Applied Behavior Analysis & Autism: An Introduction

Autism™ NEW JERSEY

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Forward

Both authors have been profoundly touched by many individuals with autism and their families. We have partnered with parents to teach their children and learned from the challenges and joys they experienced while raising a child with autism. Many of these parents consistently requested a written overview that defined and described methods used within Applied Behavior Analysis (ABA) programming. Parents wanted this information during their initial search to better understand this treatment approach, and during their journey to increase their knowledge and abilities. Unfortunately, only a few such publications have met this need and they cover slightly different topics.

This book is intended for those parents and professionals who want an overview of Applied Behavior Analysis and the meaningful changes it can make in the lives of people with autism. The book is divided into brief segments that focus on specific topics. Within each section, readers can expect a description or definition of the topic, examples from everyday settings, and references for further information. References are largely drawn from the professional literature with an emphasis on those that have a high degree of scientific validity. We hope this book is helpful to you and we welcome your feedback for future revisions.

It is important to emphasize that this book is an overview and the resources listed in each section and at the end should be referred to for a more comprehensive understanding of the discussed topics.

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Introduction

Why ABA?

There are many autism treatments available, and most of them claim promising results. How do you know if these claims are true? Is there concrete evidence that the treatment works? Choosing the right treatment is in the best interest of your child and should be worth the commitment and resources. So the question is: why ABA?

There are many anecdotes that appear to support numerous treatments. ABA stands out because its foundation is the collection and review of direct observational data. There have been hundreds of well-controlled studies published in the professional literature documenting ABA's effectiveness with learners with autism (Matson et al., 1996). Most of these studies have focused on one or two specific behaviors that required intensive teaching or treatment. Some have focused on the learners' behavior as well as the therapists' and the parents' behavior during academic and social interactions. Approximately ten studies have explored the long-term effects of intensive ABA programming for young children with autism. The results of these studies challenged previous notions that people with autism could not be educated or that they could not lead meaningful and independent lives. The children who participated in early and intensive ABA programming learned many new skills and substantially reduced their problematic behavior. Some of these children learned so much that today it is hard to tell them apart from typically developing children.

While there is still much to learn about how early behavioral intervention affects young children with autism, there are some powerful messages from the studies conducted so far (Green, 1996). Several state and federal agencies have heard these powerful messages and agree that there is solid evidence that early and intensive ABA intervention can produce comprehensive and meaningful improvements for a large proportion of children with autism (for example, Maine Administrators of Services

for Children with Disabilities (MADSEC) Autism Taskforce, 1999; New York State Department of Health, 1999; U.S. Department of Health and Human Services, 1999).

Additionally, the United States Congress commissioned a panel of autism experts to publish a state of the research on autism and provide recommendations for public policy and future research (National Research Council, 2001). While they recognized the contribution of a behavior-based approach in autism treatment, they pointed out the lack of comparison studies of among this and other popular treatments. The results from this type of study would shed more definitive light on the question of which treatment was the best. They stressed the importance of conducting studies that directly compared interventions so that educators and parents could select the most effective treatment for an individual with autism. Since then, two comparison studies have been published in peer-reviewed journals. While there are limits to how much information can be gleaned from only two studies (described below), the results tells us more about the effectiveness of ABA.

How does ABA compare to other treatments? Howard, Sparkman, Cohen, Green, & Stainslaw (2005) published a study on the effects of three different treatment approaches used within early intervention. Sixty-one young children with autism spectrum disorders received one of three treatment procedures: a) intensive behavior analytic intervention, b) intensive eclectic intervention which was a combination of popular methods, or c) non-intensive public early intervention. The children were an average of 34 months old when they entered the study. The study measured each child's skills before and after a 14-month intervention in the areas of: a) cognitive, b) non-verbal, c) receptive/expressive language, and d) adaptive skills. The results of this study showed that children in an intensive ABA program produced significant improvement across all four areas compared to the children who received eclectic and non-intensive treatments. The study even found that the children who received non-intensive early intervention showed a regression.

What about children with autism who enter treatment at a later age? There is some evidence that these children also benefit substantially from ABA instruction when compared to children who participated in other interventions of similar intensity (Eikeseth, Smith, Jahr, & Eldevik, 2002). The researchers examined the progress of 25 4-7 year olds who received either intensive behavioral treatment or intensive eclectic treatment in public school settings. The results indicated that children who participated in intensive behavioral treatment made large improvements across all measured skill areas (i.e., cognitive, visual-spatial, language, and adaptive behavior skills) as compared to those children who received intensive eclectic treatment.

The same is likely to be true for adults with autism. While there are well-documented effects of behavioral assessment and intervention strategies on improved functioning for adults with autism (McClannahan, MacDuff, & Krantz, 2002), there are limited long-term data on intensive programs for adults. However, it is clear that many adults experience real and substantial gains come from ABA intervention. Thus, it stands to reason that ABA remains a central and effective component of services for individuals of all ages with autism.

Early and intensive ABA programming is cost effective and potentially life changing for individuals and their families (Jacobson, Mulick, & Green, 1998). Why not turn to science and get the best available treatment? When you review the results of the research, you will find ABA.

Resources

Celiberti, D. A., Buchanan, S. M., Bleeker, F. N., Kreiss, D. S., & Rosenfeld, D. (2004). The road less traveled: Charting a clear course for autism treatment. *Autism: Basic Information* (5th ed., pp. 17-32). Robbinsville, NJ: Autism New Jersey.

Eikeseth, S., Smith, T., Jahr, E., & Eldevik, S. (2002). Intensive behavioral treatment at school for 4- to 7-year-old children with autism: A 1-year comparison controlled study. *Behavior Modification, 26*, 49-68.

Green, G. (1996). Early behavioral intervention for autism: What does research tell us? In C. Maurice (Ed), G. Green, & S. C. Luce (Co-eds.). *Behavioral intervention for young children with autism: A manual for parents and professionals* (pp. 29-44). Austin, TX: PRO-ED.

