

Chapter 1

Achieving Lasting Behavior Change By Applying Behavior Analysis

What Is It and How Does It Work?

Goals

1. Describe how human behavior influences our welfare.
2. Briefly describe the evolution of behavior analysis from its early beginnings to the present.
3. Describe the specific position radical behaviorists take to explain human behavior.
4. Discuss the circumstances under which the behavior of organisms was found as equivalently lawful as other natural phenomenon and thereby amenable to scientific investigation.
5. List and describe the philosophical concepts on which applied behavior analysis (ABA) is based.
6. Describe the manner in which ABA consists of a (a) scientific method, (b) technology, and (c) professional approach.
7. Define *behavior*.
8. Describe ABA in simple language.
9. Say how you would justify labeling a particular intervention as being behavior-analytic in character.
10. Differentiate between *applied* and *basic* behavior analysis.
11. Briefly describe ABA's position on the protection of clients' rights.
12. List four current roles and functions of ABA participants of particular interest to you.
13. Specify and describe each of ABA's basic features.
14. Specify and describe each ABA practitioner category.
15. Describe *radical behaviorism*.

16. Discuss the behavioral position on assigning responsibility for an individual's particular actions.
17. Provide a general overview of the professional approach to ABA and describe and illustrate each major step or element in Figure 1.1.

INTRODUCTION

For better or worse, change is a fact of life. Change is inherent in nature and, as creatures of nature, in all of humanity's personal and social behavior. Over the millennia, familial, tribal, social, cultural, legal, educational, business, health, and numerous other organizational systems have evolved to manage behavioral change. Contemporary societies attempt to manage such change by creating laws, institutions, policies, and practices to provide a balance between personal and communal freedom, thereby enabling these societies to survive and flourish.

In the best of all possible worlds, if those systems were to function smoothly and effectively, all would be well. Alas, they often are imperfect and that is where the need for change begins. If children fail to attain appropriate verbal, social, or self-help skills, that becomes a source of distress for their families and others in the community. When members of social, service, healthcare, business, or other organizations commit mistakes or shirk their responsibilities, others within, and perhaps outside of the group pay the price. Personal and group misconduct like criminal deeds, neglectful or harmful parenting, and drug, sexual, or self-abuse certainly can take a toll on individuals and their societies.

While the world's societies have made incredible progress to date, much remains to be accomplished, especially within the realm of human behavior. Probably that fact explains why so many of us are fascinated by such questions as, "Why do people (and other living organisms) do the things they do?" and "What, if necessary, can be done to produce effective and enduring learning of, or change, in a particular behavior?"

Within the past hundred years or so, a science of the behavior of living organisms has been evolving

in answer to these questions. At present, thousands of scientific researchers and practitioners continue actively to pursue those questions, standing as evidence of the broad interest in humane, responsible, constructive, durable behavioral change.

Certainly most recognize just how critical a role human behavior plays in determining the future survival of humankind. Increasingly apparent is the fact that not only our own personal health and happiness, but the very continuation of we homo-sapiens as a species, heavily depend on our behavioral choices. To illustrate:

- Attaining/retaining good health by accessing, choosing, and consuming nutritious foods; exercising regularly and gaining adequate rest; having the wherewithal to function safely at work, play, and at home; and obtaining essential skilled medical assistance *versus* damaging our health by consuming excessive quantities of marginally or non-nutritious foods or of harmful substances; participating in hazardous activities; and being unable to access essential help and support.
- Optimizing our abilities to permit us to support ourselves and our dependents through education, training, and constructive planning and to detect and capitalize on available opportunities *versus* struggling just to survive.
- Saving and contributing to our own savings and the world's resources *versus* exploiting, over-expending, or wasting them.
- Cooperating and collaborating in mutually beneficial group decisions *versus* competing to the advantage of few but to the detriment of many.

The list goes on and on. As any rational person must agree, not only our present but our personal and collective future prospects depend upon how humans behave. Ergo, one of the most profound questions anyone can pose is: “What must we as individuals and as members of the human family do to advance our survival and to permit us to live longer, healthier, and more fulfilling lives?” The more we understand about human behavior and our ability to modify it humanely and effectively the closer we approach the answer to that question.

Be cautious about accepting undocumented advice, though, because, as Daniels and Lattal (2017) have pointed out, despite abundant advice available via the web, social media, and from numerous books on how to live the good life, make personal changes, and to reach one’s potential, much of that material is based on outdated theories and beliefs. By contrast, thanks to the science of human behavior, rigorous tools now exist for determining:

- why individuals tend behave as they do under particular circumstances and
- how effectively to:
 - promote and teach specific behaviors
 - broaden or refine the circumstances under which particular behaviors are emitted
 - reduce or eliminate inappropriate or unhealthy behavior, without necessarily having to resort to threats or punishment.

In other words, we no longer need to turn to outdated beliefs or theories about why people (and other living organisms) behave the way they do. Rather, thanks to the findings of nearly a century of scientific study of human behavior, we now possess a set of effective tools for altering behavior for the good of the individual and of society.

Addressing people’s directly observable behavioral issues goes as far back as humans have lived in social groupings. From prehistoric times onward, people have struggled to comprehend why living organisms behave the way they do, and, how to change it. This seemingly universal inclination to comprehend and change behavior has generated numerous explanations and methods. Some strategies designed to help people meet their daily

challenges and gain better control over their destinies have been wise; others, though perhaps well-intended, have been fanciful or even cruel: from belief systems, folklore, social regulation and sanctions to wars, torture and various other benign or cruel strategies. Of those, the more serious-minded and systematic approaches eventually coalesced into the field of psychology.

Within the more recent past, though, many resolute philosophers and scientists began to speculate about whether the behavior of living organisms actually might obey natural laws in ways similar to those of the physical world. In keeping with that perspective, during the latter part of the nineteenth century, experimental psychology began to emerge as a scientific enterprise represented by an expanding array of methodologically-oriented investigators of the “psyche” or “mind.” Some viewed behavior according to its structure. This structuralism, initially proposed by Wilhelm Wundt (1832–1920) and promoted by Edward B. Titchener (1867–1927), sought to understand the adult “mind” in terms of a set of simple, definable components. Wundt viewed the mind as being composed of the sum total of the individual’s experience from birth to the present time. The structural psychologists’ major tool was introspection (a careful set of self-observations made under controlled conditions by trained observers using a stringently-defined descriptive vocabulary). Using this technique, they attempted to discover how these components fit together into complex forms called hypothetical or imaginary constructs.¹ These include internal mentalistic processes like attitudes, feelings, self-concepts, or motivations, or even structures like Sigmund Freud’s (1856–1939) id, ego, and superego or Carl Jung’s (1865–1961) concepts of the extroverted and introverted personality types, archetypes (differing but repeating patterns of thought and action that appear time and again across people, countries, and continents), and the collective unconscious, the repository of all the religious, spiritual, and mythological symbols and experiences.

Others, like John B. Watson (1878–1958), considered by many to be the founder of behaviorism (Malone, 2014), took an alternative, much

¹See MacCorquodall & Meehl, 1948.

