment interference; rapid back-and-forth alternation of treatments does not reflect the way interventions are typically applied which may be viewed as artificial or undesirable

4. Describe an appropriate research design for each of the following scenarios.
 - A. The dependent variable would be study behavior and the independent variable would be contingent vs. noncontingent praise. A reversal design employing a noncontingent reinforcement (NCR) reversal technique would most likely be used.
 - B. The dependent variable would be quiz scores and the independent variable would be Procedures X and Y. A multielement design would be appropriate here.
 - C. The dependent variable would be disruptive behavior and the independent variable would be response cost. An A-B-A-B (or reversal) design would be appropriate in this instance.
5. Graphs
 - A. ABA design: A functional relationship is not evident. One problem is that there wasn't an abrupt change in trend or level with the onset of the treatment condition. Also, the experimenter discontinued the treatment condition prematurely. (Salvaging this experiment may have been possible given a) a longer treatment condition and an abrupt decrease in the behavior with the onset of the second baseline, and b) the addition of a second treatment condition with an abrupt increase in level or trend.)
 - B. A-B-C-B-C: A functional relationship is evidenced by the abrupt change in level with the onset of intervention one and a reversal of that effect with the onset of the second intervention two condition. (Baseline and intervention one are functionally equivalent.)
 - C. Two-phase multielement design: A functional relationship is not evident. There is not a vertical separation between Intervention A and Intervention B.
 - D. Multi-element design: A functional relation is evidenced by the vertical separation between Procedure 1 and Procedure 2.
 - E. B-A-B design: A functional relation is evidenced by the abrupt change in level between the first Treatment condition and Baseline, and Baseline and the second Treatment condition.

Chapter 9 Answer Key

Multiple Choice

1. A
2. B
3. C
4. D
5. A
6. A
7. D
8. C
9. D
10. B
11. C
12. B, C

True/False

1. TRUE.
2. FALSE. The possibility of co-variation between different behaviors is a limitation of a multiple baseline design.
3. TRUE.
4. FALSE. The fact that the behavior must already be in the participant's repertoire is a limitation of the changing criterion design.
5. FALSE. Conducting a reversal phase in one or more tiers of a multiple baseline design can strengthen the demonstration of a functional relation.

Short Answer/Essay

1. Answer should include: multiple baseline across behaviors to evaluate effects of intervention on two or more different behaviors of the same participant; multiple baseline across settings to evaluate effects of intervention on the same behavior of the same participant in two or more different settings; and a multiple baseline across participants design to evaluate the same behavior of two or more different participants.
2. Answer should include: Experimental control is demonstrated if each behavior is changed when and only when the independent variable is applied to the new setting.

3. Answer should include: One condition that multiple probe design is effective for is evaluating the effects of instruction on skill sequences in which it is highly unlikely that the participant's performance on later steps of the sequence could improve without instruction or mastery of earlier steps. A second condition is when prolonged baseline measurement may prove reactive, impractical, or too costly.
4. Answer should include: Limitations include (a) having to wait too long to modify certain behaviors, (b) a tendency for baseline phases to contain too few data points and (c) the fact that baselines begun after the independent variable has been applied to earlier baselines can mask the interdependence of behaviors.
5. Answer should include: Two or more different behaviors for one participant are selected and baseline measurement for each behavior is conducted. After steady state responding is obtained in baseline, the independent variable is applied to one behavior while maintaining baseline conditions for the other(s). When steady state or criterion-level performance is reached for the first behavior, the independent variable is applied to the next behavior.
6. Answer should include: A multiple probe design is used to analyze the relationship between an independent variable and the acquisition of a successive approximation or a sequence of behaviors. Intermittent measures, or probes, are taken on all behaviors at the beginning of the experiment. Probes are then taken each time the participant has achieved mastery of one of the behaviors or skills in the sequence. Just prior to instruction on each behavior, a true baseline measure is taken until stability is achieved.
7. Answer should include: Baselines begun after the independent variable has been applied to previous behaviors, settings, or subjects cannot be used to verify predictions based on earlier tiers of the design. Only baselines begun while the earlier behavior is still under baseline conditions can be used to verify predictions made for earlier behaviors.
8. Answer should include: Three situations are when a planned reversal is not desired or possible, limited resources preclude a full-scale multiple baseline design, and a new behavior, setting, or subject appropriate for a multiple baseline analysis becomes available.
9. Answer should include: the length of the phases, the magnitude of the criterion changes, and the number of criterion changes.
10. Answer should include: The first problem is that large changes may not permit the inclusion of a sufficient number of changes in the design because the terminal level of performance is reached sooner. The second problem is that criterion changes cannot be so large that they contradict good instructional practices. The changes must be detectable but also achievable.

Chapter 10 Answer Key**Multiple Choice**

1. C
2. B
3. A
4. A
5. C
6. B
7. D
8. A, C
9. D
10. D

True/False

1. FALSE. Attempting to cancel out variability through statistical manipulation neither eliminates its presence in the data nor controls the variables responsible for it.
2. FALSE. The phrase *control of behavior* is technically inaccurate because the experimenter controls only some aspect of the subject's environment.
3. TRUE.
4. TRUE.
5. FALSE. A study can demonstrate a functional relation between the independent variable and a socially important target behavior – and thus be significant from an applied perspective – yet contribute little to the advancement of the field.
6. TRUE.
7. FALSE. Placebo controls can and have been used in single subject behavior analytic research.

Short Answer/Essay

1. Answer should include: A focus on individual subject behavior has enabled behavior analysts to discover and refine effective interventions for a range of socially significant behaviors. The most useful information about a treatment is how individual behavior has changed as a result of the treatment. Information on group performance averages is not as useful for developing individual behavior change interventions.
2. Answer should include: Individual subject designs attempt to identify sources of variability and either control or manipulated them as an independent variable. Data that contains a lot of variability are likely to indicate to the behavior analyst that more research is needed to identify the sources of that variability. In group comparison designs, statistical manipulation

is used to cancel out variability. Causes of variability are attributed to chance and are not eradicated through statistical treatments.

3. Answer should include: First, the majority of studies that have advanced the field of applied behavior analysis have used experimental designs that incorporated one or more of those tactics. Second, examination of isolated experimental tactics is one step in learning the assumptions and principles that guide selection and arrangement of those tactics into an effective experimental design to answer a specific research question.
4. Answer should include: Treatment drift occurs when the application of the independent variable during later stages of the experiment differs from the way the treatment was applied at the outset of the study. Treatment drift is a threat to the internal validity of a study. Low treatment integrity is a major source of confound in an experiment, making it difficult, or impossible, to interpret the results with confidence.
5. Answer should include: A complete and precise operational definition is the first step to achieving a high level of treatment integrity. It provides the basis for training those who will implement the intervention and those who will judge the level of treatment integrity obtained. Precise definitions are a requisite for meeting the technological dimension of applied behavior analysis. Failure to provide a precise operational definition hampers dissemination and proper use of the intervention and makes replication and validation of the experiment impossible.
6. Answer should include: External validity refers to the degree to which a functional relation found reliable and socially valid in a given experiment will hold under different conditions. The generality of findings in applied behavior analysis research is assessed, established, and specified through replication of experiments, both direct and systematic.
7. Answer should include three of the following: Seeking consumer opinion through surveys, questionnaires, performance scales, or interviews; empirically assessing the performance of individuals judged to be highly competent and experimentally manipulating different levels of performance to determine socially valid outcomes; comparing participants' performance to normative standards; using a standardized assessment tool; asking experts to evaluate participant performance; testing participants' new behavior in the natural environment.
8. Answer should include: First, applied behavior analysts are concerned with producing socially significant, not statistically significant change. If a problem is solved, you can see that in the data. If the change is so small or unclear that statistical treatment is necessary, the problem has not been solved. Second, visual analysis is well suited for identifying variables that produce strong, large, and reliable results. Visual analysis is less likely to produce Type I errors but increases the commission of Type II errors. Third, statistical methods remove or cancel out variability in the data. If there is a significant amount of variability, more analysis should be conducted, as the answer to the problem is not yet clear. Fourth, statistical tests require the data to conform to predetermined criteria for analysis. This results in less flexibility in experimental design which is highly valued in applied behavior analysis.

9. Answer should include: Shift needs to occur toward a more complete analysis and conceptual understanding of the principles that underlie successful demonstrations of behavior change. The field's concept of analytic has changed. Applied behavior analysis is now considered analytic when it makes convincing demonstrations of behavior change AND when the behavior change methods make systematic and conceptual sense. Both conditions are now expected in order to be truly analytic.