Howard, J. S., Sparkman, C. R., Cohen, H. G., Green, G., & Stainslaw, H. (2005). Comparison of intensive behavior analytic and eclectic treatments for young children with autism. *Research in Developmental Disabilities, 26*, 359-383.

Jacobson, J. W., Mulick, J. A., & Green, G. (1998). Cost-benefit estimates for early intensive behavioral intervention for young children with autism--general model and single state case. *Behavioral Interventions, 13*, 201-226.

MADSEC Autism Taskforce. (1999). *Executive summary*. Portland, ME: Department of Education.

Matson, J. L., Benavidez, D. A., Compton, L. S., Paclawskyj, T., & Baglio, C. (1996). Behavioral treatment of autistic persons: A review of research from 1980 to the present. *Research in Developmental Disabilities, 17*, 433-465.

McClannahan, L. E., MacDuff, G. S., & Krantz, P. (2002). Behavior analysis and intervention for adults with autism. *Behavior Modification, 26,* 9-26.

National Research Council (2001). *Educating children with autism.* Committee on Educational Interventions for Children with Autism. C. Lord & J. P. McGee (Eds.) Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

New York State Department of Health Early Intervention Program. (1999). *Clinical practice guidelines: The guideline technical report – Autism/pervasive developmental disorders, assessment and intervention.* Albany, NY: New York State Department of Health.

U.S. Department of Health and Human Services. (1999). *Mental health: A report of the surgeon general.* Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health.

What is ABA?

ABA makes meaningful changes in people's lives through the use of procedures that have been demonstrated to work. The following description of ABA was adapted from Green (1996).

Behavior analytic treatment for autism uses reinforcement in structured and natural environments to help individuals learn new skills. Skills ranging from simple to complex are broken down into small, measurable units and systematically taught. A high-priority goal is making it enjoyable for the learner. Through carefully planned guidance and reinforcement, the learner is more likely to exhibit appropriate behavior during and after the teaching interaction. In contrast, problem behaviors are not reinforced. Some analysis may be necessary to determine the function(s) and reinforcers for these behaviors to develop an effective intervention plan.

On a more technical note, Cooper, Heron, and Heward (1987) define ABA as:

> the science in which procedures derived from the principles of behavior are systematically applied to improve socially significant behavior to a meaningful degree and to demonstrate experimentally that the procedures employed were responsible for the improvement in behavior. (p. 14)

As we said above, ABA makes meaningful changes in people's lives through the use of procedures that have been demonstrated to work.

During the last fifty years, Behavior Analysis has been referred to in a number of different terms, including behavior modification, behavior management, contingency management, positive approaches, and operant or Skinnerian

psychology. Most of these terms fail to fully capture the nature and dimensions of contemporary behavior analysis, and bring with them associations that are either inaccurate or misleading. Here is some accurate information. Behavior Analysis has two main branches: experimental and applied. The experimental analysis of behavior is a field of study in which animals and humans participate in experiments and researchers observe how they behave and learn in different situations. The results of these studies are then used to inform Applied Behavior Analysis, ABA, which is the service part of the discipline. In other words, this type of behavior analyst works with people to improve their behavior and quality of life.

ABA programs are based on empirical research, include the direct observation and measurement of behavior, and utilize antecedent stimuli, positive reinforcement, and other consequences to produce behavior change. ABA is a well-developed discipline among the human service professions. It has a mature body of knowledge, established standards for practice, distinct methods of service, recognized experience and educational requirements for practice, and identified sources of requisite education in universities.

Resources

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Green, G. (1996). Early behavioral intervention for autism: What does research tell us? In C. Maurice (Ed.), G. Green, & S. Luce (Co-eds.). *Behavioral intervention for young children with autism: A manual for parents and professionals* (pp. 29-44). Austin, TX: PRO-ED.

Newman, B. (1999). *When everybody cares: Case studies of ABA with people with autism.* NY: Dove and Orca.

Newman, B., Reeve, K. F., Reeve, S. A., & Ryan, C. S. (2003). *Behaviorspeak: Glossary of terms in applied behavior analysis (ABA).* NY: Dove & Orca.

Newman, B., Reinicke, D., & Newman, L. (2000). *Words from those who care: Further case studies of ABA with people with autism.* NY: Dove and Orca.

Additional Resources

These two resources describe the characteristics of Applied Behavior Analysis. While they do not contain information specific to autism, they are quite relevant and provide an accurate and thorough picture of the concepts that guide the field.

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

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

How Behavior Analysts Approach Teaching

The behavioral teaching approach takes into account a few factors, such as the student's current level of performance, the skill acquisition and behavior reduction goals, and some assumptions about what causes behavior (performance) to occur. ABA views the immediate present as the key to comprehending current behavior, and uses information about the past cautiously (for example, to understand how a behavioral pattern developed over time).

Causes of Behavior

1. **Genetic explanations** - With the human genome project complete, we now know more about how genes affect behavior. Unfortunately, this information is not yet helpful in producing a medical treatment or cure for autism.
2. **Past experiences** (sometimes called reinforcement history or learning history) – Behavior analysts study how behaviors are acquired and maintained through reinforcement. While it is important to understand a person's history of experiences, this source may yield only limited and insufficient information about how to increase a person's behavioral skills.
3. **Immediate environment** – the events that are happening during every moment of our lives. This includes the setting, other people present and their behavior, objects, activities, routines, resources, etc. Behavior analysts see the immediate environment as the major cause of behavior. They collect very specific information about what happens before and after a behavior. They then use this information to make appropriate behavior more likely and inappropriate behavior less likely. Parents and teachers can have a tremendous impact on behavior because they are such a large part of the child's immediate environment. So, the more you know about maximizing learning, the more you can change a person's behavior.

ABCs of Behavior

Let's look more closely at how behavior analysts study the interaction between the immediate environment and behavior.

One of the main things that behavior analysts do is examine the ABCs: Antecedents, Behavior, and Consequences.

Antecedent: what comes before a specific behavior
Behavior: the behavior itself
Consequence: what happens after a specific behavior

This analysis helps to pinpoint what may trigger a behavior and assists in identifying what consequences keep a behavior going.

