

Behavior Modification

Principles and Procedures

Raymond G. Miltenberger

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Behavior Modification

Principles and Procedures

Raymond G. Miltenberger
University of South Florida

Seventh Edition



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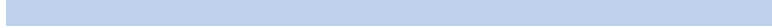
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To my wife, Nasrin, and my kids, Ryan, Roxanne, and Steven



About the Author



Raymond G. Miltenberger

Raymond G. Miltenberger received his Ph.D. in clinical psychology in 1985 from Western Michigan University. He is currently a professor and director of the Applied Behavior Analysis Program at the University of South Florida. Dr. Miltenberger teaches courses in the applied behavior analysis master's and doctoral programs. He conducts applied behavior analysis research with his students and publishes widely in the areas of sports and fitness, child safety skills training, habit disorders, and functional assessment and treatment of behavioral disorders. In addition to spending time with his family, he enjoys walking and biking, golf, reading, and travel.

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Preface

I am gratified that the first six editions of *Behavior Modification: Principles and Procedures* received positive reviews from students and professors. The seventh edition has kept the positive features of the first six editions, has been revised to address the suggestions of reviewers, and has been updated to reflect the latest research in behavior modification.

The goal of this seventh edition (as with the earlier editions) is to describe basic principles of behavior so that the student learns how environmental events influence human behavior and to describe behavior modification procedures so that the student learns the strategies by which human behavior may be changed. The text is divided into 25 relatively short chapters, each covering a manageable amount of information (for example, one principle or procedure). This text can be used in a standard one-semester course in behavior modification, applied behavior analysis, behavior management, or behavior change.

The material in the text is discussed at an introductory level so that it may be understood by students with no prior knowledge of the subject. This text is intended for undergraduate students or beginning graduate students. It would also be valuable for individuals working in human services, education, or rehabilitation who must use behavior modification procedures to manage the behavior of the individuals in their care.

I have made a concerted effort in this text to ensure examples reflect the fullness of human diversity with respect to ability, language, culture, gender, age, socioeconomic, and other forms of human difference that students may bring to the classroom.

Features of the Text Continued from the First Six Editions

The following features of the text are intended to help the reader learn easily.

Organization of the Text Following a general introduction to the field in Chapter 1, Chapters 2 and 3 present information on behavior recording, graphing, and measuring change. This information will be used in each subsequent chapter. Next, Chapters 4–8 focus on the basic principles of operant and respondent behavior. The application of these principles forms the subject of the remaining 17 chapters. Procedures to establish new behaviors are described in Chapters 9–12, and procedures to increase desirable behaviors and decrease undesirable behaviors are considered in Chapters 13–19. Finally, Chapters 20–25 present a survey of other important behavior modification procedures.

Principles and Procedures The various procedures for changing behavior are based on the fundamental principles of behavior established in experimental research over the past 90 years. In the belief that the student will better understand the procedures after first learning the fundamental principles, the principles underlying operant and respondent behavior are reviewed in Chapters 4–8; the application of the principles in the behavior modification procedures is described in Chapters 9–25.

Examples from Everyday Life Each chapter uses a variety of real-life examples—some relevant to college students, some chosen from the author’s clinical and research experience—to bring the principles and procedures to life.

Examples from Research In addition, both classic studies and the most up-to-date research on behavior modification principles and procedures are integrated into the text.

Practice Quizzes Three fill-in-the-blank quizzes with 10 questions are provided at the end of each of the 25 chapters. The practice quizzes provide students with further exercises for self-assessment of their knowledge of the chapters’ content.

Practice Tests Practice tests at the end of each chapter have short-answer essay questions and include page numbers where the answers can be found.

Application Exercises At the end of each chapter where procedures are taught (Chapters 2, 3, and 9–25), several application exercises are provided. In each exercise, a real-life case is described and then the student is asked to apply the procedure described in the chapter. These exercises give students an opportunity to think about how the procedures are applied in real life.

Misapplication Exercises The application exercises are followed by misapplication exercises. In each one, a case example is provided, and the procedure from the chapter is applied to the case in an incorrect or inappropriate manner. The student is asked to analyze the case example and to describe what is wrong with the application of the procedure in that case. These misapplication exercises require the student to think critically about the application of the procedure. Answers to the applications and misapplications are in the Solution and Answer Guide; these are valuable tools for instructors, as they assess their students’ abilities to apply the information provided in the chapter.

Step-by-Step Approach In each chapter in which a particular behavior modification procedure is taught, the implementation of the procedure is outlined in a step-by-step fashion, for ease of comprehension.

Summary Boxes Periodically throughout the text, information from a chapter is summarized in a box that has been set off from the text. These boxes are intended to help the student organize the material in the chapter.

Chapter Summaries Chapter summaries provide information that is consistent with the major headings in each chapter.

Examples for Self-Assessment In the early chapters on basic principles (Chapters 4–7), there are tables with examples of the principle discussed within that chapter. Later in the chapter (or in a subsequent chapter), the student is directed to return to a specific table and, using the new information being presented in the chapter, to analyze specific aspects of the examples provided in that table.

Self-Assessment Questions At intervals throughout the text, students are presented with self-assessment questions. To answer these questions, students will need to use the information already presented in the chapter. These questions will help students assess their understanding of the material. In most cases, answers are presented in the text immediately following the question.

Figures Most of the chapters include figures from the research literature to illustrate important principles or procedures. Students must use information from earlier chapters on behavior recording, graphing, and measuring change to analyze the graphs.

For Further Reading Each of the chapters includes a For Further Reading box. In this feature, interesting articles that are relevant to the content of the chapter are identified and briefly described. Citations for these articles have also been provided. These articles are from major behavioral journals, so they can be easily accessed online by students. Instructors can assign these articles for extra credit or as reading assignments for when more advanced students use the textbook.