Chapter 11 Answer Key

Multiple Choice

1. B
2. B
3. A
4. B
5. C
6. A
7. C
8. B, C, E
9. D
10. C
11. A
12. C
13. A
14. C
15. D
16. B, C, D, E
17. B
18. C

True/False

- 1) TRUE.
- 2) TRUE.
- 3) FALSE. Reinforcement should be delivered immediately upon the display of the target behavior. Waiting even 30 s can result in the reinforcer following some other behavior and not achieving the desired result.
- 4) TRUE.
- 5) FALSE. Establishing operations change constantly.
- 6) FALSE. Reinforcement has an effect on behavior whether or not the individual realizes it.
- 7) TRUE.
- 8) TRUE.

Short Answer/Essay

- 1) Answers will vary. In the circular argument, the two variables should both be effects and unable to be separated from one another so that one could be manipulated to test the effect on the other. In the non-circular argument, one variable should be one that can be manipulated in order to observe the effect on the other. The explanation for why one argument is circular, and the other is not should revolve around these concepts.
- 2) Answers will vary but should include an MO, an S^D , a target behavior, and a SR^+ . There should be an indication that future responding increases as well. The MO should be relevant to the SR^+ selected (e.g., if food is the reinforcer, the MO should involve food deprivation).
- 3) This statement is self-contradictory because if a “reinforcement program” didn’t “work” (i.e., the target behavior did not increase), then the program wasn’t a reinforcement program. Reinforcement is defined by its effect on the target behavior. If the target behavior did not increase, the target behavior was not reinforced.
- 4) Reinforcement is arbitrary in the sense that any behavior that is followed closely in time by a reinforcer gets reinforced. It does not matter if the behavior is desirable or not, or whether the delivery of reinforcement was programmed or not. Behaviors are selected (i.e., they continue to occur as functional behaviors) because they produce reinforcement.
- 5) Automatic reinforcement means that a behavior produces its own reinforcement. Another person does not have to deliver it. An example is scratching your skin. The act of scratching produces stimulation that may be reinforcing to an individual.
- 6) This statement is false because a conditioned reinforcer is effective across a wide range of MO conditions. Many reinforcers function to reinforce a wide range of behaviors. However, a generalized reinforcer does not depend upon a specific MO to be effective.
- 7) A reinforcer assessment is a direct, data-based method of presenting one stimulus contingent upon a behavior and measuring the extent to which that behavior increases over time. A reinforcer assessment verifies if a stimulus functions as a reinforcer. A preference assessment measures preference for stimuli but does not verify whether these stimuli are actual reinforcers.
- 8) All these reinforcer assessment methods involve evaluating whether the stimulus maintains responding and, therefore, serves as a reinforcer. They also all involve using different schedules of reinforcement. With a concurrent schedule of reinforcement, two schedules of reinforcement are in place at the same time. An individual’s response allocations among two different behaviors (each associated with a different schedule) are measured. With a multiple schedule of reinforcement, two different reinforcement schedules are in place at different times for the same behavior, and each is associated with its own discriminative stimulus. Typically, one schedule is response dependent and the other is response independent. Responding under each schedule is measured. With a progressive-ratio schedule of reinforcement, the requirements for earning reinforcement are systematically increased over time. The point at which responding declines is measured.

Chapter 12 Answer Key**Multiple Choice**

1. B
2. D
3. A
4. D
5. B
6. C

True/False

1. TRUE.
2. FALSE. This is an example of a conditioned negative reinforcer.
3. FALSE. The severity of the MO should be the minimum amount necessary to evoke the target behavior.
4. TRUE.
5. FALSE. The effects of work duration on task aversion are idiosyncratic to the learner.

Short Answer/Essay

1. Answers should include: With escape, the aversive stimulus is present prior to the response, which terminates the aversive stimulus. With avoidance, the aversive stimulus is not present prior to the response. Engagement in the response prevents the presentation of the aversive stimulus from occurring.
2. Answers should include a clear MO (aversive stimulus), the S^D , the behavior, and termination of the aversive.
3. Answers should include the schedule for the onset of the aversive in the absence of the avoidance response, the aversive stimulus, the avoidance behavior, and the consequence (delayed presentation of the aversive).
4. Answers should include at least one of the following: A) People often think that negative reinforcement is the opposite of positive reinforcement and therefore, assume negative reinforcement means punishment. However, the terms “positive” and “negative” refer to the presentation and removal of stimuli rather than the “goodness” or “badness” of the stimuli. B) People confuse negative reinforcement and punishment because they both involve the use of aversive stimuli. However, with negative reinforcement, the aversive stimulus is presented prior to the occurrence of the target behavior (resulting in an increase in the behavior over time). Whereas with punishment, the aversive stimulus follows the occurrence of the target behavior (resulting in a decrease in the target behavior over time).

5. Positive and negative reinforcement are similar in that they both produce increases in future target behavior. Positive and negative reinforcement are different in that positive reinforcement involves the presentation of a desired stimulus following a target behavior, whereas negative reinforcement involves the termination of an aversive stimulus following a target behavior.
6. Negative reinforcement and punishment are similar in that they both involve aversive stimuli. However, with negative reinforcement, the aversive stimulus is present prior to the occurrence of the target behavior. With punishment, the aversive stimulus follows the occurrence of problem behavior. Negative reinforcement produces an increase in the future occurrence of the target behavior. Punishment produces a decrease in the future occurrence of the target behavior.
7. Answers will vary but should include all elements of the discriminated avoidance or escape contingency.
8. Examples will vary but answers should include: Ethical concerns regarding the use of negative reinforcement also exist for positive reinforcement. With both procedures, an effective EO must be in place to evoke the target response. That EO is often the presence of an aversive condition. The EO for positive reinforcement involves a state of deprivation that makes the reinforcer for engagement in the target behavior valuable. With negative reinforcement, the EO involves the presence of an aversive stimulus to evoke the target behavior that results in the offset of the stimulus.
9. Answers will vary but should include examples that meet the following definitions. Unconditioned negative reinforcers are related to our inherited capacity to respond to them (e.g., painful stimuli). Conditioned negative reinforcers are originally neutral events that acquired their effects through pairing with existing negative reinforcers.

Chapter 13 Answer Key

Multiple Choice

1. B
2. C
3. D
4. D
5. A
6. C
7. D
8. A
9. C
10. D
11. B

True/False

1. TRUE.
2. TRUE.
3. FALSE. Lag schedules promote response variability.
4. TRUE.
5. FALSE. Ratio strain can result from abrupt increases in ratio requirements when moving from denser to thinner reinforcement schedules.

Matching

1. J
2. B
3. D
4. G
5. K
6. F
7. L
8. A
9. I

- 10. C
- 11. H
- 12. E

Short Answer/Essay

1. Fixed ratio schedules of reinforcement require that a specific number of responses occur before a reinforcer is delivered. A variable ratio schedule of reinforcement is similar, except that the number of responses that must occur before a reinforcer is delivered varies around a mean number. Fixed interval schedules of reinforcement provide reinforcement for the first correct response following the passage of a fixed duration of time. Variable interval schedules of reinforcement are similar, except the elapsed time varies around a mean. In both cases, variable schedules of reinforcement produce steady rates of responding. Fixed schedules usually produce a post-reinforcement pause (i.e., a period during which no responding occurs). Fixed ratio schedules tend to have a stair-step pattern. Fixed interval schedules tend to have a scalloped pattern. Interval schedules of reinforcement tend to produce lower overall rates of responding than ratio schedules of reinforcement.
2. A scallop effect often occurs with fixed interval schedules of reinforcement. Because the end of the interval is predictable, there is often little responding early in the interval. However, as the end of the interval nears, responding tends to increase to higher rates, peaking at the end of the interval. Following the end of the interval, responding again decreases to low levels until the end of the interval approaches again. On a cumulative graph, this results in a visual pattern that resembles a scallop.

Examples will vary but should be consistent with the definitions of fixed and variable ratio schedules. (Fixed ratio schedules of reinforcement require that a certain, constant number of responses occur before a reinforcer is delivered. A variable ratio schedule of reinforcement is similar, except that the number of responses that must occur before a reinforcer is delivered varies around a mean number.) Ratio strain is demonstrated when the ratio of required responses to reinforcement is changed quickly. The effect is that responding decreases.