Example: **Teaching Exchange**

Teacher says, "Get your lunchbox. It's time to eat." (**Antecedent**)

Student walks to cubby, gets lunchbox, walks to seat at table, and sits down. (**Behavior**)

Teacher says, "Terrific work, Johnny. You got your lunchbox. You're ready to eat." (**Consequence**)

Both the antecedent (the instruction) and the consequence (eating lunch) influence whether the behavior will happen again.

Example: **Challenging Behavior**

Teacher says, "Let's clean up. It is time for circle." (**Antecedent**)

Student throws blocks, lies on floor, and screams. (**Behavior**)

Teacher says, "We need to clean up our toys," and helps child to put blocks in the box. (**Consequence**)

Both the antecedent (the instruction) and the consequence (not allowed to continue playing) influence whether the behavior will happen again.

In real situations, other factors such as the learner's motivation and setting events are taken into account. These simple examples are presented for illustration purposes of the ABC analysis.

What does this mean for me?
We can understand how and when behaviors occur by examining antecedents and consequences. We often can change behaviors by changing what we do immediately before and immediately after behavior.

What Principles and Methods Comprise ABA?

Motivation

Motivation is the heart and soul of ABA. Behavior analysts want to know what a person is motivated by, what interests her, and what she experiences as fun. The old cliché is true: different strokes for different folks. Perhaps you enjoy a good meal of Italian food while another person prefers a backyard barbeque. The same is true for learners with autism. Motivation is individually determined and best understood by observing the person and his/her choices. It also is important to keep in mind that motivation can change on a moment-to-moment basis. Even though you like a good barbeque, you probably wouldn't want one every night of the week. Here's another example: sometimes you prefer to listen to calm music and other times to loud, upbeat music. To maximize the learner's fun and performance, behavior analysts encourage him/her to make choices and incorporate these preferences into the teaching interaction.

This moment-to-moment analysis of the learner's motivation can seem like a lot of hard work, which goes above and beyond the standard curriculum and typical teaching strategies. So, why is this important and worthwhile? When equipped with this information, behavior analysts can offer fun activities, interesting objects, and desirable items to the learner. The learner then associates the instructor with those fun and desirable items and activities. This often is called pairing yourself with reinforcement. It is the essence of making learning fun and of building a positive association with the instructor. The instructor becomes the source of fun and desirable items, the person who gives squishy balls, teddy grahams, hugs, high fives, trips to the playground, and giggles.

a learner engages in a certain behavior, and is very relevant to understanding challenging behaviors. When we understand what a person is motivated to obtain (attention, a desired object, a break from instructional demands), we can reorganize the environment. We can provide motivating things in the absence of challenging behavior and teach the learner ways to appropriately request them.

Technically speaking, motivation is often called an "establishing operations" (EO) or a "motivational operation" (MO). They are events with to properties:

1. a reinforcer-establishing effect that establishes what is reinforcing in the moment
2. an evocative effect that evokes a particular response

In simple terms, an EO determines what is wanted and influences what the individual does to get the desired item. Here's an example with an adolescent with autism.

Jason has been outside on a hot day. He gets thirsty and desires water (the reinforcer-establishing effect). We now have established water as a potential reinforcer. The second property, called an evocative effect, is demonstrated when Jason does something to obtain that reinforcer (water). He might take his teacher's hand and lead her to the water fountain. He also might give her a picture of a glass of water. Thus, the same reinforcer could evoke different response at different times or for different people. Responses that have been successful in the past are more likely to occur than other responses.

Here's another example. A child sees a popular toy from a favorite movie in the toy store. She may want it. This is the reinforcer-establishing effect. Once in the toy store, she may request the toy because such requests have been honored in the past. This is the evocative effect. If requests have led to obtaining desired things, the likelihood of requesting is high in these situations.

This is true for both appropriate and inappropriate behaviors used to request desired items. Therefore, this concept also can be used to understand how challenging behaviors emerge. ABA instructors are very interested in EOs, and in maximizing motivation in general. Understanding EOs significantly increases the success of instruction.

A student is new to the learning environment. The teacher puts out an array of enticing toys and foods. She samples some and plays with some, and waits for the learner to indicate an interest. As the learner reaches for an item, she immediately grants access to the item. She also offers praise, hugs and attention while the learner eats the snacks and plays with the toys. She is pairing herself with rewards and working to identify EOs. She wants to know what the learner wants. Eventually, she will ask the learner to engage in a brief task before granting access to the desired item.

Resources

Delmolino, L., & Harris, S. L. (2004). *Incentives for change: Motivating people with autism spectrum disorders to learn and gain independence.* Bethesda, MD: Woodbine House.

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

Sundberg, M. L., & Partington, J. W. (1998). *Teaching language to children with autism or other developmental disabilities.* Pleasant Hill, CA: Behavior Analysts, Inc.

Reinforcement

Behavior analysts knowingly use reinforcement to increase behavior. However, we all use reinforcement every day, in our dealings with other people. We may not call it reinforcement, but it is happening all the time! Reinforcement involves 1) the systematic and immediate delivery of a consequence (following a behavior) and 2) an increased likelihood that the behavior will happen again. In fact, we can only know that something is a reinforcer after we watch its effect on behavior over time. Simply providing a preferred item contingent upon a behavior will not necessarily result in an increase in behavior under similar conditions in the future.

Type 1 Reinforcement

Type 1 reinforcement (also referred to as positive reinforcement) involves the addition of something desirable, such as praise, hugs, a gummy bear, and stickers.

Example 1
A teacher is instructing Thomas to point to objects. She puts a ball, a cup, a shoe, a spoon, and a hat on the table. She instructs him to "Touch the shoe." Thomas touches the shoe. The teacher enthusiastically says, "Hooray! You touched the shoe. Now you get to put on your shoes and go outside."

- Behavior: following an instruction by touching an item
- Consequence: received praise and a chance to go outside and play
- Future effect: makes following instructions more likely to occur the next time someone asks him to do something

Example 2
Johnny sees a friend eating a cookie. He points to the cookie. His mother then gives him a cookie.