List of Key Terms After each Chapter Summary section, there is a list of the new terms that were used in the chapter. The list of key terms shows the page number on which each term was introduced. Although these terms are all found in the Glossary at the end of the text, having the new terms, and their page numbers, listed at the end of each chapter will allow the student to have an easy reference to the terms when reading the chapter or when studying for a test or quiz.

Glossary At the end of the text is a glossary of the important behavior modification terms used in the text. Each term is followed by a succinct and precise definition.

New Features in the Seventh Edition

Learning Objectives Added new learning objectives at the beginning of each chapter to guide students' attention to the most important topics in each chapter.

Cultural Diversity Added a discussion of cultural diversity to Chapters 1 and 13. The names that appear in all chapters are now more culturally diverse.

Graphing and Functional Relationships Added a discussion of level, trend, and variability in evaluating data in a graph in Chapter 3. Made the distinction between graphs to evaluate behavior change (A–B design) versus graphs to demonstrate a functional relationship (research designs).

Reinforcement Added information in Chapter 4 to include more information on concurrent schedules, a description of the matching law, a description of multiple schedules of reinforcement, and a description of behavioral contrast. Also added a discussion of decision rules for analyzing reinforcement.

Resurgence Described the concept of resurgence in the discussion of reinforcement of functionally equivalent responses when using extinction in Chapter 5.

Self-Assessment Exercises Added self-assessment exercises in more chapters to help students understand concepts and distinguish among concepts presented in the chapters.

Stimulus Equivalence Added a section in Chapter 7 on stimulus equivalence, with new figures to help explain the concepts.

Verbal Behavior Added a section on verbal behavior in Chapter 10. Explained the different verbal operants, discussed multiple control, and discussed training verbal behavior.

Functional Assessment Added information in Chapter 13 on using the functional assessment interview, the importance of multiple informants and having experts in behavior analysis conduct the interview, using the interview to build rapport with caregivers, and assessing factors related to cultural diversity. Provided more information on test versus control conditions in conducting a functional analysis. Discussed the interview informed synthesized contingency analysis as a type of hypothesis testing functional analysis. Discussed functional assessment in research versus practice.

Antecedent Interventions Added information in Chapter 16 on the high-p instructional sequence as an antecedent intervention, described behavioral momentum theory as an explanation for its effectiveness, and described noncontingent reinforcement.

Acceptance-Based Therapies Added a discussion in Chapter 25 of mindfulness and mindfulness-based therapies. Added more information on acceptance and commitment therapy.

New References Added 178 new references to reflect recent research and provide the scientific support for the principles and procedures presented in the text.

Other New Features

- Discussed telehealth as a new direction in behavior modification in Chapter 1.
- Introduced the term *sampling methods* to categorize interval recording and time sample recording in Chapter 2.
- Added a “For Further Reading” box to discuss the choice of continuous versus discontinuous recording methods in Chapter 2.
- Added more information to help students distinguish between positive and negative reinforcement and positive and negative punishment in Chapters 4 and 6.
- Added new information on momentary DRO in Chapter 15.
- Added more information on the function of habits in Chapter 21.
- Introduced comprehensive behavioral intervention for tics in Chapter 21.
- Discussed new research on treatment for habits during public speaking in Chapter 21.
- Added new information on behavioral contracting for parents in Chapter 23.
- Restructured information to emphasize relaxation procedures and fear reduction procedures in Chapter 24.

Instructor Resources

Additional instructor resources for this product are available online. Instructor assets include an Instructor’s Manual, Solution and Answer Guide, PowerPoint® slides, and a test bank powered by Cengage®. Sign up or sign in at www.cengage.com to search for and access this product and its online resources.

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For the Behavior Modification Student

To get the most out of this text and out of your behavior modification course, you are encouraged to consider the following recommendations.

1. Read the assigned chapters before the class meeting at which the chapter is to be discussed. You will benefit more from the class if you have first read the material.
2. Answer each of the self-assessment questions in the chapter to check if you understand the material just covered.
3. Complete the end-of-chapter practice quizzes to assess your knowledge of the chapter content.
4. Answer the practice test questions at the end of each chapter. If you can answer each question, you know that you understand the material in the chapter.
5. Complete the application and misapplication exercises at the end of the procedure chapters. In that way, you will understand the material in the chapter well enough to apply it or to identify how it is applied incorrectly.
6. The best way to study for a test is to test yourself. After reading and rereading the chapter and your class notes, test yourself in the following ways.
 - Review the key terms in the chapter and check if you can define them without looking at the definitions in the text.

- Review each practice test question at the end of the chapter and check if you can give the correct answer without searching for the answer in the text or in your notes.
- Come up with novel examples of each principle or procedure in the chapter.
- Make flash cards with a term or question on one side and the definition of the term or the answer to the question on the other side. While studying, look at the term (or question) on one side of the card and then read the definition (or answer) on the other. As

you study, you will find that you need to turn the cards over less and less often. Once you can supply the answer or definition on the back of the card without looking, you'll know that you understand the material.

- Always study in a location that is reasonably free from distractions or interruptions.
- Always begin studying for a test at least a few days in advance. Give yourself more days to study as more chapters are included on the test.