Chapter 14 Answer Key

Multiple Choice

1. C
2. B, D
3. A, B, D
4. A, B, C
5. D
6. C

True/False

1. TRUE.
2. FALSE. This describes negative reinforcement. Positive punishment occurs when the presentation of an aversive stimulus decreases the future occurrence of the behavior.
3. TRUE.
4. FALSE. Reinforcement involves an increase in behavior. Punishment involves a decrease in behavior. Negative and positive refer to the mathematic operations of subtraction and addition. Negative – a stimulus is removed from the environment. Positive – a stimulus is added to the environment.
5. TRUE.

Matching

1. C
2. F
3. A
4. G
5. B
6. E
7. D

Short Answer/Essay

1. Answers should include at least three of the following: a) may occasion emotional and aggressive behavior; b) may occasion escape and avoidance behavior; c) behavioral contrast effects may occur where the behavior decreases in the punishment setting but increases in a setting where there is no punishment in place; d) may involve modeling of undesirable behavior, (i.e., children may imitate their parents' actions, such as hitting), and e) possible overuse due to negative reinforcement of the punishing agent's behavior.
2. Answers should include: Procedural guidelines are written primarily to protect the client's rights and wellbeing. Interventions should be effective, least restrictive, and incorporate strategies aimed at minimizing undesirable side effects. Further, procedure guidelines help protect the practitioner.
3. Answers should include: The efficacy of punishment is directly related to the reinforcement contingencies in place for the problem behavior. Punishment will be more effective when the problem behavior is contacting little to no reinforcement. A functional analysis enables the practitioner to identify the reinforcers for problem behavior. Once identified, one can attempt to break the problem behavior reinforcer contingency. A functional analysis also enables the practitioner to find a replacement behavior that serves the same function as the problem behavior. Punishment is likely to be more effective when combined with reinforcement for an appropriate alternative behavior.
4. Answers should include: Positive practice and restitutional overcorrection are both positive punishment procedures that involve the learner engaging in an alternative behavior that is essentially the opposite of the problem behavior. Positive practice involves the learner repeating a correct form of the behavior or a behavior that is incompatible with the problem behavior a specified number of times contingent on the learner's engagement in problem behavior. With restitutional overcorrection, the learner repairs the damage they caused or returns the environment to its original state and then engages in additional behavior to bring the environment to a condition that is better than it was prior to their engagement in problem behavior.
5. Answers should include a) the client's right to safe and humane treatment, b) the professional's responsibility to adhere to the doctrine of the least restrictive alternative, and c) the client's right to effective treatment.

Chapter 15 Answer Key

Multiple Choice

1. D
2. A
3. A
4. B
5. A, C
6. A, B, D
7. A
8. C
9. C
10. D

True/False

1. TRUE.
2. FALSE. Time-out must decrease the future rates of problem behavior to be considered time-out.
3. FALSE. Bonus response cost is likely to be less aversive than existing cache response cost.
4. FALSE. Individual reinforcer withdrawals should be large enough to be punishing but not so large that the individual runs completely out of their reinforcer supply.
5. TRUE.

Matching

1. C
2. G
3. D
4. A
5. H
6. B
7. E
8. F

Short Answer/Essay

1. Answers may vary but should include: When deciding to use time-out, practitioners are ethically obligated to use the most powerful but least restrictive variation of the procedure. Of the two, nonexclusion time-out is the least restrictive. Exclusion time-out also has more limitations, including the individual may resist going or engage in emotional outbursts, it typically requires more supervision to monitor the individual's safety and to prevent the individual from potentially engaging in destructive and/or self-stimulatory behavior, and it results in the student accessing less instructional time compared to nonexclusion time-out.
2. Answers should include: Time-out is defined by procedural, conceptual, and functional factors/perspectives. Procedural: Time-out involves immediately removing the individual from the time-in setting, where they are able to access reinforcers, to the time-out setting where reinforcement is not available for a specific period of time contingent on engagement in the problem behavior. Conceptual: The individual must be able to discriminate between the time-in and time-out settings. That is, the time-in setting should be noticeably more reinforcing than the time-out setting. Functional: Time-out, by definition, must result in a decrease in the future occurrences of the problem behavior. If the behavior did not decrease, time-out did not take place.
3. Answers should include: Advantages of a time-out room include: 1) the individual has substantially less opportunities to acquire reinforcement in a time-out room; 2) the individual quickly learns to discriminate the time-out room from the time-in area, resulting in the time-out room acquiring conditioned aversive properties. This in turn, makes the time-in areas even more reinforcing; and 3) the individual is less likely to get hurt or hurt others when removed from time-in to the time-out room. Disadvantages include: 1) the individual may resist or engage in emotional outburst while being escorted to time-out. The implementer should be prepared to address these behaviors; 2) using a time-out room could function as a negative reinforcer for the implementer resulting in its increased use; 3) the time-out room could become an S^D for the individual's engagement in destructive or inappropriate self-stimulatory behavior; and 4) the public is likely to have negative perceptions about the use of a time-out room.
4. Answers should include: The time-in setting must be reinforcing in order for its removal to effectively punish the problem behavior. That is, a more reinforcing time-in setting results in a more powerful and effective time-out.
5. Answers should include: Existing cache response cost: The individual loses a specific number of previously earned positive reinforcers contingent on problem behavior. The previously earned reinforcers are essentially a bank or supply of currently available reinforcers. The response cost component withdraws from that supply. Bonus response cost: The individual loses a specific number of reinforcers that were originally acquired noncontingently (i.e., they were freely given to the individual). The instructor noncontingently provides this supply of reinforcers for the primary purpose of withdrawing a specific number of them contingent on the individual's engagement in problem behavior. When selecting one system over the other, consider 1) which of the two is the least aversive, 2) which has less potential for occasioning emotional outburst and aggressive behavior, and 3) which is likely to more quickly suppress the problem behavior.

Chapter 16 Answer Key

Multiple Choice

1. A, B, C
2. B
3. D
4. C
5. B
6. D
7. D
8. A
9. B
10. C
11. A

True/False

1. FALSE. With an EO for reinforcement, the behavior altering effect temporarily increases behavior. With an EO for punishment, the behavior altering effect temporarily decreases behavior.
2. TRUE.
3. FALSE. The value-altering effect decreases the reinforcement efficacy of a stimulus.
4. FALSE. Behavior-altering effects include dimensions of behavior, such as frequency, intensity, and duration.
5. TRUE.

Short Answer/Essay

1. Answers should include: Value-altering effect – MOs increase (EO) or decrease (AO) the efficacy of a specific consequence. Behavior-altering effect – MOs temporarily increase (evocative) or decrease (abative) the frequency of behavior associated with a specific consequence. With reinforcement, EOs have a reinforcement establishing effect that increases the value and efficacy of the reinforcer. EOs have an evocative effect on behavior. That is, they temporarily evoke or increase a dimension of the behavior associated with the reinforcer. With reinforcement, AOs have a reinforcement abolishing effect that decreases the value and efficacy of the reinforcer. AOs have an abative effect on behavior. That is, they temporarily abate or decrease a dimension of the behavior associated with the reinforcer. EOs and AOs work in the opposite direction with punishment. EOs have a punishment establishing effect that increases the efficacy of the punisher. EOs have an abative effect on behavior. That is, they temporarily abate or decrease a dimension of the behavior associated

with the punisher. AOs have a punishment abolishing effect that decreases the efficacy of the punisher. AOs also have an evocative effect on behavior. That is, they temporarily evoke or increase a dimension of the behavior associated with the punisher.

2. Answers should include: Behavior altering effects are temporary evocative or abative stimulus effects that change the current frequency of behavior. Antecedent stimuli have behavior altering effects. Function altering effects are repertoire altering stimulus effects that allow an individual to behave differently in the future. The contingent presentation of a stimulus (i.e., a consequence) has a function altering effect. The same antecedent events that function as MOs are likely to have function altering effects that change the future frequency of behavior when applied as consequences.
3. Answers should include definitions of each CMO. Examples will vary. CMO-S: The surrogate CMO is a previously neutral stimulus that was paired with an UMO to acquire its MO effects. CMO-R: The reflexive CMO is an antecedent stimulus that is associated with the worsening of a condition. Its own offset functions as a negative reinforcer. CMO-T: The transitive CMO is a stimulus that makes another stimulus a valuable reinforcer or punisher.
4. Answers will vary but should include three UMOs from the following classifications a) deprivation and satiation, b) UMO's relevant to sexual stimulation, c) changes in the temperature, and d) painful stimulation.
5. Answers will vary but should include descriptions of the S^D , MO, and a relevant four-term contingency. Similarities include they are both antecedents and have behavior altering effects due to their relations with specific reinforcing or punishing consequences. S^D s are correlated with the differential availability of specific consequences. MOs are correlated with the differential efficacy of specific consequences.