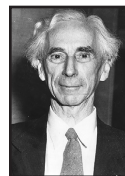
more objective route toward exploring why people behave as they do. His methodological behaviorism emphasized directly observing human and animal action to study behavior. He assumed that, like other natural phenomena, behavior obeys certain basic laws. He particularly emphasized the interaction between maturing human beings and their environments, contending that he could guarantee to take “well-formed” healthy infants and a specifically organized world, and train those infants to become “any type of specialist... doctor, lawyer, artist, merchant-chief, and, yes, even beggerman” (Watson, 1930, p. 82). B. F. Skinner (1904–1990) assumed a similar, though more parsimonious (economical) perspective, endorsing the notion that the behavior of organisms is the subject matter of science.

Today, behavior analysts agree that the behavior of organisms is as subject to the laws of nature as any other natural phenomena. Like other natural scientists, radical behaviorists attribute what living organisms do and say to their ontogeny (the origin and development of an individual organism from embryo to adult) and to their phylogeny (those historical patterns of relationships among their genetic endowments, past experiences, and the internal and external environmental contingencies of reinforcement currently affecting them). Of special relevance is the way multiple events may affect one another, especially when they are contingently related to one another (i.e., preceding or following one another). Examples of contingent relations include twisting the doorknob and the door opens (positive reinforcement), touching a hot stove and getting burned (positive punishment), inhaling pepper and sneezing, pressing the correct elevator button and arriving at the correct floor. Contingent relations of that sort are fundamental to nonhuman and human learning and behavior change. Another way of saying this is that particular patterns of behavior evolve and persist through natural selection, in much the same way that Darwinian *selectionism* (Darwin, 1872/1958) operates. Those qualities best suited to the organism’s physical and its cultural environment (the local common code of systems of beliefs and attitudes about what is good and bad, right and wrong) are most readily selected for survival.

This deterministic perspective asserts that, like other natural phenomena, human behavior obeys

the laws of nature—that it is causally determined—by combinations of preceding events and/or consequences. And, perhaps even more important for ourselves, as agents of behavioral change, we appreciate that like physical and chemical processes, once translated into (technically, operationalized as) human actions, these behavioral phenomena lend themselves to manipulation for purposes of scientific investigation. This recognition has evoked an ever-expanding experimental analysis of behavior; one directed toward producing a body of knowledge and understanding about how contingencies of reinforcement influence what people and other living organisms say and do.

As with other scientific information (i.e. physical phenomena), many have pondered whether it would be possible to put the knowledge derived from the scientific analysis of behavior to use for the benefit of humankind. Or is it too late? The race between the forces supportive of healthy growth and of destruction is intense. The more we learn about the intricacies of the behavior of organisms, and the sooner we learn how to constructively and compassionately apply that knowledge, the better chance humanity has to continue to survive and thrive. Bertrand Russell, the eminent philosopher, stressed this point in 1955:



Whether men will be able to survive the changes of environment that their own skill has brought about is open to question. If the answer is in the affirmative, men will have to apply scientific ways of thinking to themselves and their institutions. They cannot continue to hope, as all politicians hitherto have, that in a world where everything has changed, the political and social habits of the eighteenth century can remain inviolate. Not only will men of science have to grapple with the sciences that deal with man, but—and this is a far more difficult matter—they will have to persuade the world to listen to what they have discovered (Russell, 1955, p. 6–7).

What Russell sagely endorsed was scientifically to examine and publicly disseminate new methods for arranging and applying effective, morally and

ethically justifiable behavior-change techniques, as epitomized by applied behavior analysis. This science would

- rely on an empirical approach, one based on observational and experimental practice, to seek to discover and describe as economically or parsimoniously as possible the natural laws and principles that explain and are capable of controlling human behavior.
- convince others that they should pursue such discoveries and then establish how best to apply these findings toward the betterment of both individuals and humankind in general.

THE ORIGIN AND EVOLUTION OF THE FIELD OF APPLIED BEHAVIOR ANALYSIS



By the 1940s, experimental psychology was sufficiently well established to enable Edwin G. Boring (1950) to draw upon a fairly voluminous body of work

in preparing his *History of Experimental Psychology*. Among the greats contributing to the discipline was B. F. Skinner (1938), of whom you will read more in Chapter 2. Skinner undertook to experimentally analyze basic behavioral processes both within a temporal and a biological context. This endeavor was labeled “the experimental analysis of behavior.” Then, in the late 1950s and early 1960s, Skinner and several of his students and colleagues (e.g., James Holland, Sidney Bijou, Israel Goldiamond, Nathan Azrin, Fred Keller, and others) began to explore ways to extend those processes and research procedures to behavior within a social context. With the publication of the *Journal of Applied Behavior Analysis* in 1968, the latter endeavor, previously labeled “behavior modification,” officially assumed the title **applied behavior analysis (ABA)**. *ABA is an evidence-based method of examining and changing what people (and other living creatures) say and do*. Practitioners of applied behavior analysis conduct their experimental investigations of behavior-

environment relationships of relatively immediate individual, social, and cultural importance for the purpose of studying and successfully managing behavior in the real world.

Applications of behavior analysis soon began to expand into a variety of areas. Among others, Holland and Skinner (1961) successfully advanced college students’ conceptual learning by programming instruction, that is, breaking instructional content down into small parts or “steps” and requiring the student to participate actively by answering questions on the material. Meanwhile, in the mid to late sixties, Israel Goldiamond (1968) addressed stuttering, Theodore Ayllon and Nate Azrin (1965) studied psychiatric patients’ adaptive behaviors, and Sidney Bijou, Donald Baer, Jay Birnbrauer, and Montrose Wolf (see references) addressed the behavioral deficits and excesses of young children with developmental delays. The unambiguous success of those early efforts unleashed a movement toward applying behavior analysis to an array of behavioral challenges previously found quite resistant to change. Well-controlled applied experimental investigations covered the gamut from coping with communication difficulties, school learning and deportment, self-management, physical well-being, and social issues, to an extensive list of methods for remedying other behavioral deficiencies and excesses. Not only did those investigators present compelling evidence of their participants’ progress, but thanks to the tightly-controlled experimental methods of ABA, they were able to supply clear and objective evidence convincingly to support their claims.

A number of features comprise applied behavior analysis. (See Box 1.1, “Definitions of Philosophical Concepts on which ABA is Based.”) As you proceed through this text, you increasingly will recognize how successfully the field of applied behavior analysis has adhered to these concepts.

Another facet of the discipline of behavioral analysis has focused primarily on the *conceptual analysis of behavior*, which verbally addresses historical, philosophical, theoretical, and methodological issues. Illustrations of the latter are found in such journals as *The Behavior Analyst*, *Verbal Behavior*, and numerous others, covering conceptual and professional issues.

Box 1 Definitions of Philosophical Concepts on which ABA is Based

Determinism: Doctrine that acts of the will, occurrences in nature, or social or psychological phenomena are causally determined by preceding events or natural laws.

Empiricism: Derived from or guided by experience or experiment.

Parsimony: The simplest theory that fits the facts of a problem is the one that should be selected.

Scientific method: A method of inquiry based on empirical or measurable systematic observation measurement and experiment, and the formulation, testing, and modification of hypotheses or questions.

Pragmatism: A practical approach to problems in which truth is found in the process of verification. Pragmatism and behaviorism go hand in hand (Baer, Wolf, & Risley, 1968).

Selectionism: Behaviors evolve and persist through natural selection (based on the contingencies—antecedents, or precursors, and consequences related to the behavior's occurrence—in the environment interacting with biology) in much the same way as Darwinian selectionism in the evolution of species.