The following websites provide a range of valuable information about different aspects of behavior modification or applied behavior analysis.

http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1938-3703	<i>Journal of Applied Behavior Analysis</i>
http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1938-3711	<i>Journal of the Experimental Analysis of Behavior</i>
http://www.abainternational.org	The Association for Behavior Analysis International
http://www.apbahome.net/	Association of Professional Behavior Analysts
https://www.apa.org/about/division/div25 http://www.abct.org	APA Division 25 (Behavior Analysis)
http://www.abct.org	Association for Behavioral and Cognitive Therapy
http://fabaworld.org	Florida Association for Behavior Analysis
http://www.calaba.org/	California Association for Behavior Analysis
http://www.txaba.org/	Texas Association for Behavior Analysis
http://babat.org/	Berkshire Association for Behavior Analysis and Therapy
www.autismspeaks.org	Autism Speaks
http://www.behavior.org	Cambridge Center for Behavioral Studies
http://www.bfskinner.org/	B. F. Skinner Foundation
http://www.bacb.com/	Behavior Analyst Certification Board

Raymond G. Miltenberger

Introduction to Behavior Modification

1

Learning Objectives

- 1-1 Define human behavior
- 1-2 Describe the defining features of behavior modification
- 1-3 Describe the historical roots of behavior modification
- 1-4 Describe the ways behavior modification has improved people's lives

In this textbook, you will learn about behavior modification, the principles, and procedures used to understand and change human behavior. Behavior modification procedures come in many forms. Consider the following examples.

Ted and Jane were having some difficulties in their marriage because of frequent arguments. Their marriage counselor arranged a behavioral contract with them in which they agreed to do several nice things for each other every day. As a result of this contract, their positive interactions increased and their negative interactions (arguments) decreased.

Tanisha pulled her hair incessantly and as a result created a bald spot on the top of her head. Although she was embarrassed by the bald spot, which measured 1 inch in diameter, she continued to pull her hair. Her psychologist implemented a treatment in which Tanisha was to engage in a competing activity with her hands (e.g., needlepoint) each time she started to pull her hair or had the urge to pull. Over time, the hair pulling stopped and her hair grew back in.

Francisco joined a fitness group. At each group meeting, Francisco deposited a sum of money, set a goal for daily exercise, and earned points for meeting his exercise goals each week. If he earned a specified number of points, he got his deposit back. If he did not earn enough points, he lost part of his deposit money. Francisco began to exercise regularly and lost weight as a result of his participation in the group.

Dr. Crosland had a research meeting with her graduate students every Wednesday at 8:00 A.M. She noticed that many students arrived a few minutes late each time. Dr. Crosland began giving every student who showed up by 8:00 A.M. a ticket and requiring every student who showed up late to put a dollar in a jar. She randomly chose one ticket each week and gave that student the dollars in the jar. After she put this plan in place, students rarely showed up late again.

You will notice that each of these examples focuses on some aspect of human behavior and describes ways to change the behavior. Because behavior modification focuses on behavior and behavior change, it is appropriate to begin with a discussion of behavior.

1-1 Defining Human Behavior

Human behavior is the subject matter of behavior modification. **Behavior** is what people do and say. The characteristics that define behavior are as follows.

1. Behavior involves a person's actions (what people do or say); it is described with action verbs. Behavior is not a static characteristic of the person. If you say that a person is angry, you have not identified the person's behavior; you have simply labeled the person. If you identify what the person says or does when angry, then you have identified behavior. For example, "Jennifer screamed at her mother, ran upstairs, and slammed the door to her room." This is a description of behavior that might be labeled as anger.
2. Behaviors have **dimensions** that can be measured. You can measure the **frequency** of a behavior; that is, you can count the number of times a behavior occurs (e.g., Shane bit his fingernails 12 times in the class period). You can measure the **duration** of a behavior, or the time from when an instance of the behavior starts until it stops (e.g., Shih jogged for 25 minutes). You can measure the **intensity** of a behavior or the physical force involved in the behavior (e.g., Hamid bench pressed 220 pounds). You can measure the speed of behavior, or the **latency** from some event to the start of a behavior. Frequency,

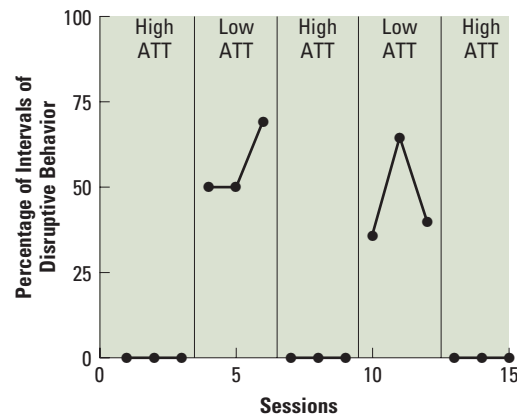
duration, intensity, and latency are all dimensions of a behavior. A dimension is a measurable aspect of the behavior.

3. Behaviors can be observed, described, and recorded by others or by the person engaging in the behavior. Because a behavior is an action, its occurrence can be observed. People can see the behavior (or detect it through one of the senses) when it occurs. Because it is observable, the person who sees the behavior can describe it and record its occurrence. (Refer to Chapter 2 for a description of methods for recording behavior.)
4. Behaviors have an impact on the environment, including the physical and the social environment (other people and ourselves). Because a behavior is an action that involves movement through space and time (Johnston & Pennypacker, 1981), the occurrence of a behavior has some effect on the environment in which it occurs. Sometimes the effect on the environment is obvious. You turn on the light switch, and the light goes on (an effect on the physical environment). You raise your hand in class, and your professor calls on you (an effect on other people). You recite a phone number from a website, and you are more likely to remember it and to dial the correct number (an effect on yourself). Sometimes the effect of a behavior on the environment is not obvious. Sometimes it has an effect only on the person who engages in the behavior. However, all human behavior operates on the physical or social environment in some way, regardless of whether we are aware of its impact.
5. Behavior is lawful; that is, its occurrence is systematically influenced by environmental events. Basic behavioral principles describe the functional relationships between our behavior and environmental events. These principles describe how our behavior is influenced by, or occurs as a function of, environmental events (refer to Chapters 4–8). These basic behavioral principles are the building blocks of behavior modification procedures. Once you understand the environmental events that cause behaviors to occur, you can change the events in the environment to alter behavior. Consider the graph in Figure 1-1, which shows the disruptive behavior of a child with autism in the classroom. When the child receives high levels of attention from the teacher, his disruptive behavior rarely occurs. When the child receives low levels of attention from the teacher, his disruptive behavior occurs more frequently. We conclude that the disruptive behavior is functionally related to the level of teacher attention.

