

## Applied Behavior Analysis

**5.1 Defined: Applied behavior analysis (ABA)**, previously known as behavior modification,<sup>[1]</sup> is defined as the process of systematically applying interventions based upon the principles of learning theory to improve socially significant behaviors to a meaningful degree, and to demonstrate that the interventions employed are responsible for the improvement of behavior. Contrary to popular belief, behavior analysts emphasize that the science of behavior must be a *natural* science as opposed to a *social* science. As such, behavior analysts focus on the observable relationship of behavior to the environment, including antecedents and consequences, without resort to "hypothetical constructs". By functionally assessing the relationship between a targeted behavior and the environment, the methods of ABA can be used to change that behavior.

Methods in applied behavior analysis range from validated intensive behavioral interventions—most notably utilized for children with an autism spectrum disorder (ASD)—to basic research which investigates the rules by which humans adapt and maintain behavior. However, applied behavior analysis contributes to a full range of areas including: AIDS prevention, business management, conservation of natural resources, education, gerontology, health and exercise, industrial safety, language acquisition, littering, medical procedures, parenting, psychotherapy, seatbelt use, severe mental disorders, sports, substance abuse, and zoo management and care of animals.

**ABA or Applied Behavior Analysis** is a time tested and data based strategy for teaching children with disabilities. It is most often used with children with autistic spectrum disorders, but is an effective tool for children with behavioral disorders, multiple disabilities, and severe intellectual handicaps. It is the only treatment for Autistic Spectrum disorders approved by the FDA (Food and Drug Administration.)

Although it may seem simplistic, it is actually the best way to strip away all our cultural prejudices and see behaviors as they are. Based on the work of BF Skinner, it identifies behaviors that should be extinguished, behaviors that are to be taught and reinforced, reinforcers, and reinforcement schedules.

ABA may also refer to the certification that an ABA specialist who is certified by ABA International. An ABA evaluates students (FBA) and writes programs, both behavioral (BIP) and educational for students.

## 5.2 History

ABA is defined as an applied natural science devoted to developing and applying procedures for effective and beneficial behavior change. It is one of the three fields of behavior analysis. The other two are radical behaviorism, or the philosophy of the science; and experimental analysis of behavior, or basic experimental research.

### History

B.F. Skinner further revised the traditional theory of Behaviorism in the 1930s, and developed the modern form of it known as Behavior Analysis.

Although deriving from a similar philosophy, behavior modification was one form of behaviorism that modified behavior without addressing what was causing it. ABA uses environmental events. In other words, it *analyzes* what is prompting that behavior (the antecedent) and then develops consequential strategies. The antecedent also allows the practitioner to teach replacement behaviors for the individual.

Much of the beginnings of ABA can be traced to a group of faculty and researchers at the University of Washington including Don Baer, Sidney Bijou, Bill Hopkins, Jay Birnbrauer, Ivar Lovaas, Todd Risley, James Sherman, and Montrose Wolf. In the 1960s, Baer, Hopkins, Risley, Sherman, and Wolf became faculty in the Department of Human Development and Family Life at the University of Kansas. They and their colleagues began a concentrated effort at developing and perfecting the application of behavior analysis to address a wide variety of human problems. They also founded the Journal of Applied Behavioral Analysis in 1968 which publishes research examining the application of behavior analysis to socially-relevant behavior. The term "Applied Behavior Analysis" (ABA) first came to widespread use after the introduction of *The Journal of Applied Behavior Analysis*.

ABA is a science used in a wide range of fields to reinforce behavior with various subtypes such as Organizational behavior management (OBM), Positive behavior support, (such as School-wide Positive Behavioral Interventions and Supports

(SWPBIS)), and Clinical behavior analysis (CBA, such as Contingency Management). Most of the time people use the subtype term Early intensive behavioral intervention (EIBI, including the Lovaas model and Pivotal response treatment (PRT)) interchangeably with ABA. However, the latter is a distinct psychological science of reinforcing behavior.

Ole Ivar Lovaas is considered a grandfather of Applied Behavior Analysis and developed standardized teaching interventions based on behavioral principals. Lovaas devoted nearly a half a century to groundbreaking research and practice aimed at improving the lives of children with autism and their families. In 1965, Lovaas published a series of articles that therapeutic approaches to autism. The first two articles presented his system for coding behaviors during direct observations and a pioneering investigation of antecedents and consequences that maintained a problem behavior, a forerunner of what is now called experimental functional analysis. The subsequent articles built upon these methods and reported the first demonstration of an effective way to teach nonverbal children to speak, a study on establishing social (secondary) reinforcers, a procedure for teaching children to imitate, and several studies on interventions to reduce life-threatening self-injury and aggression.

Lovaas was cited in his early career to use low dosages of electroshock therapy to children with extreme self injurious behavior. In 1973, Lovaas published a long-term follow-up for the behavior modification intervention and was dismayed to find that most of the subjects had reverted to their pre-intervention behaviors. After these findings, Lovaas and his colleagues proposed several ways to improve outcomes such as starting intervention during the children's preschool years instead of later in childhood or adolescence, involving parents in the intervention, and implementing the intervention in the family's home rather than an institutional setting. Subsequent articles like the 1987 "Behavioral Treatment and Normal Educational and Intellectual Functioning in Young Autistic Children" reinforce this proposal of early and intensive intervention—without the use of aversives (such as electric shocks)—paired with continual therapy yields the most effective results for children with autism. Lovaas highly believed that the support and involvement in parents applying therapy at home contributed to a higher success rate. Lovaas dedicated his life to the study of autism and was a strong advocate for people with autism even co-founding what is today the Autism Society of America.