As you will see, by referring to our list of references, the analysis of behavior—basic, applied, and conceptual—has not only survived, but continues to flourish to the extent that today literally thousands (we estimate about 50,000) of behavior-analytic papers on the topic have been published in scientific journals. As one exemplar, ABA's effectiveness in promoting adaptive behavior among people on the autism spectrum certainly has attracted the attention of scientists, professionals, and the lay population at large. (Autism is a syndrome associated with communicative, emotional, social and other severe difficulties, previously highly resistant to successful treatment.) Yet the difficulties of autism-related behaviors are only one among numerous sets of behavioral challenges. Throughout this text, you will encounter extensive experimental evidence illustrating how behavior analysts have successfully applied established principles of behavior toward improving learning and performance in a myriad of specialty areas. Examples among the multitude include education, job training, developmental and rehabilitation services, parenting, personal, family and vocational counseling, sports performance, health promotion and treatment, commercial and industrial ventures, public services, public affairs, war and peace. In fact, just about any situation involving the actions of living organisms is a potential focus for an experimental analysis.

APPLIED BEHAVIOR ANALYSIS TODAY

As our knowledge about the way organisms learn and change their behavior expands, those practicing applied behavior analysis become increasingly able to successfully and constructively guide learning and performance in specific directions. As often happens with new terms, the meaning of applied behavior analysis has been evolving over time. Essential to its definition are that ABA is a scientific method, a technology, and/or a professional approach. The *Behavior Analysis Certification Board* has provided us with the following simplified definition of ABA:

Definition of ABA

ABA is the design, implementation, and evaluation of environmental modifications to produce socially significant improvement in human behavior. ABA includes the use of direct observation, measurement, and functional analysis of the relations between environment and behavior. ABA uses changes in environmental events, including antecedent stimuli and consequences, to produce practical and significant changes in behavior. These relevant environmental events

are usually identified through a variety of specialized assessment methods. ABA is based on the fact that an individual's behavior is determined by past and current environmental events in conjunction with organic variables such as their genetic endowment and ongoing physiological variables. ABA focuses on treating behavioral difficulties by changing the individual's environment rather than focusing on variables that are, at least presently, beyond our direct access.

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THE ESSENTIAL FEATURES OF APPLIED BEHAVIOR ANALYSIS: A SCIENTIFIC, TECHNOLOGICAL AND PROFESSIONAL APPROACH

ABA as a Scientific Approach

When we speak of **behavior**, quite simply, we refer to *what living organisms do, including what and how they communicate*, aside from its intrinsic value or acceptability. It is a neutral term. We do not use the term to connote “good behavior” or “misbehavior,” as teachers, parents, and child-care specialists sometimes do. Behavior analysis is the experimental investigation of variables that influence the behavior of any living organism. From

the beginning, applied behavior analysis has taken an empirical, that is, an experimental, data-based, scientific approach, drawing upon observation and experience to *describe, predict, and ethically manage (“control”) behavior*. Its aim has been to identify the variables that lawfully and meaningfully influence behavior in real-world settings, such as clinics, hospitals, schools, the home, the workplace, virtual space capsules (e.g., Hienz et al., 2005), out in the community—anywhere people (and sometimes animals, like guide dogs, work horses, and others that perform service functions) participate in their daily affairs. The meaning of “applied” in “applied behavior analysis” is that the behaviors it quantitatively describes and functionally addresses are socially important. This is done by successfully teaching and supporting constructive, adaptive, healthy, safe, and satisfying learning and performance, and by reducing detrimental behavioral excesses and deficits. Baer, Wolf, and Risley (1968) originally defined and described applied behavior analyses as “experimental investigations of behavior conducted in real-world settings.” In so doing, they noted that its essential features specify that the behaviors to be changed are explicitly important and objectively and quantitatively measurable. Its experimental manipulations analyze with precision sufficient to “show clearly what arrangements were responsible for the change” (p. 97). That means that its descriptions of all procedures and contextual conditions contributing to that change are complete and technologically exact, while the effectiveness and magnitude of the change is of sufficient value to be meaningful and general (see Table 1.1).

TABLE 1.1 Basic Features of ABA

<i>Feature</i>	<i>Function</i>
Applied	Focuses on socially significant behaviors
Behavioral	Focuses on observable, objective measurement of behavior
Analytical	Demonstrates functional relationships
Technological	Fully describes all procedures implemented in such detail that someone else could replicate implementation
Conceptually systematic	Utilizes procedures based upon principles of behavior analysis
Effective	Demonstrates socially significant behavior change through objective measurement
Generality	Produces behavior change across behaviors, people, and/or settings

To elaborate, when we speak of **applied research**, we refer to investigating and analyzing the effect environmental changes produce upon socially important behavior in real-life settings like homes, schools, health facilities, factories, etc. Typically the behaviors ABA addresses are those intended to benefit participants (and perhaps others with whom they interact) such as heightening students' ability to communicate in class, or of workers' adherence to safety guidelines on the job. By contrast, **basic behavioral research** (e. g., "the experimental analysis of behavior" is conducted in the laboratory under tightly controlled experimental conditions and generally focuses on easily quantifiable arbitrary actions (not necessarily valued by society) such as bar presses or chain pulls. Because applied investigations tend to be pragmatic, that is, designed to be of practical value, designing tight experimental controls tends to be more of a challenge within applied behavior analytic research. Try objectively, reliably, and validly to measure such human qualities as "being generous, affable, wise, or clever." Not easy, but indeed possible. Baer, Wolf, and Risley (1968) counseled that applied behavioral researchers "must try harder" (p. 93) to quantify behavior thoroughly and reliably.

On reviewing the history of the ABA field twenty years after publishing their initial description of applied behavior analysis, Baer, Wolf, and Risley (1987) noted that some of its elements (applied, behavioral, analytic, technological, conceptual, effective, and capable of appropriately generalized outcomes) had expanded in scope, in the sense that it was now addressing more complex problems. They also noted that, in the interim, novel (especially computerized) measurement and analytic tools and strategies had emerged, and recognized that the context in which the behavior is emitted ("expressed" or "produced") plays a more important role in determining how a person behaves at a particular time and place. Additionally, they observed that practitioners were tending to pay greater attention to the particular function of unwelcome or dangerous behavior and to the complexity of interactions between antecedent circumstances and the behavior of interest.

If, the reasoning goes, an experimenter can turn behavior on and off or up and down "at will,"

whether it be smiling, singing, choosing, using, solving, or whatever, the experimenter has achieved a successful behavioral analysis. Convincing parents, teachers, clients themselves, managers, and supervisors that they should be able to manage behavior similarly, however, may not be easy. But as you will discover, applied behavior analysts can also apply their methods toward teaching others how successfully to apply those behavior analytic methods (as is our purpose in preparing this text). Consequently, when describing a particular application, the behavior analyst must identify and completely specify all the actions to be taken (or perhaps to be avoided) by the change agents. To meet the technological qualification, well-prepared program implementers must be able to take that description and, assuming they apply it reliably to participants with similar behavioral repertoires, to essentially achieve or replicate (duplicate) the results.