These defining characteristics of behavior apply to behaviors that are overt or covert. Most often, behavior modification procedures are used to understand and change overt behaviors.

Figure 1–1

This graph, adapted from a study by Durand and Carr (1992), shows the influence of teacher attention on the disruptive behavior (defined as pushing away task materials; loud screaming, whining, or crying; and hitting or knocking over objects) of a young boy (Paul) in a special education classroom. The graph shows that disruptive behavior does not occur when Paul receives frequent teacher attention (High ATT). However, when Paul receives teacher attention infrequently (Low ATT), he engages in disruptive behavior about 50% of the time. This graph shows the functional relationship between the teacher's attention and Paul's disruptive behavior. (Based on Durand, V. M., & Carr, E. G. [1992]. An analysis of maintenance following functional communication training. *Journal of Applied Behavior Analysis*, 25, 777-794).



An **overt behavior** is an action that can be observed and recorded by a person other than the one engaging in the behavior. Even if no one else is present when the behavior occurs, it is overt behavior if it could have been recorded if someone were there to observe it. However, some behaviors are covert. **Covert behaviors**, also called *private events* (Skinner, 1974), are not observable by others. For example, thinking is a covert behavior; it cannot be observed and recorded by another person. Thinking can be observed only by the person engaging in the behavior. The field of behavior modification focuses primarily on overt or observable behaviors, as does this textbook. However, Chapters 8, 24, and 25 discuss covert behaviors and behavior modification procedures applied to them.

Characteristics of Behavior

- Behavior is what people do and say.
- Behaviors have dimensions that can be measured.
- Behaviors can be observed, described, and recorded.
- Behaviors have an impact on the environment.
- Behavior is lawful.

1-2 Examples of Behavior

Now let's illustrate the defining characteristics of behavior with some examples. The following examples include both common behaviors and problematic behaviors for which behavior modification procedures might be used.

Kumiko sits at her computer and types an email to her parents.

This is behavior: pressing the keys on the keyboard while typing is an action, has physical dimensions (frequency of pressing keys, duration of typing), can be observed and recorded, has an impact on the environment (produces letters on the screen), and is lawful (occurs because of previous learning that pressing the keys produces letters on the screen).

Mandy lies in her crib and cries loudly. Her mother picks her up and feeds her.

This behavior has all five of the characteristics described in the previous example (an action that has measurable dimensions, can be observed and recorded, produces an effect on the environment, and is lawful). One difference is that the effect of crying is on the social environment: her mother responds to her crying by picking her up and feeding her. Each past instance of crying has resulted in Mandy's mother feeding her, so the crying continues to occur when Mandy is hungry. There is a functional relationship between Mandy's crying and the mother's behavior of feeding her.

Lamont's paper for his behavior modification class is a week late. Lamont gives the paper to his professor and lies, saying he missed the deadline because had to go home to visit his sick grandmother. The professor accepts the paper without any penalty. Lamont also missed a history test. He tells his history professor he missed the test because of his sick grandmother. The professor lets him take the test a week late.

Lamont's behavior—lying about his visit to his sick grandmother—has all five characteristics of a behavior. It is an action (something he said) that occurred twice (frequency), was observed by his professors, and resulted in an effect on his social environment (his professors let him hand in a paper and take a test late without a penalty); it is lawful because there is a functional relationship between the behavior (lying) and the outcome (getting away with a late paper and test).

Samantha is a 6-year-old with an intellectual disability who attends special education classes. When the teacher is helping other students and not paying attention to her, Samantha cries and bangs her head on the table or floor. Whenever Samantha bangs her head, the teacher stops what she is doing, picks her up, and comforts her. She tells Samantha to calm down, assures her that everything is all right, gives her a hug, and often lets Samantha sit on her lap.

? Identify each of the five characteristics of Samantha's behavior.

Samantha's head banging is a behavior. It is an action that she repeats a number of times each day. The teacher could observe and record the number of occurrences each day. The head banging produces an effect on the social environment: the teacher provides attention each time the behavior occurs. Finally, the behavior is lawful: it continues to occur because there is a functional relationship between the head-banging behavior and the outcome of teacher attention.

1-3 Defining Behavior Modification

Behavior modification is the applied science and professional practice concerned with analyzing and modifying human behavior.

- *Analyzing* means identifying the functional relationship between environmental events and a particular behavior to understand the reasons for the behavior or to determine why a person behaved as they did.
- *Modifying* means developing and implementing procedures to help people change their behavior. It involves altering environmental events to influence behavior. Behavior modification procedures are developed by professionals (e.g., board certified behavior analysts) and used to change socially significant behaviors, with the goal of improving some aspect of a person's life. Following are some characteristics that define behavior modification (Gambrill, 1977; Kazdin, 1994).

1-4 Characteristics of Behavior Modification

- *Focus on behavior.* Behavior modification procedures are designed to change behavior, not a personal characteristic or trait. Therefore, behavior modification de-emphasizes labeling. For example, behavior modification is not used to change autism (a label); rather, behavior modification is used to change problem behaviors exhibited by children with autism.

Behavioral excesses and deficits are targets for change with behavior modification procedures. In behavior modification, the behavior to be modified is called the **target behavior**. A **behavioral excess** is an undesirable target behavior the person wants to decrease in frequency, duration, or intensity. Smoking is an example of a behavioral excess. A **behavioral deficit** is a desirable target behavior the person wants to increase in frequency, duration, or intensity. Exercise and studying are possible examples of behavioral deficits.