- Behavior: pointing to a desired item (cookie) to ask for it
- Consequence: received a cookie when (and only when) he asked for it
- Future effect: makes pointing to a desired item (cookie) more likely to occur the next time he sees something he wants

Type 2 Reinforcement

Type 2 reinforcement (also referred to as negative reinforcement) involves the removal of something undesirable.

Example 1
We turn off an alarm clock to stop the loud repetitive sound.

- Behavior: touching "off" button on clock
- Consequence: removing undesirable alarm sound
- Future effect: makes "touching-off-button" behavior more likely to occur the next time alarm sounds

Example 2
At McDonald's Playland, a child is overwhelmed by the loud noises. The child requests to leave, saying "car, car." The family leaves.

- Behavior: requesting to go home
- Consequence: exiting reduces exposure to undesired noise
- Future effect: makes requesting to go home more likely to occur the next time child experiences high noise level

Both positive and negative reinforcement increase behavior by making the learner's life better.

A note on negative reinforcement: The common definition and the ABA definition of negative reinforcement are different. As previously mentioned, the ABA definition refers to an increase in behavior when something annoying is stopped or prevented because of our behavior. In contrast, the common use of the term is a synonym for punishment. These terms can lead to confusion. The important piece to focus on is the learner's behavior and what happens following the behavior. If the learner repeatedly behaves in ways that result in escape or avoidance of something undesirable, negative reinforcement is in effect. Readers are referred to text books on ABA for further information and clarification.

It can be tempting to think of preferred items as reinforcers. Yet, before doing so, it must be demonstrated that the contingent use of the preferred item is the reason for a behavior increase; only then can the item be called a reinforcer. For learners with autism, some items and activities are more likely to be reinforcers than others. Primary reinforcers serve a biological function and include food, water, warmth, and sexual stimulation. Initially, learners with autism may be more responsive to primary reinforcers. Secondary reinforcers gain their potency because they were paired with primary reinforcers or other established secondary reinforcers.

There are four types of secondary reinforcers:

- tangible reinforcers such as trinkets and toys,
- activities-oriented reinforcers such as playing a game and going to the movies,
- social reinforcers such as physical contact and verbal praise, and
- generalized reinforcers such as tokens and money that allow access to a range of other primary and secondary reinforcers.

Effective programming makes use of both types of reinforcement to maximize the learner's progress. The behavior analyst's goal is to move toward the type and schedule of reinforcement that will maintain the behavior in typical settings.

Resources

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Hall, R. V., & Hall, M. L. (1998). *How to select reinforcers* (2nd ed.). Austin, TX: PRO-ED.

Leaf, R., McEachin, J., & Harsh, J. D. (Eds.). (1999). *A work in progress: Behavior management strategies & a curriculum for intensive behavioral treatment of autism* (pp. 23-36). New York, NY: DRL Books.

Miller, L. K. (1996). *Principles of everyday behavior analysis* (3rd ed.). Pacific Grove, CA: Brooks/Cole Publishing Company.

Shaping

Shaping is a way to reinforce improvement in behavior. Shaping is used to gradually teach the learner how to do something better. Over time, an instructor rewards attempts that look more like the desired behavior. Thus, the learner is encouraged through reinforcement to exhibit more appropriate behavior. While shaping behavior can be a slow process, it can be quite effective if done correctly. This process requires that the teacher has both intimate knowledge of the learner and the ability to shift gears based on the learner's performance. One of the positive effects of shaping includes decreasing frustration by providing feedback to the learner that he/she is on the right track. Learning becomes more rewarding because there are many opportunities for reinforcement along the way.

When shaping behavior, there are several things to remember. First, shaping is both an art and a science. The teacher has to respond to the learner's performance. On a moment-to-moment basis, she must match the amount of the learner's effort with the amount of reinforcement. On a broader scale, a teacher must set her requirements based on the learner's performance throughout the day. For example, if a child is feeling ill, it is a good idea to maintain the program and not require additional effort on this particular day. Second, the learner will become skilled more quickly when all of his/her teachers communicate and agree. This is to say that consistency across teachers, parents, and others is an important component of the shaping process. All instructors must communicate to understand the current teaching plan. When everyone implements the same protocol, the learner more efficiently acquires skills. This emphasis on consistency is also valuable for all other teaching programs.

Behavior analysts often describe their teaching method as "shaping" a particular behavior. For example, they may say that they are shaping vocal sounds. At first, a vocal approximation of a word would be reinforced, for example "ba" for "ball." As the child becomes more fluent in making sounds, the teacher reinforces only vocal approximations that sound like the target word. Behavior analysts also shape other behavior, such as compliance, by asking a learner to follow one easy instruction. When the learner performs that skill well, the teacher expects more. To follow the above examples, she may ask the child to say, "want ball," or to follow two instructions.

Resource

Foxx, R. M. (1982). *Increasing behaviors of persons with severe retardation and autism.* Champaign, IL: Research Press.

Prompts

Prompts are defined as extra cues or hints that help the learner to know what to do in a particular situation or time. Prompts are things we do to increase the likelihood that learners will make the correct responses. Whenever a learner is being taught something for the first time or has not yet mastered a skill independently, prompting should be used to ensure correct responses and to prevent errors. Even after a learner has mastered a skill, he/she may still need prompting to respond within an appropriate amount of time and in new situations.

Generally, we use more obvious prompts when teaching a new skill and more subtle prompts when the learner has mastered a skill but needs a reminder. Types of prompts include:

- physical or hand-over-hand assistance
- gestural such as pointing
- modeling or demonstration
- visual such as a picture
- textual such as written checklist
- verbal such as "What do you want?"

Example 1

The instructor says, "Do this," while clapping her hands together. She then reaches over to take the child's hands and makes a clapping motion with them. This physical prompt ensures that the learner correctly imitates the teacher.

Example 2

A mother and a child are in a toy store. The mother says, "You can pick out a toy." The child does not respond. The mother then shows him two toys and verbally prompts him, "Do you want Winnie the Pooh or Elmo?" The child grabs Elmo. The mother notices that the visual and verbal prompts made his response more likely.