Chapter 17 Answer Key**Multiple Choice**

1. A
2. C
3. B
4. A
5. B
6. C
7. D
8. A
9. D
10. A

True/False

1. FALSE. Operant and respondent stimulus control are not identical. While both involve antecedent stimuli evoking a response, there is a difference between the function of the discriminative stimulus for operant behavior and the conditioned stimulus for respondent conditioning. Discriminative stimuli acquire their controlling functions through association with stimulus change that occurs following the behavior. Conditioned stimuli acquire their controlling functions through associations with other antecedent stimuli that elicit behavior.
2. TRUE.
3. TRUE.
4. TRUE.
5. FALSE. The S-delta can also be used to denote that the condition provides a lesser amount or quality of reinforcement compared to the discriminative stimulus condition.
6. FALSE. In conditional discriminations the three-term contingency itself comes under contextual control and thus operates at the level of a four-term contingency.
7. TRUE.

Short Answer/Essay

1. Motivating operations and discriminative stimuli are similar in the following ways: (1) they both occur before the behavior of interest, and (2) both events have evocative functions. Motivating operations are different from discriminative stimuli because an antecedent functions only as a discriminative stimulus when a specific response is reinforced in its presence and the same response does not produce reinforcement in its absence. A motivating operation may be present under both of these circumstances.

2. The stimulus discrimination process requires two stimuli. The practitioner consistently reinforces the occurrence of a target response in the presence of one stimulus and does not reinforce the target response in the presence of the other stimulus. Examples will vary, but there must be a clear S^D and $S-\Delta$.
3. Answers will vary. Answers should provide clear examples of stimulus discrimination across classes and stimulus generalization within the class. For example, balls of different shades of red are all “red” (stimulus generalization). However, a green ball would not be considered in the same class because it is a different color (stimulus discrimination).
4. Four ways to transfer stimulus control from prompts to natural stimuli are: Most-to least prompts, least-to-most prompts, time delay, and graduated guidance. In most-to-least prompts, one begins with the most intrusive prompt (physical guidance) and fades back to least intrusive prompts (verbal prompts) as the learner progresses. In least-to-most prompts, one begins with the least intrusive prompt and systematically increases the prompt intrusiveness until the correct response is made. With time delay, variations occur in the time interval between the presentation of the natural stimulus and the presentation of a response prompt. This delay can be constant or progressive. Graduated guidance consists of quickly fading physical prompts within the prompt itself. For example, a practitioner may begin to physically guide a person through a task, but slowly fade the physical guidance within the step as the individual begins to complete the step independently.

Chapter 18 Answer Key

Multiple Choice

1. D
2. C
3. A, E, F, H
4. A
5. B
6. C
7. B
8. D
9. B
10. A

True/False

1. TRUE.
2. TRUE.
3. FALSE. Skinner's analysis of verbal behavior can serve as a guide for language assessment and intervention for people who had verbal behavior but have lost or are losing their repertoire. There is an expanding body of research supporting this approach with various populations including people who have been diagnosed with dementia.
4. TRUE.
5. TRUE.

Matching

1. D
2. E
3. F
4. H
5. A
6. C
7. B
8. G

Short Answer/Essay

1. Two general methods for controlling value changes in the MO include capturing the MO value change as it occurs naturally and creating the MO by generating some change that alters the value of the consequence. To capture a naturally occurring MO, the practitioner would look for changes in collateral behaviors that may be evoked by the MO (such as looking at an iPad that is on the shelf). Creating motivation requires the practitioner to make a direct change in the environment (e.g., introducing an iPad). Examples will vary.
2. Definition of autoclitic relation: a speaker's own verbal behavior functions as an S^D or an MO for additional speaker verbal behavior. This is a secondary verbal behavior about a speaker's own verbal behavior. Examples will vary but can include an autoclitic mand (e.g., "Believe me; that is the correct answer"), tact ("I am confident that this is the way") or intraverbal autoclitic frame ("May I have a ____?").

Chapter 19 Answer Key

Multiple Choice

1. C
2. A
3. B
4. B
5. D
6. D
7. C
8. C
9. B
10. A
11. C

True/False

1. TRUE.
2. FALSE. There should be at least 3 comparison stimuli when training match-to-sample responding.
3. FALSE. During EBI, two stimulus-stimulus relations are trained and the emergence of reflexivity, symmetry, and transitivity are tested for.
4. TRUE.
5. FALSE. RFT is grounded on the experimental history of stimulus equivalence.

Matching

1. B
2. D
3. C
4. A
5. D
6. B
7. A
8. C

Short Answer/Essay

1. 3 reflexive (SAD=SAD, emoji=emoji, crying picture=crying picture), 2 symmetrical (emoji=SAD, SAD=crying picture), and 2 transitive (emoji=crying picture, crying picture=emoji)
2. Answer should include one of the following: 1) use stimulus compounds so each part becomes a member of the equivalence class, 2) use class-specific reinforcement so the specified reinforcer becomes a member of the class, or 3) train a simple discrimination.
3. 1) formation of equivalence classes resulting from testing and probing, 2) delayed emergence, 3) class expansion, 4) class merger, 5) transfer of function, and 6) emergence of contextual control.
4. 1= untrained, derived, or emergent relations; 2= trained relations; 3= stimuli in the equivalence class

Chapter 20 Answer Key

Multiple Choice

1. A, B, D
2. C, D
3. A
4. C
5. A
6. B
7. B, C, D
8. A, E
9. B
10. A, C

Matching

1. F
2. B
3. E
4. C
5. D
6. A

True/False

1. FALSE. There is evidence (e.g., Hayes, Kohlenberg, & Hayes, 1991) that new reinforcers may be created indirectly via relationships other than pairing, and by derived relations other than “sameness.”
2. TRUE.
3. FALSE. The standard view of derived class acquisition doesn’t provide for a mechanism other than specific reinforcement contingencies—often in a conditional discrimination format—to create derived relations with respect to a given set of stimuli.
4. TRUE.
5. FALSE. Research (e.g., Pytte & Fienup, 2014) has demonstrated that simply telling verbally skilled students about two relations (AB and BC) can be sufficient for them to derive the third relation (AC). This is not to say, however, that active responding and feedback do not strengthen learning.
6. FALSE. On the contrary, a relational frame is the specific type of relation derived via arbitrarily applicable relational responding.

7. FALSE. Deictic relations develop later, after verbal behavior and simpler forms of relational responding have been established.
8. TRUE.
9. TRUE.
10. FALSE. Rule-governed behavior often is not sensitive to change and therefore may interfere with flexibility.

Short Answer/Essay

1. The critical concept is that “a pairing-focused account of conditioned consequences is too narrow” (p. 506). Answers may make reference to Sidman’s view that “derived relations are an automatic outcome of specific reinforcement contingencies” (p. 509), which is not wrong but may not be comprehensive enough, in that it doesn’t appear to be necessary in an account in which arbitrarily applicable relational responding is assumed to be a generalized operant. Transformation of function research that appears to support the departure from a pairing focused account includes the Dack, McHugh & Reed (2009) study on learned helplessness, or Hayes, Kohlenberg, & Hayes (1991) and other studies discussed from pp. 504-506 (including Table 20.1).
2. Three ways in which private events interfere with well-being are by (1) evoking unpleasant emotional responses that monopolize attention (e.g., anxiety leads to avoidance or to dwelling more on private stimuli—thoughts and feelings—than on the current external activities and environment), (2) contributing to the spread of suffering via transformation of functions (e.g., receiving praise and being unable to resist conceiving of its opposite), and (3) excessive rule-governance, which can take place in the absence of support from the external environmental, including things in the local environment that could displace or contradict it. Examples will vary.
3. Examples will vary but may include unpleasant thoughts or emotions such as depression, anxiety, obsessive thoughts, and may include—but don’t necessarily need to include, overt manifestation of these. The two tactics are altering the aversive function of private events and lessening the control of private events over other behavior. These are actually named in multiple choice question 10, above, but the present question requires elaboration both in terms of an example and reference to the behavioral mechanism of the tactic. Altering the aversive function may be effective in a way that is analogous to exposure therapy: repeated contact with the aversive stimulus in the absence of negative consequences diminishes its power to evoke or elicit the undesirable response (this could be an extinction phenomenon, but it may be unfair to expect students to state that and it is not mentioned in the chapter). Lessening the control of private events over other behavior does not involve confronting the aversive condition but rather simply acknowledging it while “mindfully” focusing on non-aversive stimuli in the immediate environment, the practice of which should be automatically negatively reinforcing.
4. Points in common should include at least 2 or 3 of the following: a foundation in basic principles of behavior; the acknowledgment of behavioral function; a special understanding of verbal behavior including rule-governed behavior; a scientific approach to solving socially important human problems (or improving individual lives in meaningful ways); an interest in

self-management; and a commitment to research. The methods, in contrast, are very different: ACT methods do not target discrete observable target behavior; systematically manipulate externally arranged consequences; and may not even set out to teach specific replacement behavior. The Singh et al. (2011) study on reducing aggression by 3 adolescents with autism may be instructive with respect to an example: a conventional approach would have completed a functional assessment or analysis and likely taught some form of replacement behavior, such as an individualized functional communicative response based on the analysis; the emphasis would be on managing the situations that typically evoked aggression. The approach in the study, on the other hand, was to teach each boy to first manage the emotional response, regardless of function, with the use of a breathing and body-focused exercise intended to delay impulsive and unsafe action and defuse the emotion historically associated with those unsafe actions. In either event, incidentally, the intervention could lead via different paths to comparable reinforcement, in some measure: escape or avoidance of unpleasant feelings and outcomes, and contact with positive reinforcement that aggression would have precluded.