Applied Behavior Analysis as a Technology of Behavior Change

Behavior analysts assess behavioral challenges and design the most promising solutions by selecting methods to apply, monitor, analyze, revise and reanalyze if necessary, communicate the effects of their interventions. In general, ABA investigations involve one or more of several categories of behavior-change tactics. Among numerous examples are:

Increasing behavior such as:

- communicating, reading, defining words correctly
- praising, describing an accomplishment, donning safety equipment, precisely adhering to protocols
- completing assignments according to standards
- participating in decision-making and following through on agreements
- exercising more skillfully, harder, and/or longer
- creating works of art, literature, or technological solutions to problems

- adhering to health and/or self-help routines

Teaching and maintaining behavior such as satisfactorily performing:

- academic skills, including reading, writing, spelling, arithmetic operations
- technical skills, such as designing an engine, a computer program, an electromechanical device
- professional skills, like performing difficult diagnostic, surgical, or engineering routines
- self-care skills, like grooming, self-feeding, preparing meals, making beds
- self-management skills, like organizing one's time, completing assignments, controlling emotional outbursts, choosing and conforming to healthy diets and exercise
- family, organizational, and management skills such as systematizing, choosing, and monitoring individual and group goals
- job skills, as in assembling products, providing specific services, preparing reports
- social skills, such as asking and answering questions, greeting people, excusing one's inappropriate (rude) behavior, engaging in conversations, participating in community organizations
- leadership skills, as in defining an organization's mission, setting objectives, defining job requirements, assessing performance, providing feedback, reinforcing positive practices
- continuing productive, proactive practices such as those in this list
- engaging in activities of civic responsibility, like voting and caring for the environment
- detecting subtle differences in one's own or others' behavior or the products of their behavior

Making behavior appropriately responsive to highly specific stimuli, as in learning to label actions as correct, expert, precise, sophisticated, talented, or skillful such as:

- decoding letters and words: reading complex words and sentences in one's own or a different language
- identifying and applying the correct way to solve mathematical problems: basic or advanced operations, such as adding, subtracting, multiplying, dividing, solving a range of equations or word problems
- differentiating an actual painting by Vermeer from a forgery; a benign from a malignant tumor; a fine from an ordinary wine; a designer outfit from a knock-off; a brilliant versus an amateur musical or sports performance; a cat from a jaguar; a child with autism versus one with a hearing loss; an adult with depression from one with fatigue caused by a medical problem

Selecting the most valid and reliable measurement or functional analytic system suitable for a particular set of circumstances

Generalizing or expanding the breadth of performance to new stimuli:

- reading words written in script after seeing them in print
- using pictures to ask for food or for toys
- behaving politely with all the teachers
- using addition and subtraction with both word problems and numerals
- choosing a healthy diet at home and in a restaurant
- displaying good posture while standing as well as while sitting
- listening without interrupting to one's spouse, one's parents, and one's children

Reducing maladaptive, counter-productive behavior that:

- interferes with one's own or others' well-being, satisfaction, learning, or progress
- is dangerous or destructive, such as injuring others or making oneself ill
- creates an atmosphere of fear and intimidation

Beyond its thousands of success stories, including having become the standard of care for the treatment of autism spectrum disorders because of the hundreds of successful peer-reviewed studies published over the past 50 years), ABA offers the distinct advantage of providing objective evidence of the effectiveness of its methods. To qualify as a true ABA program, every single-case application must be accompanied by graphic displays of the impact of the specific intervention. Additionally, before any treatment is deemed reliably to produce a particular result, it must duplicate that outcome in the form of multiple repetitions or replications of the treatment and effect either across different behaviors within the same individual or across different individuals or groups. Supplying evidence favoring a particular ABA intervention supports practitioners and consumers in their efforts to secure the resources essential to its implementation.

Applied Behavior Analysis as a Profession



By its very nature, applied behavior analysis is conducted under conditions of daily living: in homes, educational and training institutions, hospitals, clinics, works settings, dormitories, out in the community—anywhere people ordinarily function. Clientele include those whose actions present both ordinary and exceptional daily challenges, such as personal problems in living, troublesome family and other social interactions, delayed developmental skills, and worrisome risks to health, safety, livelihood, and overall well-being. Because an essential feature of ABA is gathering valid evidence of behavior change over time, the method is self-correcting. By observing, recording, and graphing ongoing performance patterns, change managers can determine whether to continue with an intervention or to adjust

it. Generally, they persist with those explorations until they find a mix that continues to produce solid evidence of progress. Then, to be absolutely convinced that those indications of success are indeed a function of the specific intervention and not just happenstance, they test the validity of their conclusions by using one or more experimental-analytic designs. Note that each ABA intervention is, in a sense, a single-case “experiment.” This is not to say that every problem addressed by ABA is solved; just that when success is achieved, as it often is through a course of procedural adjustments, we can feel confident that the ultimate intervention, and not some other unknown factor, was responsible.

Given the confidence inspired by its precise methodology and the confirmation of its successes, numerous commercial, educational, or service organizations have adopted ABA as their key behavior-management strategy and have employed trained applied behavior analysts to perform professional functions. “Applied Behavior Analyst” increasingly is listed as a job title in educational, human service, commercial, and other enterprises. In fact, many states in the United States as well as governmental agencies elsewhere already have required or are in the process of requiring that people promoting their services as applied behavior analysts document the adequacy of their training and demonstrate the precision of their knowledge and skills. They do this by presenting their credentials, passing examinations covering a breadth of information of the sort contained in this text, demonstrating their ongoing ability to apply the skills deemed essential by specialists and peers in the field, and regularly upgrading their competence through continuing education.

Of course, being able to pass a written or oral examination is no guarantee that the ABA practitioner actually will consistently examine behavioral challenges skillfully, design and apply interventions and analytic strategies appropriately, or communicate the results and make useful recommendations for the future clearly. Organizations such as the Behavior Analysis Certification Board™ (BACB) have begun to address this concern by incorporating documented supervised practical experience in their list of requirements. (See the *Behavior Analysis*

Certification Board[®] (BACB²) website: <http://www.bacb.com/> for the current requirements.) In addition, many states now license Behavior Analysts.

Must everyone who conducts applied behavior analysis be certified? Not if the person conducting the analysis does not gain compensation for offering ABA services; nor in those cases in which the venture is being carried out for research purposes, although in the latter case it must adhere to the ethical guidelines of the American Psychological Association, which includes obtaining peer approval. Otherwise, those who offer their services as applied behavior analysts to the public for a fee, who work in a jurisdiction requiring it, or who seek to reassure their peers (and themselves) that they have mastered the basic knowledge essential to practicing ABA competently probably should seek certification and/or, should it come to pass in your state, licensure.³



⁴ As an empirical scientific enterprise, applied behavior analysis is based on or derived from controlled observation or experiment; it is designed to produce data, or factual evidence of change. No one honestly can claim that ABA is a sure cure for everything that ails the human condition. On the contrary, what this science-based technology does provide is a valid and objective way of examining behavioral challenges and, by using refined investigative methods, of testing promising interventions. Then, depending on the behavioral repertoires of individual participants and change agents and accessibility of material and human resources, it tries to identify circumstances that may support or alter the behavior of interest. It also tests the feasibility of promising ethically sound change strategies.