Resources

MacDuff, G. S., Krantz, P. J., & McClannahan, L. E. (2001). Prompts and prompt-fading strategies for people with autism. In C. Maurice, G. Green, & R. M. Foxx (Eds.). *Making a difference: Behavioral intervention for autism* (pp. 37-50). Austin, TX: PRO-ED.

Van Houten, R. (1998). *How to use prompts to initiate behavior.* Austin, TX: PRO-ED.

Modeling (Imitation Training)

When we are presented with a new assignment, we are likely to have a lot of questions about how to start the project. You may ask yourself, "What do I need to do here?" You may feel like you want to see exactly what needs to happen. We all like to watch others do something when we are learning it for the first time. (Think about learning to ride a bike or draw a happy face. These things are much easier to do if you have watched someone do it.) Typically developing children watch and imitate others all day long.

A model is any antecedent (before the behavior) stimulus that is identical in form to the behavior. A model is a stimulus that the learner imitates. If we want the child to clap his/her hands, and we clap our hands while saying, "Do this," we have provided a model. As mentioned in the previous section, a model is a type of prompt. Models are used in imitation training to help learners copy our behavior. Modeling is a powerful instructional tool that also can assist learners to master complex skills. For example, modeling can be used to teach appropriate behavior in social situations. A teacher might instruct a learner to "Do what your friends are doing," when he/she looks lost during a transitional time while other students are cleaning up materials. Peers are a wonderful source of learning by modeling. Peers in a classroom can model appropriate ways to pay attention, complete an assignment, ask for help, and interact in all kinds of ways.

Usually, we think of modeling as the imitation of people who are physically present. However, modeling also can be taught using videotapes. Video modeling has been shown to be a highly effective technique for teaching play skills and some social skills. A learner might watch videotaped sequences of children playing imaginatively with a dollhouse, and then practice what was viewed.

Because of the central importance of learning by observation, imitation training often is a major focus of early instruction. Learners need to be able to imitate very simple tasks, sequences of actions, and novel actions. When a learner has demonstrated the ability to widely imitate and to imitate novel actions, they often are said to have achieved generalized imitation (see page 45). This is an important goal for all learners. A child with this ability will be able to learn from classmates and other peers.

Many ABA programs spend a lot of time during the initial phase of instruction teaching learners how to imitate. Later phases of instruction incorporate a variety of experiences to help the learner imitate in more real life situations. Another consideration is that learners with autism may not be initially motivated to learn these skills. Instructors should pay careful attention to the quality, quantity, and variety of reinforcement provided for progress. Much of children's learning develops through imitation as they repeat what they hear and do what they see. Imitation is a valuable developmental achievement. The ability to consistently and fluently imitate others offers many benefits in all aspects of life.

Resources

Buggey, T. (2009). *Seeing is believing: Video self-modeling for people with autism and other developmental disabilities.* Bethesda, MD: Woodbine House.

Krantz, P. J., MacDuff, G. S., Wadstrom, O., McClannahan, L. E., Dowrick, P. W. (1991). Using video with developmentally disabled learners. In P. W. Dowrick, *Practical guide to using video in the behavioral sciences* (pp. 256-266). Indianapolis, IN: John Wiley & Sons.

Leaf, R., McEachin, J., & Harsh, J. D. (Eds.). (1999). *A work in progress: Behavior management strategies & a curriculum for intensive behavioral treatment of autism.* New York, NY: DRL Books.

Striefel, S. (1998). *How to teach through modeling and imitation* (2nd ed.). Austin, TX: PRO-ED.

Discrete Trial Instruction/Discrete Trial Teaching

Discrete trial instruction (DTI) or discrete trial teaching (DTT) has historically been the primary instructional method used in ABA intervention for children with autism. It is a very systematic and methodical way of teaching and is supported by a history of success in teaching skills across all areas. This technique is well suited to individuals with autism because it makes instruction very clear to the learner. Discrete trials are comprised of several components.

1. an SD, or a discriminative stimulus (an instruction)
2. a response (what the child does in response to the instruction)
3. a consequence (feedback to the child about his/her response)

There has been some research on the most effective ways to teach when using discrete trials. Here is a summary of several of those issues.

1. Teach in an errorless way. We know that children with autism have a tendency to repeat errors, so it is important to prevent errors and to interrupt errors whenever possible. (It is rare that anyone could learn a skill without any errors. The point here is to minimize the errors that a learner may make.)
2. Mix in new material with older, known material. Technically, this is called task interspersal. For interspersal to be effective, you must mix in a new item with items that learners know very well (have already mastered). We know that learners learn more rapidly when taught in this way. It also is more naturalistic than asking a child to do the same thing many times in a row.
3. Collect data on learning progress. This may be done on a trial-by-trial basis, or through probe data collection techniques (in which the teacher takes data only on some of the trials).

Discrete Trial Instruction is sometimes described incompletely or inaccurately. This is because DTI has been conducted for many years, and the definition of "best practice" DTI has changed along with the evolution of the field of ABA. Therefore, some people's views of DTI are only partly accurate because they do not have the most up-to-date information. Here are some of the most common misconceptions that people may have about DTI.

MYTH

DTI is just doing the same thing over and over and over again.

FACT

Historically, people did do DTI as blocks of trials, typically working on the same target behavior repetitively. Children were asked to do the same thing many times (most often 10 times) in a row. While we know that repetition helps learning and that children with autism require many trials of instruction to learn new things, we also know that learning is more efficient if we vary what we ask the child to do. Best practice now dictates that we slowly intersperse new items with things the child knows very well.

MYTH
DTI is very slow paced.

FACT
Historically, DTI was slower in pace than other types of instruction. This is because it was usually done with trial-by-trial data recording, which was noted during the time between trials. The number of learning opportunities is reduced when several seconds pass between trials.

How slowly or quickly you provide instructions, often called pacing, has become increasingly important in ABA intervention. DTI can be done at a rapid rate. To maximize learning opportunities, probe data collection can replace trial-by-trial data collection. Other modifications in data collection also can assist the teacher in maintaining the pace of instruction.