- *Guided by the theory and philosophy of behaviorism.* The guiding theoretical framework behind behavior modification is **behaviorism**. Behaviorism's core tenets are that behavior is

lawful and controlled by environmental events occurring in close temporal relation to the behavior (refer also to Baum, 1994; Chiesa, 1994; Skinner, 1953a, 1974).

- *Procedures based on behavioral principles.* Behavior modification is the application of basic principles originally derived from experimental research with laboratory animals (Skinner, 1938) and humans. The scientific study of behavior is called the **experimental analysis of behavior**, or behavior analysis (Skinner, 1953b, 1966). The scientific study of human behavior to help people change behavior in meaningful ways is called **applied behavior analysis** (Baer et al., 1968, 1987). Behavior modification procedures are based on research in applied behavior analysis that has been conducted for more than 60 years (Ullmann & Krasner, 1965; Ulrich et al., 1966).
- *Emphasis on current environmental events.* Behavior modification involves assessing and modifying the current environmental events that are functionally related to the behavior. Human behavior is controlled by events in the immediate environment, and the goal of behavior modification is to identify those events. Once these **controlling variables** have been identified, they are altered to modify the behavior. Successful behavior modification procedures alter the functional relationships between the behavior and the controlling variables in the environment to produce a desired change in the behavior. Sometimes labels are mistakenly identified as the causes of behavior. For example, a person might say that a child with autism engages in problem behaviors (such as screaming, hitting himself, and refusal to follow instructions) because the child is autistic. In other words, the person is suggesting that autism causes the child to engage in the behavior. However, autism is simply a label that describes the pattern of behaviors the child engages in. The label cannot be the cause of the behavior because the label does not exist as a physical entity or event. The causes of the behavior must be found in the environment (including the biology of the child).
- *Precise description of behavior modification procedures* (Baer et al., 1968). Behavior modification procedures involve specific changes in environmental events that are functionally related to the behavior. For the procedures to be effective each time they are used, the specific changes in environmental events must occur each time. By describing procedures precisely, researchers and other professionals make it more likely that the procedures will be used correctly each time.
- *Treatment implemented by people in everyday life* (Kazdin, 1994). Behavior modification procedures are developed by professionals (board certified behavior analysts; board certified assistant behavior analysts; or other professionals, such as licensed psychologists specifically trained in behavior modification). However, behavior modification procedures often are implemented by people such as teachers, parents, job supervisors, or others to help people change their behavior. People who implement behavior modification procedures should do so only after sufficient training by a professional. Precise descriptions of procedures and professional supervision make it more likely that parents, teachers, and others will implement procedures correctly.
- *Measurement of behavior change.* One of the hallmarks of behavior modification is its emphasis on measuring the behavior before and after intervention to document the behavior change resulting from the behavior modification procedures. In addition, ongoing assessment of the behavior is done well beyond the point of intervention to determine whether the behavior change is maintained in the long run. If a supervisor is using behavior modification procedures to increase work productivity (to increase the number of units assembled each day), the supervisor would record the workers' behavior for a period before implementing the procedures. The supervisor would then implement the behavior modification procedures and continue to record the behavior. This recording would establish whether the number of units assembled increased. If the workers' behavior changed after the supervisor's intervention, they would continue to record the behavior for a further period. Such long-term observation would demonstrate whether the workers continued to assemble units at the increased rate or whether further intervention was necessary.

Behavior Modification and Applied Behavior Analysis

Behavior modification (as described in this textbook) and applied behavior analysis are two terms used to identify virtually identical fields. Although research on the application of behavioral principles to help people change their behavior (behavior modification) had been published since the late 1950s, the term *applied behavior analysis* was introduced in 1968 in the first issue of the *Journal of Applied Behavior Analysis* with the publication of Baer, Wolf, and Risley's article defining applied behavior analysis. In their article, Baer et al. (1968) identified a number of characteristics of applied behavior analysis including (a) a focus on socially important behavior; (b) demonstration of functional relationships between environmental events and behavior; (c) clear description of procedures; (d) connection to basic behavioral principles; and (e) production of meaningful, generalizable, and long-lasting changes in behavior. These defining features of applied behavior analysis also characterize the contemporary field of behavior modification as described in this textbook.

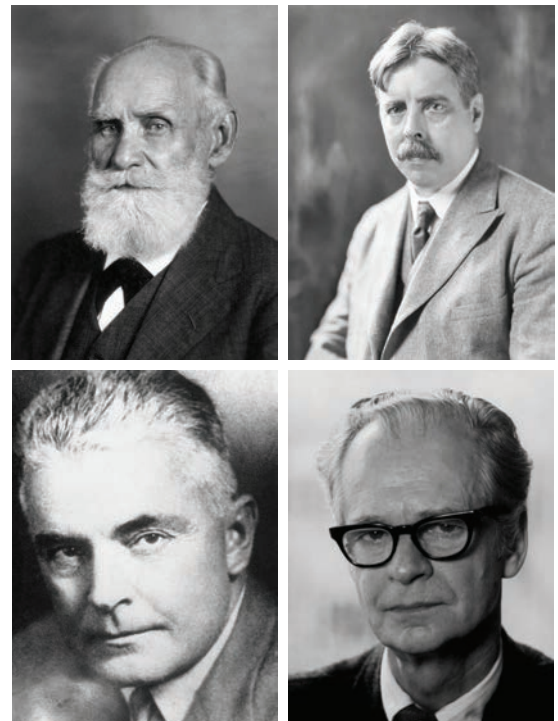
Characteristics of Behavior Modification