Applied behavior analysis per se is not a moral philosophy. As you will see, ABA often has successfully addressed such goals as enabling people suc-

cessfully to communicate and/or interact effectively with others; control drug abuse; decrease or eliminate problematic behaviors such as fears or phobias, enuresis, behavioral excesses, and deficiencies; master physical feats or job skills; achieve academically; parent skillfully; lead organizations successfully; humanely train and manage animals as they perform particular jobs; and much more. But as a science and technology, it imposes no value on which behavior is good or bad, right or wrong. That must be undertaken by the clients or their surrogates, behavior analytic professionals themselves, peer review boards, ethics committees, responsible parents or advocates, or others who undertake to advocate for the participants. To assure ethical application, the Behavior Analysis Certification Board requires professional practitioners of ABA to adhere to its Professional and Ethical Compliance Code (2016) of which information can be found at BACB.com.

ABA does not restrict itself to any single subject matter any more than do the broad disciplines of social work, clinical or counseling psychology, biology, physics, chemistry, or engineering. Those with special qualifications in the area of interest take the lead when describing optimal performance and join the participants and/or their advocates and the change agent in setting the goals and objectives of the particular ABA intervention. (Of course, many qualified behavior analysts also have qualifications in other fields, such as specialized or general education, training, counseling, psychology, developmental and rehabilitation services, corrections, job safety, business, health, economics, animal training, medicine, commerce, industry, and so on. In such cases, they sometimes fulfill both sets of responsibilities.)

WHO, THEN, PROTECTS CLIENT RIGHTS?



As in any responsible community, various people serve as advocates for dependent clients by reviewing and approving (or not) the intervention goals and methods. These advocates may include members of a peer review committee who represent the perspectives of the clients; the consumers of ABA services, their

²The BACB[®] is nonprofit corporation whose “mission is to develop, promote and implement a voluntary international certification program for behavior analyst practitioners” (<http://www.bacb.com/>)

³At the time of this writing, ABA licensure is being investigated by some jurisdictions as a possible qualification for ABA professionals who provide their services for a fee.

⁴This symbol of justice scales will appear throughout this text when ethical or legal issues are discussed.

parents, guardians, or designated representatives. Typically in the United States, when university faculty members plan research, whether with humans or nonhumans, their action plan must be vetted by a committee of peers before the study can begin. Professional associations, technical societies, and health and human service agencies also delegate those sorts of responsibilities, usually to a committee of peers, as do many educational and business organizations. Additionally, consumer groups, such as parents or clients with particular common interests or challenges, often organize committees to see to it that their own values and concerns are heeded. As you will see, especially in our discussion of ethics (Chapter 32), representatives of consumers' communities are urged to review the goals and proposed procedures before endorsing and allowing particular categories of ABA plans to proceed. The BACB also assumes responsibility for disciplining any board-certified behavior analyst who violates its Professional and Ethical Compliance Code.

CONTEMPORARY BEHAVIOR ANALYTIC PRACTICE

As you now recognize, ABA currently is practiced worldwide. If you, as a reader, have a specific behavioral interest or concern, you are reasonably certain to find a set of peer-reviewed journal publications on the topic. In the increasingly rare event that you cannot locate any, by the time you master this book and proficiently practice its methods under supervision, you may be the one to blaze a new trail in this exciting approach to evidence-based behavior change.

Probably because, since its emergence about a half century ago, the field of applied behavior analysis has been associated with striking confirmation of successful management and change in socially meaningful behavior, in all walks of life, the enterprise has continued to expand rapidly. With the stated mission of its flagship organization, the Association for Behavior Analysis International, being: "... to contribute to the well-being of society by developing, enhancing and supporting the growth and vitality of the science of behavior analysis through research, education, and practice, (Marr, 2016, p. 3)"

the membership, especially in its applied branch has grown from a handful of ardent, primarily United States midwesterners, to many, many thousands worldwide. Untold numbers, certified by the Behavior Analysis Certification Board™ or not, who might or might not belong to the ABAI or related organizations, are practicing within the discipline. As Table 1.2 suggests, they use their skills in the community, sports, education, and human services, as well as within clinical, health, manufacturing, commercial, financial, and numerous other institutions and organizations. Sensible behavior analysts who hope to live healthy, fulfilling lives, as we ourselves try to do, also apply that knowledge to manage their own behavior, and by mutual informed consent, that of members of their households.

As we have seen, behavior analysts may combine their expertise with other roles. Whether parents, organizational behavior or performance managers, coaches, clinicians, trainers, consultants, teachers, counselors, psychologists, psychotherapists, social workers, vocational counselors, speech and language therapists, personnel or organizational managers, or any other discipline related to analyzing and improving human performance, applied behavior analysts contribute by abetting performance improvement. They accomplish this by assisting their consumers to function more effectively, efficiently, productively, maturely and constructively. But to succeed, applied behavior analysts must demonstrate a certain level of proficiency, including mastery of the concepts and methods of applied behavior analysis, plus a range of other relevant analytic and performance skills.

Organizations desiring to verify that their behavior analytic personnel meet the necessary performance requirements in their specialized areas (e.g., behavioral safety, autism education, community service, etc.) can seek certification from particular independent organizations, such as the *Cambridge Center for Behavioral Studies* (<http://behavior.org>) or from their professional specialty organizations. An example is qualifying as a *Picture Exchange Communication System*⁵ implementer or trainer. In

⁵An alternative or augmentative behavior-analytic-based system that enables non-speaking clients to express their wants and observations, based on exchanging pictorial images rather than spoken words (see Chapter 19).

TABLE 1.2 A Sample List of Current Roles and Functions of ABA Program Participants

Academic task learning and engagement skills, writing	rehabilitation services	Nervous habits, tics	Seat belt use by motorists, children in shopping carts
Accident prevention	Direction-following	Noise, reduction in lunchroom	Self-control behavior, social interacting
Activity planning and execution	Donating food to food banks	Organizational change	Speech acquisition and other forms of communication
Adaptive (non-destructive, non-injurious) behavior at home, in residential placements	Dropping out of school	Over-selectivity	Speech fluency
Aggression	Earplug wearing	Parenting	Spelling
Animal performance for work and entertainment	Eating regulation; skills	Participation in family activities	Staff training
Cell-phone use, decreasing	Education, academic: pre-school, college, graduate, and professional	Paying attention to work assignments	Staff interactions with clients
Change at an institutional level	Equivalent-class formation	Pedestrian safety	Stair-use
Choice-making	Fear of flying	Peer management	Stereotypy
Cigarette smoking	Fire evacuation skills	Peer-assisted learning, tutoring	Student academic performance
Classroom discipline problems	Food acceptance	Personal, family, and vocational counseling	Student deportment
Commercial and industrial ventures	Frequency of recording behavioral data	Pivotal responses, learning	Student truancy
Communicating skills of typically-developing children and those with delays	Gang violence	Preventing cumulative trauma disorders	Studying
Community skills, functional	Goal-setting	Public affairs	Stuttering
Conducting fire-evacuation skills	Hallucinating, exhibiting fears and phobias, obsessing	Public services	Self-injury
Conversing	Handwriting	Quality of manufactured goods	Self-monitoring
Cooperative learning	Health: care, promotion, treatment	Quality of services	Sports skills
Correct posture	Hemodialysis, cooperating during	Reading	Story writing
Creativity	Hyperactivity	Reciprocal interactions	Supervisory performance
Customer friendliness	Imitating	Recycling	Teacher praise
Delivering performance feedback	In-service training	Requesting skills	Tantrumming
Dental regimens, compliance	Inhalation equipment, use of by asthmatics	Residing in a virtual space capsule	Task completion
Dental treatment, cooperation	Initiating socially	Safety, on-the-job, at school, in the community	Teachers greeting of students
Developmental and	Instruction-following	School-wide student improvement	Teaching strategies
	Lifting, transferring patients	Self-injury	Test performance
	Manufacturing, quality, productivity	Self-monitoring, recording	Tolerance for delay
	Marketing	Separation anxiety	Training skills, pre- and in-service skills
	Matching-to-sample	Service friendliness	Transition times
	Mathematical problem solving	Sick-leave, use of	Vandalism
	Motor performance	Social greetings	Verbal skills
		Social skills, pro-social	Violence
			Vocational, job skills
			War and peace

that instance, candidates also must meet a set of mastery standards for certification specified by its parent organization, Pyramid Educational Consultants (<http://www.pecs.com>).