Chapter 21 Answer Key

Multiple Choice

1. D
2. A
3. D
4. A
5. B
6. C
7. C
8. A
9. B
10. C

True/False

1. TRUE.
2. TRUE.
3. FALSE. Once a model evokes an imitative behavior, that behavior comes into contact with contingencies of reinforcement. These new contingencies of reinforcement then become the controlling variable for the discriminated operant.
4. FALSE. Some infants and children with developmental disabilities do not imitate and require imitation training.
5. FALSE. The delayed behaviors may have similar topographies as the imitated behaviors but occur under the control of variables. The relation between discriminative stimuli or motivating operations and delayed behaviors are functionally different from the relation between a model and an imitative behavior.
6. TRUE.
7. FALSE. Video self-modeling has been demonstrated to be effective for training some skills.
8. TRUE.

Short Answer/Essay

1. The five elements of Striefel's (1974) imitation training program are:
 1. assessing and teaching prerequisite skill for imitation training if necessary
 2. selecting models for training
 3. pretesting
 4. sequencing models for training
 5. performing imitation training

2. If a person does the same action as a model, and the behavior comes into contact with reinforcement, then the behavior becomes a discriminated operant. If the person then displays this behavior in the presence of another model, it is not considered imitation, but a discriminated operant. If a model is displayed that is novel (meaning the individual has never observed this behavior before and has no history of reinforcement with that behavior), and a person then displays the same behavior, we can say imitation has occurred. The text describes at least two examples that illustrate this. First, if a guitarist hears a novel section of improvised music and then immediately reproduces it, imitation has occurred. However, if one guitarist says to another, "Listen to this. I want to teach you this." The first guitarist demonstrates the new section of music. They practice until the second guitarist learns it. On stage the first guitarist plays the section of new music, and the second guitarist immediately follows by reproducing the same music, imitation has not occurred. Rather the second guitarist's reproduction is the result of a discriminated operant (as a result of the reinforcement history).
3. The five elements are:
 1. Assessing and teaching prerequisite skill for imitation training if necessary. This is important because learners cannot learn if they do not attend to the presentation of the model. Therefore, it is often necessary to teach prerequisite skills, such as, staying seated, looking at the teacher, keeping hands in lap, and looking at objects prior to beginning imitation training.
 2. Selecting models for training. At least 25 behaviors to use as models should be selected in order to make generalized imitation more likely. These should range from gross to fine motor movements.
 3. Pretesting. The pretest may show that the learner imitates some models without training. One should pretest all models at least 3 times. If the learner can perform certain models a specified number of times, then the practitioner should advance to the next level of training.
 4. Sequencing models for training. Practitioners should use pretest results to sequence the models for training, arranging them from easiest to most difficult. "Easiest" models are those that the learner performed correctly at least sometimes during pretesting, and "most difficult" models are those that the learner never performed correctly during pretesting.
 5. Performing imitation training. Imitation training consists of four conditions: preassessment (where a short pretest is given before each training session); training (during which practitioners provide repeated presentations of a model and reinforces approximations and/or uses prompts to get the imitation to occur); post assessment (during which the practitioner presents 5 previously learned models and 3 newly learned models to assess learning); and probes for imitative behaviors (where the practitioner will use 5 nontrained, novel models to probe for occurrences of imitation).
4. The answer should include the individual: attending to a model, observing the consequence and discriminating between consequences, and imitation or non-imitation based on the consequence experienced by model.

Chapter 22 Answer Key

Multiple Choice

1. A
2. B, E
3. D
4. A
5. B
6. B, D, E
7. C
8. D
9. B, C, D, E, F

True/False

1. TRUE.
2. FALSE. This is an example of a shaping within a response topography.
3. TRUE.
4. TRUE.
5. TRUE.
6. FALSE. Prompts should be faded out as quickly as possible.
7. FALSE. The instructor should back up to the last successful successive response approximation before proceeding.
8. FALSE. Each successive approximation should be small and gradual when the learner needs it to be. However larger steps can be taken depending on the individual learner's performance. Shaping should be individualized to the learner.
9. FALSE. One should proceed to the next approximation quickly and not reinforce an approximation for too long. Prolonged reinforcement of one approximation risks establishing the behavior too well and the learner may have difficulty moving to the next successive approximation.
10. TRUE.

Short Answer/Essay

1. Look at the trends in the data. If you observe steady progress toward the terminal behavior, the caregiver is probably increasing the criteria for reinforcement at the correct pace. If several errors are occurring, the criterion for reinforcement is probably being changed too quickly. If the previously reinforced response continues occurring long after the response criteria has been increased, the criteria for reinforcement should probably be changed a little faster.

2. Ma Yao should consider the following when selecting an initial behavior. Select a behavior that is already in the dog's repertoire. The behavior should also be a member of the targeted terminal response class. Laying down for a couple of seconds is the best behavior to initially target due to previously stated considerations.
3. Answers will vary and should include all listed components indicated in the original question.
4. Answers will vary and should include: The example given for shaping across response topographies should include different forms of related behaviors that result in the desired terminal response. The example given for shaping within the response topography should maintain the same form but change along another dimension (e.g., duration or intensity) of the behavior. The procedural approach is the same. The difference between the two is the difference/similarity in form of the targeted approximation at the beginning of the procedure compared to the terminal response.
5. Answers will vary and should include: An individual engages in (include specific) problem behavior that occurs at a tolerable level; others attempt to ignore it and do not provide reinforcement. The problem behavior increases in intensity and/or changes to a less tolerable topography. Others reinforce it at this new level. Next time, the individual starts engaging in the problem behavior at the higher level. The cycle repeats.

Chapter 23 Answer Key**Multiple Choice**

1. B
2. A
3. D
4. C
5. D
6. A
7. C
8. B

True/False

1. FALSE. All stimulus changes in the chain *except the last one* serves these two functions.
2. TRUE.
3. FALSE. Behavioral chains are abundant throughout one's daily routine.
4. TRUE.
5. TRUE.
6. FALSE. Task analyses are often revised after they have originally been constructed. In fact, it is recommended to adjust them as necessary if problems develop when teaching the behavior chain.
7. FALSE. A task analysis should be individualized to the learner. Break the skill up into the smallest number of steps necessary for the individual learner while making sure the TA is still complete.
8. FALSE. Both the single- and multiple-opportunity assessment methods can be implemented multiple times. However, with the single-opportunity methods, the instructor ends the assessment following the learner's first error. With the multiple-opportunity method, the assessment continues through all steps of the skill, despite the learner's engagement in errors.
9. TRUE.
10. FALSE. None of the methods has been shown to be more effective than the others.
11. FALSE. With backward chaining, the learner completes the steps in the correct order. However, the learner is taught the individual steps by starting with the last one first. That is, the instructor targets the last step of the chain first, followed by the second to last step, etc.

Short Answer/Essay

1. Answers should include: A behavior chain is a specific sequence of discrete responses leading to a terminal behavior. Each response (step) in the chain results in a stimulus change. Each stimulus change (with the exception of the last one) has a dual function. It functions as

a conditioned reinforcer for the preceding response and as an S^D for the subsequent response. The last stimulus change reinforces the last response and maintains the reinforcement efficacy of all stimulus change conditions in the chain.

