Applied Behavior Analysis III

7.1 Method of Identifying Functions of Behavior

Applied behavior analysis (ABA), previously known as behavior modification, 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.

FBA methods can be classified into three types: • Indirect assessment • Descriptive assessment • Functional (experimental) analysis

Indirect FBA

This method utilizes structured interviews, checklists, rating scales, or questionnaires to obtain information from persons who are familiar with the person exhibiting the behavior to identify possible conditions or events in the natural environment that correlate with the problem behavior. They are referred to as "indirect" because they do not involve direct observation of the behavior, but rather they solicit information based on others' recollections of the behavior. This form of assessment typically yields the least reliable information about the function of behavior, but can provide insight as to possible functions of the behavior to be tested in the future, the form of the behaviors (e.g. screaming, hitting, etc.), and environments in which the behavior typically occurs (e.g. school, home, etc.). This type of assessment should be performed as the initial step of any Functional Behavior Assessment to gather relevant information to complete more direct assessments.

Descriptive FBA

Unlike the indirect methods of FBAs, descriptive functional behavior assessment utilizes direct observation of behavior. These observations occur in the environment in which the behavior naturally occurs (e.g. school, home, etc.)

therefore there is no direct manipulation of the environment. The most common form of descriptive assessment involves recording the antecedents and consequences that naturally occur when the individual emits the behavior. This is referred to as ABC data collection, in which (A) represents the common antecedent, (B) represents the behavior of interest, and (C) represents the immediate consequences that occurs following the behavior. ABC data collection is used to identify the naturally occurring consequences delivered in the environment in which the behavior occurs. ABC data collection can be conducted by a wide array of individuals who have received appropriate training on how to record the data. Another form of descriptive FBA is called a scatterplot. In this assessment, staff record the time and setting in which the behavior of interest occurs over a series of days. The data are plotted on a visual scale to indicate whether there are any patterns in the behavior. For example, does the behavior occur more frequently during math instruction than it does during lunchtime? Although this assessment does not expose the staff member to the consequences of the behavior, it can be used to identify some of the antecedent conditions that typically surround the behavior of interest.

Functional (Experimental) Analysis

A functional analysis is the most direct form of Functional Behavior Assessments in which specific antecedents and consequences are systematically manipulated to test their separate effects on the behavior of interest. Each manipulation of the antecedent and consequence in a particular situation is referred to a condition. In a functional analysis, conditions are typically alternated between quite rapidly independent of responding to test the different functions of behavior. When data paths are elevated above the control condition (described below) it can be said that there is a functional relation between that condition and the behavior of interest. Below, common examples of experimental conditions are described. A standard functional analysis normally has four conditions (three test conditions and one control):

Attention

In this condition, the experimenter gives the individual moderately preferred items and instructs them to go play. After that initial instruction, the experimenter pretends to act busy and ignores all bids for attention from the individual. If the individual engages in the behavior of interest, the experimenter provides the individual with attention (commonly in the form of a reprimand). Behaviors that occur more frequently in this condition can be said to be attention maintained.

Escape

In this condition, the experimenter instructs the individual that it is time to work. After the initial instruction, the experimenter delivers a series of demands that the individual is typically required to complete (e.g. math problems, cleaning up, etc.). If the individual engages in the behavior of interest, the demand is removed and the child is allowed to take a break. Behaviors that occur more frequently in this condition can be said to be escape maintained.

Alone[edit]

In this condition, the child is left alone with a variety of items to engage with. If the child engages in the behavior of interest, no programmed consequences are delivered. Behaviors that occur more frequently in this condition can be said to be automatically maintained.

Control (Play)

In this condition, the child is allowed to engage with a variety of items during the session. No demands are placed on the child throughout the duration of the session. The experimenter provides attention to the individual throughout the session on any behavior that is not the target behavior. If the target behavior occurs, the experimenter removes attention until the behavior has subsided. This session is meant to act as a control condition, meaning that the environment is enriched for the purpose of the behavior not occurring. Said another way, by meeting environmental needs for all possible functions, the individual is not likely to engage in the behavior of interest. This condition is used as a comparison to the other conditions. Any condition that is elevated to a large degree form the control condition, shows a higher degree experimental control indicating the functional relationship between the specific environmental conditions and the behavior of interest.

7.2 Conducting a Functional Behavior Assessment

Functional Behavior Assessments are rarely limited to only one of the methodologies described above. The most common, and most preferred, method of identifying the function of behavior can be seen as a four part processes. 1) The gathering of information via indirect and descriptive assessment. 2) Interpretation of information from indirect and descriptive assessment and formulation of a hypothesis about the purpose of problem behavior. 3) Testing of a hypothesis using

a functional analysis. 4) Developing intervention options based on the function of problem behavior.