If a program of behavior change is to succeed, obtaining the cooperation of all affected individuals is essential. You can do that within organizations and families by inviting those directors, senior managers, and/or breadwinners in charge of the rewards (reinforcers) integral to the system (organization, neighborhood, family, etc.), to participate in the decision-making process. Sometimes a single individual occupies more than one role, as in the case of a parent, teacher, counselor, or therapist who has designed the program, observed and recorded data, and analyzed results. At other times, contingency

managers' involvement is limited to presenting assignments, instructions, or other forms of guidance, combined with appropriate consequences such as praise, tokens, rewards, and so on. The success of the enterprise depends on the productive collaboration of everyone involved. (Chapters 3 and 24 address such issues as how to facilitate changes in the contingency manager's behavior.)

Currently the BACB recognizes three major levels of ABA practitioner skill: the Board Certified Behavior Analyst (BCBA or BCBA-D, with the "D" indicating doctoral level training), the Board Certified Assistant Behavior Analyst (BCaBA), and the Registered Behavior Technician (RBT). Major differences among these three levels are highlighted in Table 1.3. At this point, allow us to provide you

TABLE 1.3 ABA Practitioner Categories

<i>Title</i>	<i>Minimal Level of Education</i>	<i>Training Highlights</i>	<i>Pass Criminal Background Check</i>	<i>Illustrative Job Activities</i>
Registered Behavior Technician (RBT)	High School or Above	<ul style="list-style-type: none"> • 40 hrs. of RBT training by BCBA • Pass RBT exam • Pass RBT competency assessment administered by BCBA 	Yes	Provides client interventions, collects and graphs observational data under supervision of BCBA or BCaBA
Board Certified Assistant Behavior Analyst (BCaBA)	Bachelor's Degree from Qualifying Institution	<ul style="list-style-type: none"> • 180 classroom hrs. of graduate level instruction • Specified hrs. of BCBA supervised experience • Pass comprehensive exam 	Yes	Works with clients. Supervises RBTs. Assesses and designs intervention programs. Supervised by BCBA or BCBA-D
Board Certified Behavior Analyst (BCBA)	Master's Degree from accredited university	<ul style="list-style-type: none"> • 270 hrs. of graduate level instruction in ABA • Specified hrs. of BCBA supervised experience • Pass comprehensive exam 	Yes	Supervises RBTs and BCaBAs. Assesses, designs and evaluates intervention programs
Doctoral level BCBA (BCBA-D)	Qualifying doctoral level degree	Same as BCBA	Yes	Same as BCBA

with a brief overview of the steps applied behavior analysts take in pursuing their activities as scientist/practitioners.

WHAT PATH DOES APPLIED BEHAVIOR ANALYSIS GENERALLY FOLLOW?

While any *bona fide* application of behavior analysis must include the basic features described earlier and briefly summarized in Table 1.1 (Baer et al., 1968; 1987), no standard template exists for conducting ABA programs of research and intervention. Rather, the field continues to evolve scientifically and technologically. For the moment, though, Figure 1.1 typifies the steps applied behavior analysts generally follow in designing and conducting their ABA programs.

Identifying and Deciding to Address a Problem or Challenge

Those who contemplate the need for behavior change generally are influenced by various factors. Perhaps it is one's job to manage, teach, rehabilitate, or treat people. Maybe the impetus derives from a desire to support the common good, as in protecting the environment; preserving resources; encouraging public, group, and personal health practices; promoting peace; international goodwill; or freedom from want, fear, oppression, or other threats to human well-being. Fairly often an ABA program is prompted by a presenting behavioral challenge, such as someone disrupting or failing to perform as expected within a family, organization, or out in the community. Sometimes the decision to intervene evolves from the interest or curiosity of the behavior analysts themselves or the organization employing them. Examples of the former might be searching for reasons why students cause disturbances or fail in school, while others survive and/or thrive; why a youngster regularly attacks a sibling at home; why line workers slow down production through inefficiency or unsafe work practices; why managers berate personnel to the point that their victims retaliate by vandalizing or by leaving the organization.

On occasion behavior analysts may be looking for more effective methodological refinements, such as ways to collect or validly analyze complicated data or social practices. And the list goes on. Chapter 2 surveys the building blocks essential to assessing and planning behavior change programs.

The Radical Behavioral Approach

Radical behaviorism takes the perspective that *feelings, sensations, ideas, thoughts and other features of mental life are subject to the same behavioral laws and principles as overt behaviors*. “It simply questions the nature of the object observed and the reliability of the observations” (Skinner, 1974, pp. 16–17). Applied behavior analysts, then, tend to focus on overt behaviors, or the products of behavior that permit reliable observation and measurement, including what participants say and do.

Does the fact that we may find an individual's particular behavioral pattern troubling necessarily mean that the individual is flawed or at fault? Not if you take a truly radical behavioral perspective. As radical behaviorists, we recognize that the person is not to be blamed; only that the individual's pattern of behavior is unacceptable to us. Rather than faulting Dexter by saying he is lazy, we observe that he frequently fails to do his work. Nor would it be appropriate to label Paula as “a procrastinator”; despite that she regularly procrastinates. Better to comment that Bruno plays the piano with exceptional skill (something he does and that is subject to change) than simply to label him “a prodigy” (something he is.) And instead of calling Lucretia “a rotten little kid” (implying a fixed quality), a preferable description would be that of a child who frequently hits other children and grabs their toys.

By viewing people's problematic actions in terms of what they do or fail to do, rather than what they are, we are led to recognize that change is possible. We don't go about altering people; rather we attempt to change the rates with which they perform (technically “emit” particular behaviors). This is not to imply that optimally applying behavior analysis enables us to promote, or eradicate any individual's particular behavior. Successful behavior change depends on a number of factors, many of which