MYTH
DTI doesn't result in generalization; kids don't transfer their learning into everyday situations.

FACT
Discrete trial instruction initially is used to build basic skills and early discriminations. (Discrimination means knowing when to and when not to do something.) Sometimes, this phase of instruction is very methodical and does not contain much programming for generalization. However, for some learners, generalization is built into the program from the onset. And for all learners, generalization becomes a focus of instruction within DTI.

It may be necessary to begin teaching a specific skill under very specific circumstances (same instruction, same therapist, and same reinforcer) to make it easier for the child to first learn the skill. Behavior analysts are always aware that the ultimate goal is for the child to be able to perform this skill in a variety of natural situations. At first, a discrete trial program may have only a few specific strategies and over time become "looser" as additional circumstances are introduced into the teaching interaction. All learners need to be taught when to perform and when not to perform certain behaviors. Discrete trial instruction that incorporates strategies to enhance generalization can be a successful way to achieve these goals.

MYTH
DTI doesn't include child choice because the teacher determines the tasks, items used, and rewards.

FACT
This was historically true of DTI programs. However, intensive instruction has evolved. Today, learners are offered many choices in instruction. Preferences are considered when determining rewards to be offered and activities on which to work. In fact, preferences are continually assessed, to ensure that the learner is maximally motivated to participate in instruction. Furthermore, learners often choose the order of tasks they will work on, location of work, objects to be used for an activity, etc.

MYTH
Kids who experience a lot of DTI become little robots who know how to be compliant but not how to be creative.

FACT
At the beginning of a program, teachers ask the child for specific responses, and may train in a very specialized way. Thus, the

child may behave in specific ways because those behaviors have been reinforced. However, this only represents an early phase of instruction necessary for some learners. It always is a priority to naturalize both instruction and the child's behavior.

Yes, it is true that individuals with autism exhibit repetitive behaviors in the form of motor mannerisms (hand flapping), object manipulations (lining up toy cars), language patterns (monotone voice or scripted conversation), and social behaviors (one track conversation). To varying extents, this may be a prominent characteristic that people observe about them. A goal of behavioral intervention is to constantly expand the skill repertoires of people with autism. Most importantly, anyone who knows someone with autism can tell you that he or she is creative in many different ways!

Resources

Leaf, R., McEachin, J., & Harsh, J. D. (Eds.). (1999). *A work in progress: Behavior management strategies & a curriculum for intensive behavioral treatment of autism.* New York, NY: DRL Books.

Lovaas, O. I. (2002). *Teaching individuals with developmental delays: Basic intervention techniques.* Austin, TX: PRO-ED.

MYTH

As long as you have a curriculum, anyone can effectively conduct DTI.

FACT

A comprehensive curriculum is certainly an essential component of a child's education. However, it is not enough to ensure a successful academic experience. You need a great teacher to be a great student. Everyone knows the value of a good teacher who can make the material come "alive." Teachers who use an ABA approach are always looking for ways to maximize the student's progress by analyzing the student's performance and the elements in the teaching situation (the teacher's behavior, other students' behavior, the setting, the materials used, etc.). It is this analysis of the teaching process that is most likely to result in the most beneficial outcome for the student. The analysis tells the teacher important information so that he/she can continue effective practices and discontinue ineffective practices on an ongoing basis.

Verbal Behavior

Many people in the autism community have been talking about "Verbal Behavior." Is it a part of ABA? Different from ABA? Better than ABA? What is Verbal Behavior? There sure has been a lot of verbal behavior about Verbal Behavior! To address these questions, here are some quick answers.

1. Given that ABA is the science of understanding and improving human behavior, ABA includes the analysis of verbal behavior.

2. Verbal behavior is synonymous with communicative behavior. Any interaction in which information is being conveyed is verbal behavior. Thus, verbal behavior includes both vocal means (saying a word) and non-vocal means (pointing and gesturing) of communication.

3. The analysis of verbal behavior is concerned with the functions of language including requests, comments, and conversation. Verbal Behavior is a system of classifying language that behavior analysts find very useful, both from a theoretical perspective (how we think about language) and from a practical perspective (how to teach language).

The behavioral psychologist, B. F. Skinner, developed the Verbal Behavior classification system in 1957, and wrote about it in his book *Verbal Behavior.* Skinner was concerned with expressive language, which also can be described as direct communication with others. There are several Verbal Behavior categories especially relevant to teaching learners with autism. Examples follow each category.

Verbal Behavior Classifications

Echoic - imitating a sound, word, or phrase
- Instructor says, "Say, ba" as she looks at a ball. Learner says "ba."

Mand - making a request or demand
- Learner reaches for a toy train (gesture) and says "choo choo" (speech).

Tact - labeling something in the environment
- A teacher holds up an eraser, and says, "What is it?" The learner says, "eraser."

Intraverbal - back and forth conversational exchange; talking about things or people not present
- Joey says, "I saw a movie last night." Henry says, "What movie did you see?" Joey says, "Finding Nemo. It's about a fish." Henry says, "Cool. I saw that one, too. It was good."

Verbal Behavior

It is important to recognize that Verbal Behavior is not an instructional methodology, but a framework for thinking about language development. This classification system is important because it also identifies different reinforcers for each type of verbal behavior. For example, the reinforcer for requesting something you want should be receiving that item you requested. This classification of language has been the framework of several interventions or teaching methodologies for learners with autism, including the Picture Exchange Communication System (PECS; Bondy & Frost, 2001; see page 28) and Natural Environment Training (NET; Sundberg & Partington, 1998; see page 27). The success of both intervention packages in building communication skills is impressive, and may be due, in part, to this attention to categories of communication.

Resources

Bondy, A. S., & Frost, L. A. (2001). *A picture's worth: PECS and other visual communication strategies in autism.* Bethesda, MD: Woodbine House.

Skinner, B. F. (1957). *Verbal behavior.* East Norwalk, CT: Appleton-Century-Crofts.

Sundberg, M. L., & Michael, J. (2001). The benefits of Skinner's analysis of verbal behavior for children with autism. *Behavior Modification, 25*, 698-724.