Technologies discovered through ABA research

Task analysis

Task analysis is a process in which a task is analyzed into its component parts so that those parts can be taught through the use of chaining: forward chaining, backward chaining and total task presentation. Task analysis has been used in organizational behavior management, a behavior analytic approach to changing organizations. Behavioral scripts often emerge from a task analysis. Bergan conducted a task analysis of the behavioral consultation relationship and Thomas Kratochwill developed a training program based on teaching Bergan's skills. A similar approach was used for the development of microskills training for counselors. Ivey would later call this "behaviorist" phase a very productive one and the skills-based approach came to dominate counselor training during 1970–90. Task analysis was also used in determining the skills needed to access a career. In education, Englemann (1968) used task analysis as part of the methods to design the Direct Instruction curriculum.

Chaining[edit]

The skill to be learned is broken down into small units for easy learning. For example, a person learning to brush teeth independently may start with learning to unscrew the toothpaste cap. Once they have learned this, the next step may be squeezing the tube, etc.

For problem behavior, chains can also be analyzed and the chain can be disrupted to prevent the problem behavior. Some behavior therapies, such as dialectical behavior therapy, make extensive use of behavior chain analysis.

Prompting

A prompt is a cue or assistance to encourage the desired response from an individual. Prompts are often categorized into a prompt hierarchy from most intrusive to least intrusive. There is some controversy about what is considered most intrusive: physically intrusive versus hardest prompt to fade (i.e., verbal). In a faultless learning approach, prompts are given in a most-to-least sequence and faded systematically to ensure the individual experiences a high level of success. There may be instances in which a least-to-most prompt method is preferred.

Prompts are faded systematically and as quickly as possible to avoid prompt dependency. The goal of teaching using prompts would be to fade prompts towards independence, so that no prompts are needed for the individual to perform the desired behavior.

Types of prompts:

- Vocal prompts: Utilizing a vocalization to indicate the desired response.
- Visual prompts: A visual cue or picture.
- Gestural prompts: Utilizing a physical gesture to indicate the desired response.
- Positional prompt: The target item is placed closer to the individual.
- Modeling: Modeling the desired response for the student. This type of prompt is best suited for individuals who learn through imitation and can attend to a model.
- Physical prompts: Physically manipulating the individual to produce the desired response. There are many degrees of physical prompts. The most intrusive being hand-over-hand, and the least intrusive being a slight tap to initiate movement.

This is not an exhaustive list of all possible prompts. When using prompts to systematically teach a skill, not all prompts need to be used in the hierarchy; prompts are chosen based on which ones are most effective for a particular individual.

Fading

The overall goal is for an individual to eventually not need prompts. As an individual gains mastery of a skill at a particular prompt level, the prompt is faded to a less intrusive prompt. This ensures that the individual does not become overly dependent on a particular prompt when learning a new behavior or skill.

Thinning a reinforcement schedule

Thinning is often confused with fading. Fading refers to a prompt being removed, where thinning refers to the spacing of a reinforcement schedule getting larger. Some support exists that a 30% decrease in reinforcement can be an efficient way to thin. Schedule thinning is often an important and neglected issue in contingency management and token economy systems, especially when developed by unqualified practitioners (see professional practice of behavior analysis).

Generalization

Generalization is the expansion of a student's performance ability beyond the initial conditions set for acquisition of a skill. Generalization can occur across people, places, and materials used for teaching. For example, once a skill is learned in one setting, with a particular instructor, and with specific materials, the skill is taught in more general settings with more variation from the initial acquisition phase. For example, if a student has successfully mastered learning colors at the table, the teacher may take the student around the house or his school and then *generalize* the skill in these more natural environments with other materials. Behavior analysts have spent considerable amount of time studying factors that lead to generalization.

Shaping

Shaping involves gradually modifying the existing behavior into the desired behavior. If the student engages with a dog by hitting it, then he or she could have their behavior shaped by reinforcing interactions in which he or she touches the dog more gently. Over many interactions, successful shaping would replace the hitting behavior with patting or other gentler behavior. Shaping is based on a behavior analyst's thorough knowledge of operant conditioning principles and extinction. Recent efforts to teach shaping have used simulated computer tasks.

One teaching technique found to be effective with some students, particularly children, is the use of video modeling (the use of taped sequences as exemplars of behavior). It can be used by therapists to assist in the acquisition of both verbal and motor responses, in some cases for long chains of behavior.