2. The addition of a limited hold increases fluency (responding that is both accurate and proficient).
3. Answers should include: a) The forward chaining procedure should include the instructor beginning by teaching step i until the learner performs the skill at a predetermine accuracy criterion. Step i should be followed by targeting steps i and ii. Continue the progression until all steps of the chain are performed accurately. b) The backward chaining procedure should include the instructor beginning with step ix (the last step). After the learner performs step ix at a predetermine accuracy criterion, target steps viii and ix (the last two steps). Continue the progression until the learner can accurately perform all steps of the chain. c) The instructor should start with all the learner completing all steps of the chain in sequence. Prompt and teach individual steps as needed until the learner can perform all steps without assistance.
4. Answers should include: With the single-opportunity assessment, the instructor stops the assessment at the step the learner is unable to perform and scores “-“ for all subsequent steps. With the multiple-opportunity assessment, the instructor continues the assessment, even if the learner makes an error. When the learner makes an error, the instructor completes the step for the learner, scores a “-“ for the step, and continues to the next step.
5. One might want to interrupt a behavior chain that is inappropriate or maladaptive. When interrupting a behavior chain, identify the point in the chain at which the interruption will occur. Begin the task. When the learner has reached the predetermined interruption point, restrict/block the learner’s ability to complete the step and prompt the desired response. After the interruption, the learner completes the remainder of the task.
6. Answers should include the following. 1) The S^D and response might occur out of sequence. If an S^D and response are occurring in the wrong order but still being reinforced, reexamine the sequences present throughout the behavior chain and rearrange them as needed. 2) Similar S^D s might evoke a different (incorrect) response. Rearrange the problematic S^D s to mitigate confusion. 3) Irrelevant S^D s in the natural setting might control responding. Teach the learner to discriminate relevant critical components from irrelevant ones via discrimination training. 4) S^D s in the natural setting could be different from those in the training setting. Incorporate natural S^D s into the training environment when possible. Also, conduct some of the training in the natural environment. 5) Novel stimuli in the environment may compete or interfere with responding. Incorporate these stimuli into the training environment and conduct discrimination training.
7. Answers should include the following. 1) Completeness of task analysis: Missing elements of a task analysis will make the behavior chain more difficult to learn. The more accurate and complete the TA, the easier it will be for the learner to proceed through the chain. 2) Length or complexity of the chain: The longer and more complex the chain, the more difficult it will be to learn. 3) Schedule of reinforcement: The use of a schedule of reinforcement that is appropriate for the behavior chain will maintain responding in the chain. Consider the number of responses making up the chain when determining the type of chaining procedure to use and the schedule of reinforcement. For example, with backward chaining, responses at the end of the chain are closer to the reinforcer and get reinforced more often. With forward

chaining, responses at the front of the chain are reinforced more often but are further from the terminal reinforcer. 4) Stimulus variation: If an S^D is likely to vary, the learner may respond incorrectly to the untrained variations. Introduce all variations of an S^D when teaching a behavior chain. This will ensure the learner responds accurately regardless of the presented variation. 5) Response variation: A variation in the S^D is likely to require a varied response to produce the same result in the behavior chain. When stimulus variations are present, the instructor must teach the relevant response associated with the S^D .

Chapter 24 Answer Key

Multiple Choice

1. D
2. A, B, D
3. A
4. B
5. C
6. A
7. C
8. D
9. B
10. B, C, E

True/False

1. FALSE. Extinction produces a gradual decrease in behavior.
2. FALSE. This is the definition of resurgence. An extinction burst is a rapid increase in the frequency and/or intensity of the target behavior following cessation of reinforcement.
3. TRUE. For seriously harmful behaviors where rapid reduction is necessary, extinction as a singular intervention should not be used.
4. TRUE. If all sources of reinforcement cannot be held, the extinction procedure will be ineffective. Therefore, extinction should not be used when it is clear that the practitioner cannot effectively control access to the reinforcer.
5. TRUE. Spontaneous recovery is a common occurrence and will be short lived and limited if the extinction procedures remain in effect.

Matching

1. G
2. C
3. A
4. H
5. F
6. B
7. D
8. E

Short Answer/Essay

1. Extinction of a behavior maintained by positive reinforcement would consist of withholding the reinforcer previously maintaining the problem behavior, contingent upon the occurrence of problem behavior. For example, if a problem behavior was maintained by access to adult attention, extinction would involve the adult not providing attention contingent upon the occurrence of the identified behavior. On the other hand, for a behavior maintained by negative reinforcement, extinction would involve no longer providing escape from the aversive stimulus; rather, the individual would be required to continue interacting with the aversive stimulus following the problem behavior. For example, if the problem behavior was maintained by escape from toothbrushing, extinction would involve not letting the individual discontinue toothbrushing when the behavior occurred. Instead the individual would be required to continue with the toothbrushing task.

Chapter 25 Answer Key

Multiple Choice

1. A
2. D
3. A
4. D
5. C
6. A, C, D
7. B
8. A
9. D
10. A
11. C

True/False

1. TRUE.
2. TRUE.
3. FALSE. When selecting a response for a DRA/DRI intervention, one should select a response that is already in the learner's repertoire so that the behavior will likely contact the contingencies of reinforcement.
4. TRUE.
5. FALSE. It is better to begin with an interval DRO and move to a momentary DRO. Research has shown that momentary DRO can maintain effects established by interval DRO, but it is not effective in establishing low rates of behavior.
6. TRUE.

Short Answer/Essay

1. All differential reinforcement procedures use extinction for undesirable behavior. Thus, one mechanism that decreases the undesirable response is extinction. However, differential reinforcement also uses reinforcement for either incompatible, alternate, other, or low rates of behavior. If a behavior incompatible with the undesirable behavior is increased, the undesirable behavior must decrease. When alternate or other behaviors are increased, this typically results in a decrease in undesirable behavior due to differential response allocation based on reinforcer availability.

2. Answers should include:
 - a) A clear response that is a desirable alternative to the problem behavior.
 - b) The alternate response should result in some sort of negative reinforcement (escape from a nonpreferred activity).
 - c) The problem behavior should result in extinction (continued engagement in the nonpreferred task).
3. A DRO interval should be based on the baseline rate of responding. The best way to determine the interval is to compute the average baseline interresponse time and set your DRO interval slightly below this number in order to make it more likely that the learner will contact the contingencies of reinforcement that are in place. This interval length can be increased gradually over time.
4. A DRO interval can be increased by a constant duration of time (e.g., 15 seconds each time), proportionately (e.g., by 10% each time), or based on the learner's performance (e.g., using the IRT from the last session).
5. Answers should include:
 - a) Full-session DRL involves delivering reinforcement at the end of an instructional session if the target behavior was below a predetermined criterion for the entire session.
 - ✓ Examples will vary: For example, if the target behavior is pencil sharpening, then the learner would need to sharpen pencils only X times throughout the entire class period in order to receive the reinforcer.
 - b) In interval DRL, the instructional session is divided into a series of smaller intervals, and the learner receives reinforcement if the behavior does not exceed the predetermined criterion for each interval.
 - ✓ Examples will vary: For example, the teacher could divide a class period into two intervals, and the learner could earn reinforcement for each interval during which pencils were sharpened fewer than X times.
6. A spaced-responding DRL contingency is most useful when the practitioner wants a behavior to occur with a specific IRT. That is, a spaced-responding DRL involves delivering a reinforcer following an occurrence of a behavior that is separated by at least a minimum amount of time from a previous behavior. This would be useful anytime a certain "pace" of behavior is important. One example might be using the bathroom. This behavior is expected to occur at certain intervals during the day.

Chapter 26 Answer Key**Multiple Choice**

1. A
2. B
3. B
4. D
5. C
6. A
7. E
8. C
9. D

True/False

1. TRUE.
2. TRUE.
3. FALSE. Noncontingent reinforcement uses three distinct procedures: positive reinforcement, negative reinforcement, and automatic reinforcement.
4. FALSE. Behavioral effects of high-probability request sequence suggest the abative effects of an abolishing operation by *reducing* the value of reinforcement for non-compliance to low-p requests.
5. TRUE.
6. TRUE.
7. FALSE. Functional communication training does develop alternative behaviors that are sensitive to the establishing operations and this makes it different from antecedent interventions such as noncontingent reinforcement and high-p sequences that are not sensitive to establishing operations.

Short Answer/Essay

1. Noncontingent reinforcement (NCR) is an antecedent intervention in which stimuli with known reinforcing properties are delivered on a fixed-time (FT) or variable-time (VT) schedule independent of the learner's behavior. NCR may effectively decrease problem behavior because reinforcers that maintain the problem behavior are available freely and frequently. NCR functions as an abolishing operation (AO) but some behavior analysts use "behavior momentum" to describe the effects of this procedure. NCR uses positive reinforcement, negative reinforcement, and automatic reinforcement. When using NCR there are three key elements for implementing it effectively. These include the amount and quality

of stimuli with known reinforcing effectiveness, inclusion of extinction procedures, and varying the available reinforcing stimuli to reduce problems of changing preferences.