Natural Environment Training

Sundberg & Partington (1998) have taken this classification system and created an intervention package to systematically teach language. They have added other areas of curricular emphasis and recommended a variety of instructional methods to be used along with this classification system. Their model of intervention is called Natural Environment Training (NET), which has received a great deal of attention in recent years. Sometimes intensive ABA programming using both the VB classification system and elements of NET is referred to as a Verbal Behavior program.

Other components of instruction common in NET include 1) short inter-trial intervals also known as rapid pacing, 2) errorless learning, 3) task interspersal, 4) child directed choice of materials, 5) probe data collection, and 6) sign language as a nonverbal means of communication training.

Mand Training
A child reaches for a bottle of bubbles. The instructor says, "What do you want?" The child says "ba." The instructor gives the child bubbles.

Tact Training
The instructor holds up train and says, "What is it?" The child says "train." The instructor says, "choo, choo" and pretends to be a train, inviting the child to do so, too.

Intra-Verbal Training (Beginning)
The instructor says, "The cow says…" The child says "moo." The instructor smiles and says, "moo" back to the child.

Intra-Verbal Training (Advanced)
The instructor asks, "Where did you go on vacation?" The child answers, "I went to the beach." The instructor says, "Ooh, I love the ocean!" The child says, "Me, too! And I made a sandcastle with my dad!"

Glossary

Inter-trial intervals – the amount of time between teaching trials

Errorless learning – using instructions and prompts that will ensure the learner's accuracy

Task interspersal – mixing known tasks with new tasks

Child choice – using the materials and activities that the child chooses and desires

Probe data collection – occasional data collection to obtain an estimate of how often a behavior is happening; also a sample of how well a learner is performing a particular task

Sign language – using gestures to communicate

Resources

Partington, J. W., & Sundberg, M. L. (1998). *The assessment of basic language and learning skills: An assessment, curriculum guide, and tracking system for children with autism or other developmental disabilities.* Pleasant Hill, CA: Behavior Analysts, Inc.

Sundberg, M .L., & Partington, J. W. (1998). *Teaching language to children with autism or other developmental disabilities.* Pleasant Hill, CA: Behavior Analysts, Inc.

Picture Exchange Communication System

The Picture Exchange Communication System (PECS) is a picture-based system that was developed for learners with social communication deficits (Bondy & Frost, 2001). PECS is an alternative communication system in which an individual independently uses pictures to express his wants and needs. The PECS system utilizes behavioral principles and techniques such as motivation, prompting, shaping, differential reinforcement, reinforcer assessment, and transfer of stimulus control.

One of the unique characteristics of the PECS program is that it teaches the learner to initiate an interaction with the listener. The pictures are kept in a notebook, and a learner is taught to create sentences by selecting pictures and delivering them to the communicative partner as a request for a desired item. PECS emphasizes teaching a learner to request items, respond to questions, and make social comments. Learners with autism often have deficits in these areas and benefit greatly from programming that targets these social skills.

The goal of the first phase of PECS training is to teach a learner to initiate a communication by approaching someone when he/she wants or needs something. It is recommended to use two people: a listener and a prompter. When the learner reaches for a desired item, the prompter guides him/her to pick up the picture with whatever assistance is necessary. Some learners may need a physical prompt; others may need a gestural prompt. Next, the individual reaches toward and places the picture in the open hand of the listener. During this phase of training, it is important that the prompter gradually fade the prompts over several opportunities.

In phase two of PECS training, more naturalistic aspects of communication are introduced, the communicative partner gradually moves away, and pictures are further from the learner but still in plain sight. The goal is to teach the learner how to request items in all situations in which something is desired. In phase three, attention is devoted to teaching picture discriminations.

Phases four, five, and six are advanced lessons within PECS. Phase four introduces sentence structure within the system. Teaching simple sentence formation using "I want…" or "I see…" is one way to know if the learner is making a comment or a request. This new language structure (a sentence) is taught using the language function (requesting), which the learner already knows. Phase five focuses on answering simple questions starting with "What do you want?" Phase six teaches learners how to comment on their experiences. After learners successfully complete all six phases of PECS training, they will have many communication skills to use spontaneously and respond to others.

Resource

Bondy, A. S., & Frost, L. A. (2001). *A picture's worth: PECS and other visual communication strategies in autism.* Bethesda, MD: Woodbine House.

Incidental Teaching

Incidental teaching is a process to help learners expand their verbal skills. While the term incidental teaching often refers to everyday activities as opportunities for learning, incidental teaching in ABA intervention has a more specific definition and suggested steps. For our purposes, incidental teaching is defined as waiting for the learner to initiate a request or a conversation and then responding in ways that foster more language.

The procedure is broken down into the following steps:

1. Child initiates for an item or activity. Initiation could be in the form of verbal language, sign language, picture exchange, gesturing, pointing, or leading.
2. Adult requests an elaboration in the form of a
   a. **Non-verbal cue,** such as shrugging shoulders, looking expectantly, or pointing to the item.
   b. **Verbal cue**, such as "What do you want?"
   c. **Verbal model**, such as "Say, I want juice."
3. Child responds with a slightly better response than the first initiation. For example, attempting to name an object is better than only pointing to it
4. Adult provides the child with the requested object.

(See the resources for suggestions on how to increase the number of correct and elaborated responses.)

Example 1

A desired toy train is out of reach on the child's dresser. The child stretches his arm over the dresser but cannot reach the train. The parent says, "What do you want? Train?" The child says, "T'ain!" The parent gives the train to the child.

Example 2

A child opens his lunchbox and finds that there is no straw for his juicebox. The teacher notices the student's predicament and looks expectantly at him, waiting for him to ask for help. The child says, "Uh. Oh." The teacher says, "What do you need?" The child says, "Straw." The teacher brings him a new straw.

Resources

Fenske, E. C., Krantz, P. J., & McClannahan, L. E. (2001). Incidental teaching: A not-discrete-trial teaching procedure. In C. Maurice, G. Green, & R. M. Foxx. (Eds.). *Making a difference: Behavioral intervention for autism* (pp. 75-82). Austin, TX: PRO-ED.