- Focus on behavior
 - Guided by the theory and philosophy of behaviorism
 - Based on behavioral principles
 - Emphasis on current environmental events
 - Precise description of procedures
 - Implemented by people in everyday life
 - Measurement of behavior change
 - De-emphasis on past events as causes of behavior
 - Rejection of hypothetical underlying causes of behavior
- *De-emphasis on past events as causes of behavior.* As stated earlier, behavior modification places emphasis on recent environmental events as the causes of behavior. However, knowledge of the past also provides useful information about environmental events related to the current behavior. For example, previous learning experiences have been shown to influence current behavior. Therefore, understanding these learning experiences can be valuable in analyzing current behavior and choosing behavior modification procedures. Although information on past events is useful, knowledge of current controlling variables is most relevant to developing effective behavior modification interventions because those variables, unlike past events, can still be changed.
- *Rejection of hypothetical underlying causes of behavior.* Although some fields of psychology, such as Freudian psychoanalytic approaches, might be interested in hypothesized underlying causes of behavior, such as an unresolved Oedipus complex, behavior modification rejects such hypothetical explanations of behavior. Skinner (1974) has called such explanations “explanatory fictions” because they can never be proved or disproved and are thus unscientific. These supposed underlying causes can never be measured or manipulated to demonstrate a functional relationship to the behavior they are intended to explain.

In his experiments, Pavlov presented the neutral stimulus (the sound of a metronome) at the same time that he presented food to a dog. Later, the dog salivated in response to the sound of the metronome alone. Pavlov called this a *conditioned reflex* (Pavlov, 1927).

Figure 1–2

Four major figures who were instrumental in developing the scientific principles on which behavior modification is based. Clockwise from top left: Ivan P. Pavlov, Edward L. Thorndike, B. F. Skinner, John B. Watson. (Photo credits: SOV; Archives of the History of American Psychology, Center for the History of Psychology—The University of Akron; Courtesy of the B. F. Skinner Foundation; Archives of the History of American Psychology, Center for the History of Psychology—The University of Akron.)



Zuri Swimmer/Alamy Stock Photo; Photo courtesy of Humanities and Social Science Library/NewYork Public Library/Science Photo Library; Bettmann/Getty Images; Science History Images/Alamy Stock Photo

1-5 Historical Roots of Behavior Modification

A number of historical events have contributed to the development of behavior modification. Let’s briefly consider some important figures, publications, and organizations in the field.

Major Figures

Following are some of the major figures who were instrumental in developing the scientific principles on which behavior modification is based (Figure 1-2) (Michael, 1993a).

Ivan P. Pavlov (1849–1936) Pavlov conducted experiments that uncovered the basic processes of respondent conditioning (refer to Chapter 8). He demonstrated that a reflex (salivation in response to food) could be conditioned to a neutral stimulus.

Edward L. Thorndike (1874–1949) Thorndike’s major contribution was the description of the **law of effect**. The law of effect states that a behavior that produces a favorable effect on the environment is more likely to be repeated in the future. In Thorndike’s famous experiment, he put a cat in a cage and set food outside the cage where the cat could see it. To open the cage door, the cat had to hit a lever with its paw. Thorndike showed that the cat learned to hit the lever and open the cage door. Each time the cat was put into the cage, it hit the lever more quickly because that behavior—hitting the lever—produced a favorable effect on the environment: it allowed the cat to reach the food (Thorndike, 1911).

John B. Watson (1878–1958) In his 1913 article “Psychology as the Behaviorist Views It,” Watson asserted that observable behavior was the proper subject matter of psychology and that all behavior was controlled by environmental events. In particular, Watson described a stimulus-response psychology in which environmental events (stimuli) elicited responses. Watson started the movement in psychology called *behaviorism* (Watson, 1913, 1924).

B. F. Skinner (1904–1990) Skinner expanded the field of behaviorism originally described by Watson. Skinner explained the distinction between *respondent conditioning* (the conditioned reflexes described by Pavlov and Watson) and *operant*

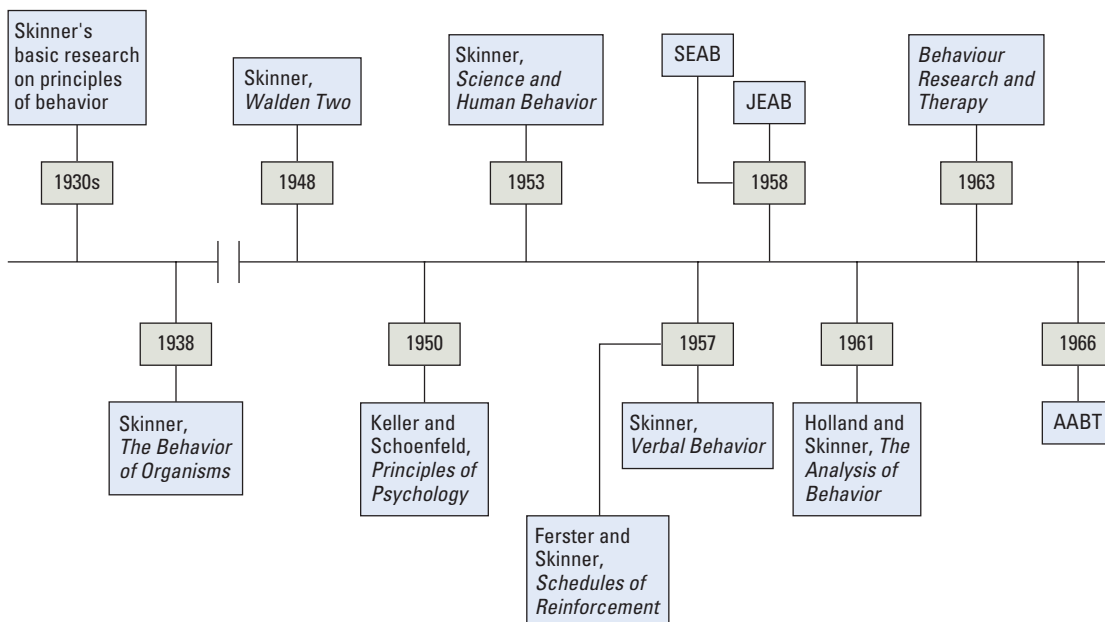
conditioning, in which the consequence of behavior controls the future occurrence of the behavior (as in Thorndike’s law of effect). Skinner’s research elaborated the basic principles of operant behavior (refer to Chapters 4–7). In addition to his laboratory research demonstrating basic behavioral principles, Skinner wrote a number of books in which he applied the principles of behavior analysis to human behavior. Skinner’s work is the foundation of behavior modification (Skinner, 1938, 1953a).