2. High-p sequence is an antecedent intervention that is also known as a high-probability instructional sequence. A high-p sequence involves the presentation of a series of easy-to-follow requests for which the individual has a history of compliance (i.e. high-p requests). After the individual complies with several high-p requests, the target request is presented (i.e. low-p). Behavioral effects of high-p instructional sequence suggest the abative effects of an abolishing operation by reducing the value of reinforcement for non-compliance to low-p requests. The high-p sequence provides non-aversive procedure for improving compliance by diminishing escape-maintained problem behaviors. This technique may decrease excessive slowness in responding to requests and increase the time used for completing tasks. Considerations for using the high-p instructional sequence effectively include selecting behaviors from the current repertoire, presenting requests in rapid succession, acknowledging compliance, and using potent reinforcers.
3. Functional communication training (FCT) is an antecedent intervention that establishes an appropriate communication behavior to compete with problem behaviors evoked by an establishing operation. Alternative responses can include vocalizations, signs, communication boards, words or picture cards, vocal output systems, and gestures. FCT is an application of DRA because it selects a specific alternative response that is developed in the individual's repertoire as a functionally equivalent response to the problem behavior. Effective use of FCT includes dense schedules of reinforcement, decreased use of verbal prompts, behavior reduction procedures, and schedule thinning. FCT is different from NCR and high-p request sequence because it develops alternative behaviors that are sensitive to the EO's.

Chapter 27 Answer Key

Multiple Choice

1. B
2. A, B, D
3. C
4. A, C, D
5. A
6. D
7. D
8. B
9. D
10. D
11. C

True/False

1. TRUE.
2. FALSE. FBA methods can actually be classified into three types including the two listed in the question, functional analysis and descriptive assessment, as well as indirect assessment.
3. FALSE. False positives are a concern with descriptive assessment.
4. FALSE. A potential virtue of non-experimental assessment is that they may contribute rich information to developing functional hypotheses and designing efficient analyses.
5. TRUE.

Matching

1. C
2. A, E
3. A
4. E
5. A
6. B, D
7. E

- 8. C
- 9. B, D, E
- 10. B

Short Answer/Essay

1. A functional behavior assessment allows a practitioner to obtain information about the purpose (or function) of a behavior for an individual. An FBA provides the opportunity to form hypothesis about the relationship between the behavior and the environment, and then test the hypothesis. The answer should include points such as an FBA 1) develops an understanding of the function of a behavior, 2) can suggest various types of interventions to prevent and replace problem behavior, and 3) may assist in prevention efforts by identifying the conditions that pose risks for future development of problem behaviors.
2. Identifying the conditions that maintain a problem behavior—identifying its function, in other words—points to environmental variables that may be altered to bring about meaningful change in the behavior. The topography, or form, of a behavior reveals little information about the actual conditions that account for it because behaviors can look very different but serve the same function, and behaviors looking exactly the same can serve completely different functions under different conditions. By only identifying the topography of a behavior, we are only able to tell what its form is or what it looks like without clarity about its controlling variables.
3. Understanding a problem behavior in terms of its controlling (antecedent) and maintaining (reinforcing) variables is a respectful way to understand an individual before changing their behavior. We may not be effective at creating socially meaningful and valid changes for a person, such as mitigating aversive stimuli or teaching habilitative skills to replace problem behavior, without first determining its function. Answers will vary but should illustrate how the intervention may not target the problem behavior at all, or even act to exacerbate the problem behavior.
4. Examples will vary but must refer explicitly to (a) altering the antecedent(s) for problem behavior to change and/or eliminate 1) the motivating operation for problem behavior, or 2) the discriminative stimuli that evoke problem behavior, and (b) altering some aspect (e.g., schedule or quantity) of consequent variables.
5. Answers will vary. Answers should include a clear discussion of the advantages such as: 1) its ability to yield clear demonstration of the variable(s) that maintain problem behavior; 2) it serves as the standard scientific method most often used in research on the assessment and treatment of problem behavior; 3) it enables the development of effective reinforcement-based treatments; and 4) it provides opportunities to explore alternative treatment methods and less reliance on punishment procedures. Answers should also include an illustration of the limitations such as: 1) assessment process may temporarily strengthen or increase the undesirable behavior to unacceptable levels, or result in the behavior acquiring new functions, which pose ethical and safety concerns; 2) the arrangement of conditions that set the occasion for, or potentially reinforce, problem behavior can be counter intuitive to causal observers; 3) some behaviors may not be amenable to a functional analysis because they occur infrequently; 4) if conducted in a

contrived setting it might not detect the variable that accounts for the occurrence of the problem behavior in the natural routine; and 5) the time, effort, and professional expertise required to conduct and interpret functional analyses can be an obstacle to its use in practice.

6. Default technologies are often implemented on a trial-and-error basis and may include increasingly restrictive interventions that vary from overcorrection, time-out, or response cost to the use of medication, protective equipment, restraint, and seclusion. Examples will vary.
7. Severe problem behavior is, by definition, unsafe, and may result in injury to the person emitting the behavior—who may also be experiencing other forms of significant distress—or to the individuals working with the person. Every effort should be made to reduce these risks. Answers to this question should offer at least 2 or 3 suggestions, including safety equipment, extra staff, the presence of medical personnel (although these must be used with caution, in the event that they may actually increase the likelihood of the behavior they are intended to manage), and modifying the analysis (especially precursor analysis).

Chapter 28 Answer Key

Multiple Choice

1. C
2. B
3. A
4. D
5. A
6. C
7. A
8. B
9. C
10. D
11. A, B, D
12. B

True/False

1. TRUE.
2. FALSE. It is common to combine token systems with other systems. In fact, the research literature shows this can be a very effective procedure.
3. FALSE. For maximum effectiveness, tokens should be delivered immediately following the target behavior—it is the "cash-in" for backup reinforcers that is delayed.
4. TRUE.
5. TRUE.
6. FALSE. It is important to write down the agreement so that the contract is specific. Also, the act of signing the contract is important to its success.
7. TRUE.
8. FALSE. Contingency contracts have been found to be useful in a variety of settings, including homes, schools, and clinics.
9. TRUE.
10. TRUE.

Short Answer/Essay

1. In a level system, students must acquire and achieve increasingly more refined behavior repertoires while the frequency of token reinforcement, social praise, or other desirable reinforcers is simultaneously decreased. As students advance through the levels, they earn more privileges, but their behavioral expectations also increase.
2. When a student doesn't earn tokens and becomes upset, it is important for the behavior analyst to remain calm and neutral. Avoid getting into confrontations, power struggles, and arguments over tokens. It is of course necessary that the student possesses the skills to earn tokens; if that is the case, then complaints should be handled with a matter-of-fact response such as, "You can try again tomorrow. " Similarly, when an individual tests the system, the behavior analyst should remain calm and neutral, responding with comments like, "That's your choice, " rather than getting into a verbal exchange/debate over the matter. It is important to consider buy-in: students should have the opportunity to contribute to facets of the system, such the development of rules and criteria or the selection and management of rewards.
3. Three things to consider when using a response cost system as part of a token economy are: (1) any behaviors subject to response cost should be clearly defined and stated in the rules, (2) more serious inappropriate behavior should result in greater token losses, and (3) a student should never lose more tokens than he/she possess (avoid having learners go "into debt").
4. Management issues to consider are:
 - a. Students need to be taught how to manage their tokens so that they are out of the way but readily available when needed. Students need to be taught how to store them safely so that they are not stolen.
 - b. Preemptive measures should be taken to avoid counterfeiting and bootlegging. Select tokens that are not easily duplicated.
 - c. Some students may hoard tokens and never exchange them, while others may exchange too freely and be unable to save for high quality items. Encourage spending for hoarders, and do not allow students with fewer than the requisite number of tokens to exchange (i.e., do not make "loans").
 - d. Chronic rule breakers deserve special consideration. It may be necessary to evaluate the quality of the reinforcers. It may be necessary to use a different system with them.
5. Interdependent group contingencies can be implemented in the following ways:
 - a. When the group as a whole meets the criterion
 - b. Based on the mean score of a group meeting criterion
 - c. Based on the results of the Good Behavior/Good Student game.
(examples of each will vary)
6. The determination of which type of group contingency to use should be based on the programmatic goals of the practitioner. If one wants to change the behavior of one person or a small group of individuals, then a dependent group contingency is the best choice. If one wants to differentially reinforce individuals for appropriate behavior, then an independent group contingency may be the best choice. If the practitioner wants to change everyone's performance, then an interdependent group contingency may be best.