## **Characteristics**

Baer, Wolf, and Risley's 1968 article is still used as the standard description of ABA. It describes the seven dimensions of ABA: application; a focus on behavior; the use of analysis; and its technological, conceptually-systematic, effective, and general approach.

### **Applied**

ABA focuses on areas that are of social significance. In doing this, behavior scientists must take into consideration more than just the short-term behavior change, but also look at how behavior changes can affect the consumer, those who are close to the consumer, and how any change will affect the interactions between the two.

### **Behavioral**

ABA must be behavioral, i.e.: behavior itself must change, not just what the consumer *says* about the behavior. It is not the goal of the behavior scientists to get their consumers to stop complaining about behavior problems, but rather to change the problem behavior itself. In addition, behavior must be objectively measured. A behavior scientist cannot resort to the measurement of non-behavioral substitutes. (Obviously multidisciplinary work within behavior and psychology may include, for example, analysis of cognition or demographics and exploration of the individual as well, where experimental standards are maintained.)

### **Analytic**

ABA must be analytic, which means that the behavior analyst can control the behavior that is being changed by changing the control behavior. In the lab, this has been easy as the researcher can start and stop the behavior at will. However, in the applied situation, this is not always as easy, nor ethical, to do. According to Baer, Wolf, and Risley, this difficulty should not stop a science from upholding the strength of its principles. As such, they referred to two designs that are best used in applied settings to demonstrate control and maintain ethical standards. These are the reversal and multiple baseline designs. The reversal design is one in which the behavior of choice is measured prior to any intervention. Once the pattern appears stable, an intervention is introduced, and behavior is measured. If there is a change in behavior, measurement continues until the new pattern of behavior appears stable. Then, the intervention is removed, or reduced, and the behavior is measured to see if it changes again. If the behavior scientist truly has demonstrated control of the behavior with the intervention, the behavior of interest should change with

intervention changes. Here control may be better called "effect" or "influence", of behavior.

### **Technological**

This means that if any other researcher were to read a description of the study, that researcher would be able to "replicate the application with the same results." This means that the description must be very detailed and clear. Ambiguous descriptions do not qualify. Cooper *et al.* describe a good check for the technological characteristic: "have a person trained in applied behavior analysis carefully read the description and then act out the procedure in detail. If the person makes any mistakes, adds any operations, omits any steps, or has to ask any questions to clarify the written description then the description is not sufficiently technological and requires improvement." This is where the experiment is repeatable.

### **Conceptually Systematic**

A defining characteristic is in regard to the interventions used; and thus research must be conceptually systematic by only using procedures and interpreting results of these procedures in terms of the principles from which they were derived.<sup>[29]</sup>

### **Effective**

ABA must be effective, which means that the application of these techniques changes the behavior it seeks to change. Specifically, it is not a theoretical importance of the variable, but rather the practical importance (social importance) that is essential. If the application of behavioral techniques does not produce a large enough effects for practical value, then the application has failed.

### **Generality**

ABA must be general, which means that it persists over time, in different environments, and spreads to other behaviors not directly treated by the intervention. In addition, continued change in specified behavior after intervention for that behavior has been withdrawn is also an example of generality. It is a goal to identify behavior stimuli with long-lasting and general effect.

## Proposed additional characteristics

In 2005, Heward, *et al.* added their belief that the following five characteristics should be added:

- **Accountable:** Direct and frequent measurement enables analysts to detect their success and failures to make changes in an effort to increase successes while decreasing failures. ABA is a scientific approach in which analysts may guess but then critically test ideas, rather than "guess and guess again." This constant revision of techniques, commitment to effectiveness and analysis of results leads to an accountable science.
- **Public:** Applied behavior analysis is completely visible and public. This means that there are no explanations that cannot be observed, but of course these are each imposed. There are no mystical, metaphysical explanations, hidden treatment, or magic. Thus, ABA produces results whose explanations are available to all of the public.
- **Doable:** ABA has a pragmatic element in that implementers of interventions can consist of a variety of individuals, from teachers to the participants themselves. This does not mean that ABA requires one simply to learn a few procedures, but with the proper planning, it can effectively be implemented by almost everyone willing to invest the effort.
- **Empowering:** ABA provides tools to practitioners that allow them to effectively change behavior. By constantly providing visual feedback to the practitioner on the results of the intervention, this feature of ABA allows clinicians to assess their skill level and builds confidence in their technology.
- **Optimistic:** According to several leading authors, practitioners skilled in behavior analysis have genuine cause to be optimistic for the following reasons:
  - Individual behavior is largely determined by learning and cumulative effects of the environment, which itself is manipulable
  - Direct and continuous measurements enable practitioners to detect small improvements in performance that might have otherwise been missed
  - As a practitioner uses behavioral techniques with positive outcomes, the more they will become optimistic about future success prospects
  - The literature provides many examples of success teaching individuals considered previously unteachable.