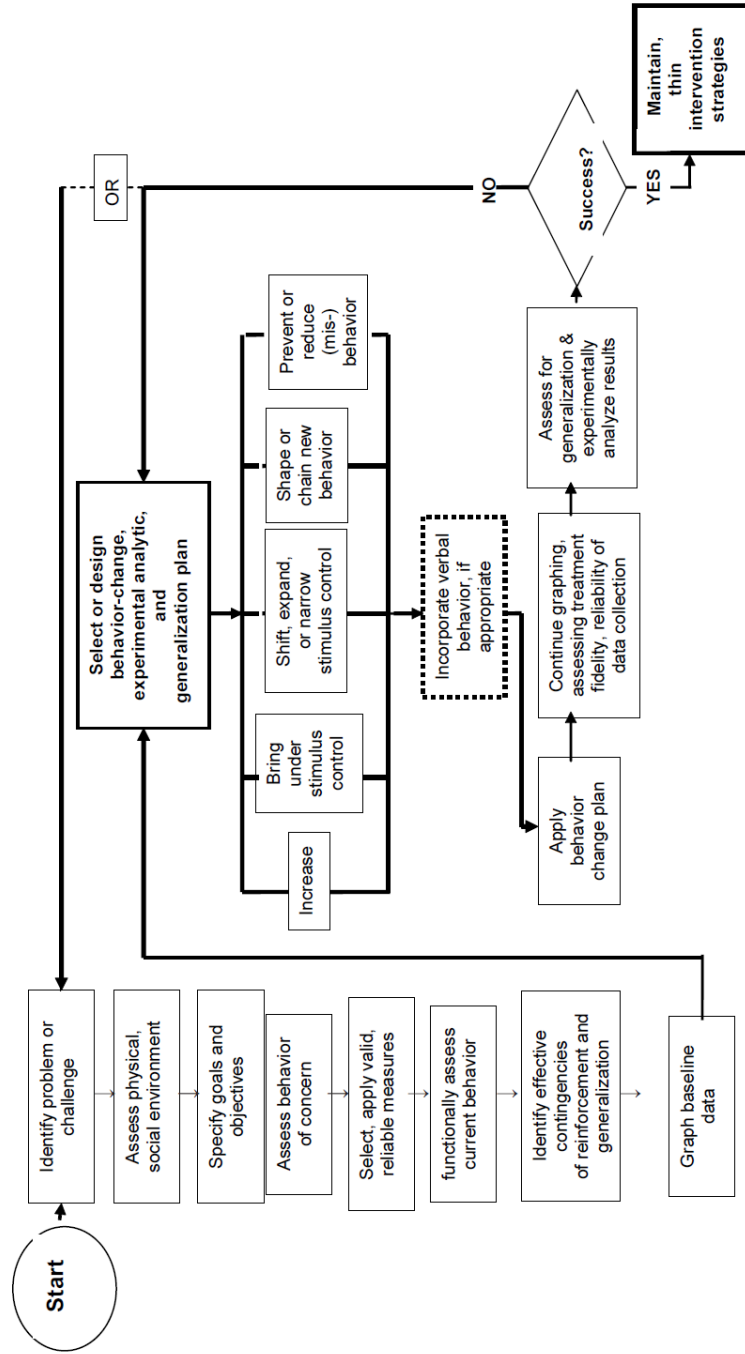


Figure 1.1 Typical applied behavior analysis process

may be well beyond the behavior analyst's control. Those include:

- Genetic endowment (i.e., the person's physical attributes and limitations) in that it can affect how rapidly and skillfully one learns to do or say or cease doing or saying particular things.
- Access to learning opportunities, material resources, medical care, and other aspects of the individual's environment.
- Prior learning, because progress may well be impeded when key pieces are missing from one's learning history.
- Historical and current antecedent and consequential stimuli, such as the reinforcers, punishers, and contextual conditions present when the individual had responded or is currently responding.

How about character? Doesn't that fit into the equation? Not really. Though a person's action patterns may be judged to be acceptable or not, the person *per se* is neither dignified nor to be condemned for committing those acts, because they were molded via interactions between the individual's physical attributes, experiences, and the conditions currently missing or in place. From the behavioral perspective, "the individual—if not his/her actions—is always right."⁶

Notice, though, we do not say that people never misbehave, (or for that matter, behave admirably,) according to particular standards or values. Rather, we do not attribute the blame (or credit) for their behavior to their ill will or malign intentions (or to their talents). Rather, blame or credit needs to be ascribed to the factors just discussed.

Given this perspective, any change procedures we choose to implement must be said to apply to behaviors, not to people. Dexter is not reinforced. His good work is. Applied behavior analysis is not in the business of changing people, only in guiding and supporting changes in their behavior.

Don't infer from this that people have no control over their own behavior, assuming they have the physical attributes and environmental histories and resources that permit them to take charge of their circumstances. As you proceed through this text, you will come to appreciate that one of the particular values of learning about behavioral principles and their optimal application is that you yourself, as a professional teacher, coach, therapist, manager, counselor, or other change agent—can use the rules to modify not only the behavior of your clientele, but also the performance patterns of your consenting loved ones as well as those of your very own self.

One more disclaimer: Whereas the behavioral approach forces us to conclude that people's actions are a function of their learning histories and any conditions currently in place, we needn't be unfeeling about what we see them say and do. The anger, frustration, or delight we experience in response to noting others' behavior is just as much a product of our own learning histories as the deeds or misdeeds of the individual generating that reaction in us. Additionally, as with our clients, you, as we, are human, with behavioral repertoires shaped by our own experiences and supported or impeded by current conditions. Nonetheless, as you master the principles governing behavior and their ethically sound application, you will begin to become increasingly more proficient in applying them not only with your clientele, but also to your own actions as a change agent. We see that particular proficiency as the major advantage you, as a student of this topic, will achieve by mastering the principles and procedures described in this text.

Designing and Implementing an ABA Program

No law of nature dictates a single ideal approach toward promoting enduring behavior change. Nonetheless our field of applied behavior analysis has generated various technologically sound ABA strategies that have dependably demonstrated fruitful and long-lasting outcomes. Below we present one such functionally and ethically sound system for promoting effective behavior change.

⁶B. F. Skinner contended that "the subject is always right!" in that his/her behavior was much a function of prior reinforcement history and contingencies currently operating.

Preparing an Environment Supportive of Constructive Change

Before initiating any action, the behavior analyst needs to know what human and material resources are readily available or attainable in the setting in which the program is to be carried out. That includes adequate funds, personnel skills, values, priorities and limitations, adequate time, space, equipment, supplies, and so on. Identifying other contenders for these and/or other resources and the strategies for adjudicating any such competition is crucial. Should adequate means be lacking in the setting, the behavior analyst must find a way to obtain or compensate for those deficiencies. Material support for many of the investigations reported in this text have included line-item budgets or special allocations, government, community, or private grants or awards, insurance reimbursements, worker organizations, client fees, and *pro bono* or volunteer contributions of time, funds, or goods.

Social and material support by family members, local supervisors, consumers, peers, subordinates, and worker organizations also can influence the success of an ABA program. When all interested parties back the aims and methods of a given program, success is likelier than when there is dissension in the ranks. Personnel can encourage or hinder progress in a myriad of ways—some obvious, such as peers voicing their approval or their condemnation; some subtle, as in their volunteering for a job like collecting data or sharing resources or “forgetting” to show up on time for a scheduled training session. This is one very important reason why wise designers and implementers of ABA programs take the time to orient those directly and indirectly affected by the proposed program, probing for any possible concerns, addressing those, and soliciting everyone’s cooperation.

Suppose personnel in a work unit worry that outside observers might distract them or pose a danger due to their unfamiliarity with the area’s intrinsic risks. Rather than insisting on adhering to the original plan, the behavior analyst in charge might solicit suggestions from those workers. For instance, one worker might point out potential risks (a violent client, a piece of equipment awaiting repair, a pathway that needs to be kept clear, a patient with a commu-

nicable disease, a disgruntled customer). Another might propose that outside observers team up with a member of the work unit until they become sufficiently comfortable with the setting and personnel to work alone. Fearing that the program might siphon off resources from their own units, others might take issue with the details of the intervention, such as the extra time or material resources required. In the long run, altering some aspect of the plan to gain greater support makes more sense than doggedly persisting.