7. Answers will vary. Answers should include at least a description of the task and of the reward. Tasks should be described in terms of (1) who will perform the task, (2) what the task is, (3) when the task must be completed, and (4) how well the task must be completed. Rewards should be described in terms of (1) who will judge task completion, (2) what the reward is, (3) when the reward will be received, and (4) how much of the reward will be earned. Answers may also describe how a task record might be included.
8. Answers will vary. However, the process you describe should include the following: Hold a family meeting to discuss how contracts work. Next, ask family members to identify tasks he/she can perform within the contract and tasks he/she already performs in the home. Next, fill out a list of behaviors that could be included in the contract. Next, fill out a list of rewards people would like to earn. Finally, write the contract, and be sure to include all of the necessary components.

Chapter 29 Answer Key**Multiple Choice**

1. A
2. A, D
3. C
4. A, C, D
5. C
6. A, B
7. D
8. B
9. A
10. D

True/False

1. TRUE.
2. FALSE. Quite the opposite: the steeper the discounting, the greater the impulsivity or inability to “delay gratification.”
3. FALSE. Antecedent-based self-management tactics include provision of *response prompts* and bringing challenging work under the control of a narrow set of stimulus conditions, among other tactics.
4. TRUE.
5. FALSE. Self-monitoring is a tactic that was originally conceived as a method of clinical assessment.
6. FALSE. Self-evaluation involves the comparison of a person’s performance by himself/herself with a predetermined goal or standard.

Short Answer/Essay

1. Answers will vary, but in addition to a well-operationalized definition, answers should include a description or illustration of at least 4 of the following guidelines: provide materials that make self-monitoring easy; provide supplementary cues or prompts; self-monitor the most important dimension of the target behavior; self-monitor early & often; & reinforce accurate self-monitoring.
2. Answers will vary. Each answer must include: (a) at least one antecedent tactic; (b) at least one tactic that contrives consequences to compete with natural contingencies; and (c) a system for monitoring the behavior (how and how often). Stronger answers will also include some discussion of public commitment, a self-management partner, and/or recognition of the need to evaluate and redesign the program as needed.

Chapter 30 Answer Key

Multiple Choice

1. C
2. D
3. B
4. A
5. C
6. D
7. B
8. A, B
9. D
10. B

True/False

1. FALSE. The total environment where instruction occurs, including any aspects of the environment, planned or unplanned, that may influence the learner's acquisition and generalization of the target behavior is referred to as the instructional setting.
2. TRUE.
3. FALSE. Stimulus equivalence is the emergence of accurate responding to untrained and non-reinforced stimulus-stimulus relations following the reinforcement of responses to some stimulus-stimulus relations
4. TRUE.
5. TRUE.
6. FALSE. A natural contingency of reinforcement or punishment—including socially mediated contingencies—is one that already exists in the relevant setting, independent of a behavior analyst's intervention. A contrived contingency includes any contingency of reinforcement (or punishment) designed and implemented by a behavior analyst or practitioner to achieve acquisition, maintenance, and/or generalization of a targeted behavior change.
7. TRUE.
8. FALSE. CRF should be used during initial acquisition of a skill for a learner and, also when strengthening little-used skills for a learner.
9. FALSE. A behavior trap is a set of powerful and interrelated contingencies that are initially accessed by a low-effort response and that subsequently motivate an individual to acquire, extend, and/or maintain a set of responses.
10. FALSE. The ripple effect and spillover effect refer to generalization across subjects or participants.

Short Answer/Essay

1. All answers should include the three major types of generalized behavior change: response maintenance; setting/situation generalization; and response generalization. Answers should provide a general definition of each with examples of how they would be promoted.
2. Answers will vary. Answers should include two of the following advantages/benefits of programming common stimuli and a brief explanation: conducting instruction in natural settings is not always possible or practical; community-based training may not expose learners to the full range of examples they are likely to encounter later in the same setting; instruction in natural settings may be less effective and efficient than classroom instruction because the trainer cannot halt the natural flow of events to contrive variety of training trials; and instruction in simulated settings can be safer.
3. Answers will vary. Answers should include five of the following suggestions as stated by Baer (1999) with a brief rationale for its importance in the performance of a target behavior: use two or more teachers; teach in two or more places; teach from a variety of positions; vary your tone of voice; vary your choice of words; show stimuli from a variety of angles; have others present sometimes; vary the reinforcers; teach in varying lighting conditions; teach in varying noise level conditions; vary decorations, furniture, & their locations; vary times of day for training sessions; vary the temperature of the training settings; vary the smells in the training settings; and vary the content of what's being taught (within limits possible).
4. Answers will vary. Answers should include three of the following factors that should be considered when teaching sufficient stimulus examples with a brief discussion of each: complexity of the target behavior; the teaching procedures employed; learner's opportunities to emit the target behavior under various conditions; naturally existing contingencies of reinforcement; and the learner's history of reinforcement for generalized responding.

Chapter 31 Answer Key

Multiple Choice

1. B
2. C
3. B, C, D
4. A
5. D
6. A, B, C, D
7. C
8. B
9. A, B
10. C
11. B, D

True/False

1. TRUE.
2. TRUE.
3. FALSE. Behavior analysts should discuss the limits of confidentiality *prior* to initiating services.
4. FALSE. Most professional organizations do more than “frown on” code violations. They often exact sanctions on members who do not follow the rules, including revoking their certifications and/or licenses, as well as expelling them from the organization.
5. FALSE. It is NEVER acceptable to present yourself as possessing licenses or certifications that you do not have.
6. TRUE. Most states have mechanisms for authorizing a course of action when an individual will not or cannot give consent for a necessary treatment, most often invoked when there is a life-threatening emergency or when a risk of serious harm is imminent. Practitioners should always follow all local, state, and national laws and regulations regarding consent.
7. TRUE. Behavior analysts often provide treatment in individuals’ homes and they visit clients and families frequently. This brings behavior analysts into close contact with clients in a natural setting, making it more likely that professional boundaries may be crossed.

Short Answer/Essay

1. Good behavior analysts are self-regulating. This means they continually seek ways to calibrate their behavior and decisions to ensure that values, contingencies, rights, and responsibilities are integrated and an informed combination of these is considered in delivering behavior analytic services. Continuing to stay abreast of current research in the field through professional reading and attending conferences can help the practitioner be self-regulating.
2. (1) Continuing Education Units are available by attending workshops and conferences. (2) Presenting at conferences or simply attending conferences, even if CEUs are not available. (3) Reading professional, high-quality, behavioral journals, such as the *Journal of Applied Behavior Analysis*, *The Behavior Analyst*, and *Behavior Analysis in Practice*. (4) Taking advantage of oversight and peer review opportunities, to present data, discuss goals and outcomes, and explain why choices and decisions were made.
3. In order to be considered capable of making informed decisions, an individual must have (a) adequate mental process or faculty by which he or she acquires knowledge, (b) the ability to select or express his or her choices, and (c) the ability to engage in a rational process of decision making. Adequate mental process is only questioned if an individual has impaired or limited ability to reason, remember, make choices, see the consequences of his/her actions, or plan for the future. What is considered adequate processes can vary for each proposed procedure.
4. The salient aspects of treatment that should be reviewed with an individual are: (a) all important aspects of the treatment procedure(s), (b) all potential risk and benefits of the procedure(s), (c) all potential alternative treatments, and (d) the right to refuse continued treatment at any time.
5. Questions you can ask yourself regarding the dignity of clients are: Do I honor the person's choices? Do I provide adequate space for privacy? Do I look beyond the person's disability and treat him/her with respect?
6. Is the client willing to participate? Are caregivers surrounding the client willing or able to participate? Has the behavior been successfully treated in the research literature? Is public support likely? Does the behavior analyst have the appropriate experience to deal with the problem? Will those most likely to be involved in implementing the program have adequate control of the critical environmental contingencies?
7. Discussion about actual clients should heavily disguise facts about the client to maintain confidentiality. Be aware that there is a lot of information about the person posting, which in combination with the client information may easily identify the client. Avoid making treatment recommendations – recommend a specific research article instead. Write a disclaimer indicating that you are not in a professional relationship with anyone reading your posts. Provide resources and an opportunity to communicate off-line if appropriate. Provide organizational training in the Compliance Code and navigating social media ethically.