Interventions based on an FBA

Critical to behavior analytic interventions is the concept of a systematic behavioral case formulation with a functional behavioral assessment or analysis at the core. This approach should apply a behavior analytic theory of change (see Behavioral change theories). This formulation should include a thorough functional assessment, a skills assessment, a sequential analysis (behavior chain analysis), an ecological assessment, a look at existing evidenced-based behavioral models for the problem behavior (such as Fordyce's model of chronic pain) and then a treatment plan based on how environmental factors influence behavior. Some argue that behavior analytic case formulation can be improved with an assessment

of rules and rule-governed behavior. Some of the interventions that result from this type of conceptualization involve training specific communication skills to replace the problem behaviors as well as specific setting, antecedent, behavior, and consequence strategies.

Efficacy in autism

ABA-based techniques are often used to treat autism, so much so that ABA itself is often mistakenly considered to be synonymous with therapy for autism. ABA for autism may be limited by diagnostic severity and IQ. The most influential and widely cited review of the literature regarding efficacy of treatments for Autism is the National Research Council's book *Educating Children with Autism* (2001) which concluded that ABA was the best research supported and most effective treatment for the main characteristics of Autism. Some critics claimed that the NRC's report was an inside job by behavior analysts but there were no board certified behavior analysts on the panel (which did include physicians, speech pathologists, educators, psychologists, and others). Recent reviews of the efficacy of ABA-based techniques in autism include:

- A 2007 clinical report of the American Academy of Pediatrics concluded that the benefit of ABA-based interventions in autism spectrum disorders (ASDs) "has been well documented" and that "children who receive early intensive behavioral treatment have been shown to make substantial, sustained gains in IQ, language, academic performance, and adaptive behavior as well as some measures of social behavior."
- Researchers from the MIND Institute published an evidence-based review of comprehensive treatment approaches in 2008. On the basis of "the strength of the findings from the four best-designed, controlled studies," they were of the opinion that one ABA-based approach (the Lovaas technique created by Ole Ivar Lovaas) is "well-established" for improving intellectual performance of young children with ASD.
- A 2009 review of psycho-educational interventions for children with autism whose mean age was six years or less at intake found that five high-quality ("Level 1" or "Level 2") studies assessed ABA-based treatments. On the basis of these and other studies, the author concluded that ABA is "well-established" and is "demonstrated effective in enhancing global functioning in pre-school children with autism when treatment is intensive and carried out by trained therapists."
- A 2009 paper included a descriptive analysis, an effect size analysis, and a meta-analysis of 13 reports published from 1987–2007 of early intensive

behavioral intervention (EIBI, a form of ABA-based treatment with origins in the Lovaas technique) for autism. It determined that EIBI's effect sizes were "generally positive" for IQ, adaptive behavior, expressive language, and receptive language. The paper did note limitations of its findings including the lack of published comparisons between EIBI and other "empirically validated treatment programs."

- In a 2009 systematic review of 11 studies published from 1987–2007, the researchers wrote "there is strong evidence that EIBI is effective for some, but not all, children with autism spectrum disorders, and there is wide variability in response to treatment." Furthermore, any improvements are likely to be greatest in the first year of intervention.
- A 2009 meta-analysis of nine studies published from 1987–2007 concluded that EIBI has a "large" effect on full-scale intelligence and a "moderate" effect on adaptive behavior in autistic children.
- In 2011, investigators from Vanderbilt University under contract with the Agency for Healthcare Research and Quality performed a comprehensive review of the scientific literature on ABA-based and other therapies for autism spectrum disorders; the ABA-based therapies included the UCLA/Lovaas method and the Early Start Denver Model (the latter developed by Sally Rogers and Geraldine Dawson). They concluded that "both approaches were associated with ... improvements in cognitive performance, language skills, and adaptive behavior skills." However, they also concluded that "the strength of evidence ... is low," "many children continue to display prominent areas of impairment," "subgroups may account for a majority of the change," there is "little evidence of practical effectiveness or feasibility beyond research studies," and the published studies "used small samples, different treatment approaches and duration, and different outcome measurements."

A 2009 systematic review and meta-analysis by Spreckley and Boyd of four 2000–2007 studies (involving a total of 76 children) came to different conclusions than the aforementioned reviews. Spreckley and Boyd reported that applied behavior intervention (ABI), another name for EIBI, did not significantly improve outcomes compared with standard care of preschool children with ASD in the areas of cognitive outcome, expressive language, receptive language, and adaptive behavior. In a letter to the editor, however, authors of the four studies meta-analyzed claimed that Spreckley and Boyd had misinterpreted one study comparing two forms of ABI with each other as a comparison of ABI with standard care, which erroneously decreased the observed efficacy of ABI. Furthermore, the four studies' authors raised the possibility that Spreckley and

Boyd had excluded some other studies unnecessarily, and that including such studies could have led to a more favorable evaluation of ABI. Spreckley, Boyd, and the four studies' authors did agree that large multi-site randomized trials are needed to improve the understanding of ABA's efficacy in autism.