Early Behavior Modification Researchers

After Skinner laid out the principles of operant conditioning, researchers continued to study operant behavior in the laboratory (Catania, 1968; Honig, 1966). In addition, in the 1950s, researchers began demonstrating behavioral principles and evaluating behavior modification procedures with people. These early researchers studied the behavior of children (Azrin & Lindsley, 1956; Baer, 1960; Bijou, 1957), adults (Goldiamond, 1965; Verplanck, 1955; Wolpe, 1958), patients with mental illness (Ayllon & Azrin, 1964; Ayllon & Michael, 1959), and individuals with intellectual disabilities (Ferster, 1961; Fuller, 1949; Wolf et al., 1964). Since the beginning of behavior modification research with humans in the 1950s, thousands of studies have established the effectiveness of behavior modification principles and procedures.

Figure 1–3

This timeline shows the major events in the development of behavior modification. Starting in the 1930s with Skinner’s basic research on the principles of behavior, the timeline includes major books, journals, and professional organizations. SEAB, Society for the Experimental Analysis of Behavior; JEAB, *Journal of the Experimental Analysis of Behavior*; AABT, Association for Advancement of Behavior Therapy; JABA, *Journal of Applied Behavior Analysis*.



Major Publications and Events

A number of books heavily influenced the development of the behavior modification field. In addition, scientific journals were developed to publish research in behavior analysis and behavior modification, and professional organizations were started to support research and professional activity in behavior analysis and behavior modification. These books, journals, and organizations are listed in the timeline in Figure 1-3. (For a more complete description of these publications and organizations, refer to Cooper et al., 1987, 2007, 2020; and Michael, 1993a.)

1-6 Areas of Application

Behavior modification procedures have been used in many areas to help people change a vast array of problematic behaviors (Carr & Austin, 2001; Fisher et al., 2021; Gambrill, 1977; Lutzker & Martin, 1981; Vollmer et al., 2001). This section briefly reviews these areas of application.

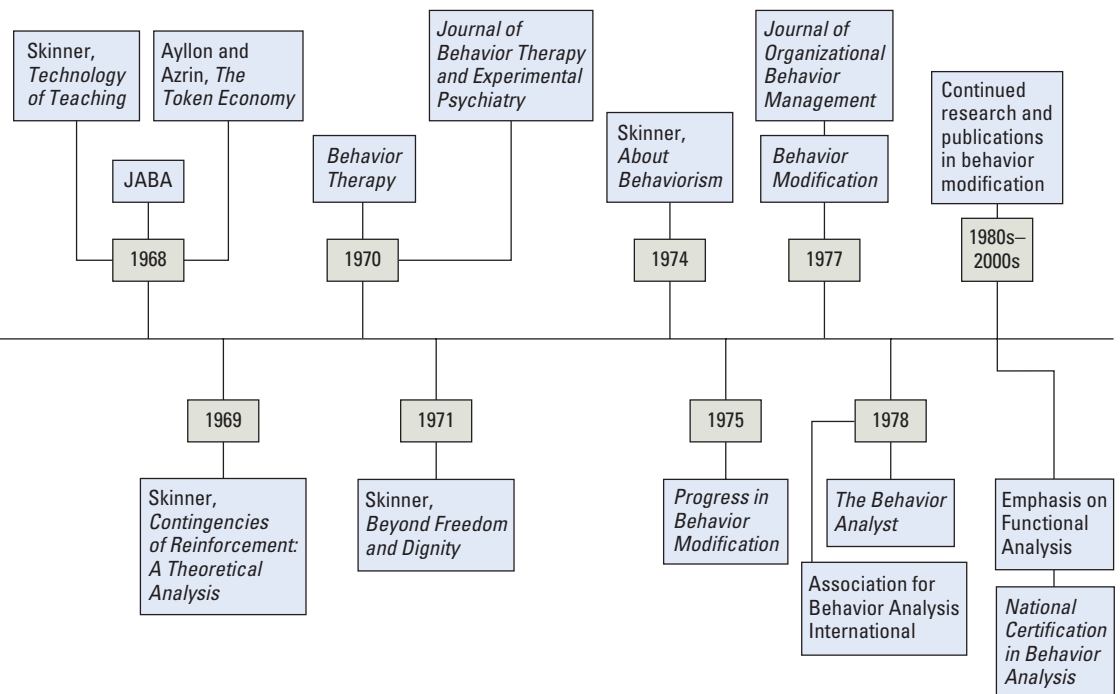
Developmental Disabilities and Autism Spectrum Disorder

More behavior modification research has been conducted in the field of developmental disabilities and autism spectrum disorder than perhaps any other area (Iwata et al., 1997; Kodak et al., 2021). People with developmental disabilities and autism often have serious behavioral deficits, and behavior

modification has been used to teach a variety of functional skills to overcome these deficits (Repp, 1983). For example, behavior modification/applied behavior analysis procedures have been successful for teaching verbal behavior to children with autism who have limited language abilities (e.g., Tincani et al., 2021). In addition, people with developmental disabilities may exhibit serious problem behaviors, such as self-injurious, aggressive, and/or destructive behaviors. A wealth of research in behavior modification demonstrates that these behaviors often can be controlled or eliminated with behavioral interventions (Barrett, 1986; Beavers et al., 2013; Repp & Horner, 1999; Van Houten & Axelrod, 1993; Whitman et al., 1983; Williams, 2004). Behavior modification procedures also are used widely in staff training and staff management in the field of developmental disabilities (Reid et al., 1989, 2012, 2021).