Identifying the realities of existing circumstances in advance makes much more sense than prematurely initiating a program and having to terminate or delay it midway through for lack of support. The moral of the story is “*If you don’t have the wherewithal to address the problem successfully and can’t readily resolve it, set that challenge aside and move on to the next one.*” Chapter 3 devotes itself to more thorough ways to assess and prepare the environment for successful behavior change, while Chapter 24 compliments that material by addressing broader organizational factors affecting constructive programmatic change.

Specifying and Refining Goals and Objectives

Once sufficient evidence has been amassed to encourage initiating a particular program, the behavior analyst’s next step is to sharpen the program’s focus by refining its goals and objectives (see Chapter 4). Examples might be to “encourage personnel to identify additional cost-cutting methods” or “promote students’ more active involvement in a new unit of study.”

Those of us who espouse Goldiamond’s (1974) *constructional approach* (see Chapter 4) concentrate on selecting or designing and pursuing constructive behavioral goals through positive means. An example is the *positive behavioral support* approach to working with developmentally challenged youngsters (Carr et al., 2002).⁷ Rarely, if ever, is it justifi-

⁷“Positive behavior support (PBS) is an applied science that uses educational and systems change methods (environmental redesign) to enhance quality of life and minimize problem behavior.” It “emerged from three major sources: applied behavior analysis, the normalization/inclusion movement, and person-centered values” (Carr et al., 2002, p. 4).

able to aim solely toward terminating an unwanted behavior without finding and substituting constructive replacement objectives designed to yield the client at least equivalent if not even more powerful reinforcers. Chapter 4, with its focus on clearly specifying goals, presents a useful technology for setting behavioral objectives springing from those goals that can be of mutual benefit to all involved.

Identifying Current Reinforcers

Reinforcement is the fuel that drives and supports behavior change.⁸ Regardless of the response on which it depends—good, bad, or indifferent—reinforcement increases the likelihood that the individual will repeat that particular behavior. Whether the focus is on increasing current, instructing new, or reducing unwelcome behavior, reinforcement is a crucial element of any teaching or behavior-management plan. Change agents need to explore and identify the stimuli that presently do or can be arranged effectively to provide a reinforcing function for the individual under the circumstances of concern. You will learn more about how reinforcers work in Chapter 5 and how to develop and/or select them in Chapter 6.

Collecting Useful Data

After clearly defining the anticipated end-point of the program, the behavior analyst returns to the here and now, assessing the current status of the behavior(s) of concern to find out what conditions support it in its present form. To accomplish that, valid, reliable measures need to be identified and used to permit the collection and recording of useful data (Chapter 7). Those data then are graphed (Chapter 8) and analyzed (Chapters 9 and 25) to identify the contingencies of reinforcement currently operating on the behavior of interest or concern (Chapter 10).

⁸Neurobiologists are homing in on the specific mechanism(s) of reinforcement within the brain. Based on extensive experimental research, current thinking is that when a behavior is reinforced, particular chemicals, such as dopamine, are released. That, in turn, strengthens the connections (synapses) between individual neurons. (See Schultz, 2000 for a layperson's explanation.)

Promoting Positive Change

Once confident of having clearly specified sound, constructive objectives and reinforcers for energizing the change process, the behavior analyst selects or designs a feasible system for noting and evaluating progress and develops a sound individual (Chapter 11) or group (Chapter 12) intervention plan. If the intention is to teach a new behavior, shaping (Chapter 13) and/or chaining (Chapter 14) would be suitable. If bringing behavior under the control of simple or complex stimuli (e.g., rules, instructions) is of concern, Chapters 15 through 19 will provide the necessary guidance. When the aim is to shift or expand the breadth of responding (or of the circumstances under which the change is to occur), the relevant information can be found in Chapters 20 and 21. Training and hoping that a modified behavior will maintain happily ever after is wishful thinking, though. A better solution is to turn to Chapters 22 through 24, which provide a set of much more promising science-based maintenance strategies.

Should all the aforementioned constructive behavior-change strategies fail to prevent or remedy severely disruptive, upsetting, or dangerous behavior, in Chapters 26 through 31 we provide you with a set of options, including various primarily constructive, humane, alternative approaches to dealing with the situation. Above all, behavior analysts must operate under a strict code of conduct, ensuring thereby that their activities are and remain ethically responsible (Chapter 32).

Implementing, Monitoring, and Experimentally Analyzing the Function of the Intervention Plan

Data are collected and graphed throughout any behavior-analytic program, under both baseline and the treatment phases during which the change strategies are implemented. These practices continue until it is determined that the change becomes meaningful and durable. Then, as mentioned, the relation of that change to the intervention(s) is experimentally analyzed (Chapters 9 and 25). Assuming the rates of improving performance reverse when the treatment is withdrawn, (for instance, are now diminishing

toward the original baseline rather than continuing to increase) then the change agent becomes more confident of the efficacy of the strategy and reapplies it to the same or a new behavior. Otherwise, the behavior of concern is reassessed and a new plan designed and implemented. Alternatively, after discarding the original plan for lack of demonstrated effectiveness, the behavior analyst has the choice of trying another intervention method to address the same problem or of selecting a different challenge.

Getting There: Continue Monitoring Behavior and Fidelity of Intervention

Data collection continues throughout all behavior analytic programs, thereby fulfilling its roles of (1) demonstrating that *the program continues faithfully to be administered according to its original design* (i.e., program fidelity), and (2) demonstrating the ongoing success or failure of the program of intervention. In the latter case, the behavior analyst and client(s) must decide whether to return to assessing the behavior anew and altering the plan of intervention accordingly, or changing the specific goals and objectives, the environment in which the intervention is being conducted, or the problem being addressed altogether.

Staying There

When, ultimately, data convincingly demonstrate that a sought-after solution has been achieved, the behavior analyst must resist the temptation to terminate that program entirely while moving on to other pressing problems. *Getting there is not the same as staying there.* Rather, the basic change procedures need to remain in place under ongoing surveillance for quite a while longer. Only if, after reviewing the data, all key individuals have agreed

that the change is well established and persisting at a steady state, is it reasonable to begin to thin the reinforcers or otherwise diminish the intensity of treatment (see Chapters 22 through 24). Eventually, control over the now-constant rate of performance may, if appropriate, be shifted to the natural environment—within the family, organization, or other social structure. Should contingency support be weak or lacking under these new circumstances, lasting change will be compromised. So, plan how to augment any necessary support to ensure change that lasts *from the very start*.

SUMMARY AND CONCLUSIONS

After discussing the philosophical foundational underpinnings and circumstances supporting the emergence and growth of applied behavior analysis (ABA) as a science, technology, and profession, this chapter has introduced you to the key features of the field. During its evolution over the past sixty+ years, ABA has undergone a tremendous expansion. Today, this evidence-based approach to behavior change has undertaken and often successfully treated performance challenges in numerous corners of the world and across a broad range of physical, cognitive, emotional, and social behavioral challenges.

Those identifying themselves to the public as applied behavior analytic practitioners in the United States and elsewhere are responsible for incorporating all of ABA's scientific and technological features within their assessment and change methods. Actually, to ensure they include all those necessary features, both experimental and practicing ABA scientists and practitioners would be well advised to follow the same evidence-based paths. Figure 1.1 displays a template designed to guide to your own thorough and ethically sound practice in the field.