Mental Illness

Some of the earliest research in behavior modification demonstrated its effectiveness in helping people with mental illness in psychiatric hospitals (Ayllon, 1963; Ayllon & Michael, 1959). Behavior modification has been used with patients with chronic mental illness to modify such behaviors as daily living skills, social behavior, aggressive behavior, treatment compliance, psychotic behaviors, and work skills (Dixon & Holcomb, 2000; Scotti et al., 1993; Wilder et al., 2001). One particularly important contribution of behavior modification was the



development of a motivational procedure for patients called a *token economy* (Ayllon & Azrin, 1968). Token economies are still widely used in a variety of treatment settings (Ivey et al., 2017; Reitman et al., 2021).

Education and Special Education

Behavior modification procedures are used widely in education (Alberto & Troutman, 2003), and great strides have been made in the field of education because of behavior modification research (Bijou & Ruiz, 1981; Martens et al., 2021). Researchers have analyzed student–teacher interactions in the classroom, improved teaching methods, and developed procedures for reducing problem behaviors in the classroom (Bambara & Kern, 2005, 2021; Becker & Carnine, 1981; Madsen et al., 1968; Martens et al., 2021; Sugai & Horner, 2005; Thomas et al., 1968).

Behavior modification procedures have also been used in higher education to improve instructional techniques and thus improve student learning (Martens et al., 2021; Michael, 1991; Saville & Zinn, 2009; Zayac et al., 2016).

In special education, that is, the education of people with developmental disabilities or other special needs, behavior modification has played a major role (Rusch et al., 1988) in developing teaching methods, controlling problem behaviors in the classroom, improving social behaviors and functional skills, promoting self-management, and training teachers (DiGennaro-Reed et al., 2021).

Rehabilitation

Rehabilitation is the process of helping people regain normal function after an injury or trauma, such as a head injury from an accident or brain damage from a stroke. Behavior modification is used in rehabilitation to promote compliance with rehabilitation routines such as physical therapy, teach new skills that can replace skills lost through the injury or trauma, decrease problem behaviors, help manage chronic pain, and improve memory performance (Bakke et al., 1994; Davis & Chittum, 1994; Heinicke, et al., 2009; O’Neill & Gardner, 1983; Tasky et al., 2008).

Community Psychology

Within community psychology, behavioral interventions are designed to influence the behavior of large numbers of people in ways that benefit everybody. Some targets of behavioral community interventions include reducing littering, increasing recycling, reducing energy consumption, reducing unsafe driving, reducing illegal drug use, increasing the use of seat belts, decreasing illegal parking in spaces for people with disabilities, and reducing speeding (Cope & Allred, 1991; Cox & Geller, 2010; Geller & Hahn, 1984; Ludwig & Geller, 1991; Silverman et al., 2021; Van Houten & Nau, 1981; Van Houten et al., 2007).

Clinical Psychology

In clinical psychology, psychological principles and procedures are applied to help people with personal problems. Typically, clinical psychology involves individual or group therapy

conducted by a psychologist. Behavior modification in clinical psychology, often called *behavior therapy*, has been applied to the treatment of a wide range of human problems (Hersen & Bellack, 1985; Hersen & Rosqvist, 2005; Hersen & Van Hasselt, 1987; Ortiz et al., 2022; Spiegler & Guevremont, 2010; Turner et al., 1981). Behavior modification procedures have also been used to train clinical psychologists (Veltum & Miltenberger, 1989).

Business, Industry, and Human Services

The use of behavior modification in the field of business, industry, and human services is called *organizational behavior modification* or *organizational behavior management* (Bailey & Burch, 2010; Daniels, 2000; Frederickson, 1982; Luthans & Kreitner, 1985; Reid et al., 1989, 2012; Stajkovic & Luthans, 1997; Wilder & Gravina, 2021). Behavior modification procedures have been used to improve work performance and job safety and to decrease tardiness, absenteeism, and job-related accidents. In addition, behavior modification procedures have been used to improve supervisors’ performances. The use of behavior modification in business and industry has resulted in increased productivity and profits for organizations and increased job satisfaction for workers.

Self-Management

People use behavior modification procedures to manage their own behaviors. They use self-management procedures to control personal habits, health-related behaviors, professional behaviors, and personal problems (Brigham, 1989; Epstein, 1996; Stuart, 1977; Watson & Tharp, 1993, 2007; Yates, 1986). Chapter 20 discusses the application of behavior modification procedures for self-management.

Child Behavior Management

There are numerous applications of behavior modification to the management of child behavior (Durand & Hieneman, 2008; Friman, 2021; Hieneman et al., 2006; Miller, 1975; Patterson, 1975; Miltenberger & Crosland, 2014; Schaeffer & Millman, 1981). Parents, caregivers, and teachers can learn to use behavior modification procedures to help children overcome bed-wetting, nail-biting, temper tantrums, noncompliance, aggressive behaviors, bad manners, stuttering, and other common problems (Christophersen & Mortweet, 2001; Gross & Drabman, 2005; Watson & Gresham, 1998).

Prevention

Behavior modification procedures have been applied to preventing problems in childhood (Roberts & Peterson, 1984). Other applications of behavior modification include preventing child sexual abuse, child abduction, accidents in the home, child abuse and neglect, poisoning, infections, and sexually transmitted diseases (Beck & Miltenberger, 2009; Carroll et al., 1992; Dancho et al., 2008; Miltenberger et al., 2013, 2021; Montesinos et al., 1990; Poche et al., 1988). Using behavior modification to prevent problems in the community is one aspect of community psychology.