Hart, B., & Risley, T. R. (1982). *How to use incidental teaching for elaborating language.* Lawrence, KS: H&H Enterprises.

Pivotal Response Training

As you may have guessed from reading the previous sections, there are many combinations of antecedent-based interventions and consequence-based interventions that you can use to make a behavior more likely to happen. Parents typically use antecedents such as instructions. For example, a parent says, "Clean up your toys, please." The child is more likely to do so following the instruction than doing so on his own accord. After the child follows the instruction, the parent might offer a consequence such as praise, "Thanks for listening to Mommy. Now we can go outside to the swings!" The clear instruction, verbal praise, and access to a preferred activity all work to increase the child's compliance. Many intervention packages do the same thing: they combine strategies to maximize a learner's progress. Behavior analysts who researched various teaching strategies were able to identify some of the most powerful ones. Then, they combined them into a package called Pivotal Response Training (PRT).

PRT is a set of instructional strategies that can increase a learner's motivation and teach important skills. For learners with autism, this effect is extremely important. Oftentimes, learners with autism are not motivated to participate in social or educational interactions. When learners are motivated, they can learn so much more. PRT incorporates strategies that help parents and teachers make the most of the learner's skills and choices in everyday settings. Also, parents can learn how to use PRT during instructional time and throughout daily activities.

Furthermore, PRT targets skills that are important and useful in many activities. For example, PRT can build a set of behaviors such as imitation, compliance, and communication.

There are seven (7) main points to remember:

The question/instruction/opportunity to respond should:

1. Be clear, uninterrupted, and appropriate to the task
2. Be interspersed with maintenance tasks (tasks the learner can already do with ease)
3. Be chosen by the child, to a large extent (watch what the child is looking at, pointing to, or touching and use those items)
4. Include multiple components (such as the 'blue block' or the 'red ball')

Reinforcers should be:

5. Contingent upon the behavior (only when the behavior is performed and not when the behavior is not performed)
6. Administered following any attempts to respond (shaping)
7. Related to the desired behavior (such as giving bubbles when the child says "open" while twisting the jar of bubbles instead of giving a food item as a reward)

You will find many examples of how to use these strategies in How to Teach Pivotal Behaviors to Children with Autism: A Training Manual. Overall, these lessons

are intended to be clear, brief, and fun. Of course, the specific goals, materials, and settings will be individualized for the learner, as with all ABA interventions. PRT offers a set of strategies to keep learners paying attention and engaged. PRT episodes should be incorporated into planned and natural activities on a frequent basis (suggested rate is one episode every two minutes). The training also encourages learners to initiate their needs and wants and to respond to others. By providing the learner with choices of motivating items, mixing some new tasks with easy tasks, and rewarding attempts, a teacher can be both effective and fun.

(Note: PRT is similar to Incidental Teaching and Mand Training within Natural Environment Training in their focus on choice, reinforcing attempts, and reinforcing contingently.)

Resources

Koegel, L. K., Koegel, R. L., Shoshan, Y., & McNerney, E. (1999). Pivotal response intervention II: Preliminary long-term outcomes data. *Journal of the Association for Persons with Severe Handicaps, 24*, 186-198.

Koegel, R. L., & Koegel, L. K. (2005). *Pivotal response treatments for autism: Communication, social, and academic development.* Baltimore, MD: Brookes Publishing.

Koegel, R. L., & Koegel, L. K. (Eds.) (1995). *Teaching children with autism: Strategies for initiating positive interactions and improving learning opportunities.* Baltimore, MD: Brookes Publishing.

Koegel, R. L., Schreibman, L., Good, A., Cerniglia, L., Murphy, C., & Koegel, L. K. (1989). *How to teach pivotal behaviors to children with autism: A training manual.* Santa Barbara, CA: University of California. Available at http://www.education.ucsb.edu/autism/behaviormanuals.

Task Analysis & Chaining

When you think about many of the tasks you perform on a daily basis, you realize how many steps are involved in each task. You may be even more aware of how many steps there are when you are learning something new, such as how to program your VCR. To learn this complex skill, you may watch someone else do it and write down all the steps. Or, you might closely follow the instructions in the manual. But what if those instructions weren't clear? You would need more information and more reinforcement for your attempts if you wanted to prevent frustration.

The same is true for learners with autism. They also need clear instructions and plenty of reinforcement for accomplishing some, and eventually all, parts of a task. One of the ways behavior analysts do this is by creating and using a task analysis. A task analysis involves breaking a complex skill into smaller, teachable units. In creating a task analysis, an instructor creates a road map for how to teach a skill, step by step. There is ample benefit for the learner; access to reinforcement is much greater when the task is taught in this manner.

An example of a task analysis is listed below. There are many ways to write a task analysis, and the same task could be described many different ways. A learner's skill level, preferences, and setting characteristics can influence exactly how a task analysis is written.

Arranging a place setting at the table could include the following steps:

1. Put placemat on the table
2. Place plate on placemat
3. Place napkin on left side of plate
4. Place fork on napkin
5. Place knife on right side of plate
6. Place spoon on right side of plate
7. Place cup at top of plate

This example assumes that all of the necessary items are within the learner's reach. This task analysis would be expanded further to include additional behaviors in order to get each of these items from their appropriate places. Similarly, this task analysis could be expanded to additional items, place settings, and other mealtime activities.

It is relatively easy to create a task analysis. There are several methods you can use. One method is to perform the behavior yourself and take note of each step of the behavior. Alternately, you could watch another person perform the behavior. If you do this, select a person who can perform the skill well. In creating the task analysis, the steps of the behavior will be linked together to create a behavior chain. Then, a task analysis assessment can then be done to evaluate what steps of the chain already are performed well by the learner. This enables the instructor to further individualize instruction by focusing on the steps that are not yet independent.

When taught through chaining, it is important that the steps be taught in order. At times, chaining is taught using a forward chaining procedure in which the steps are targeted beginning with the first step. In the above example, the student would first be taught to put the placemat on the table independently. Reinforcement is provided for successfully completing this step. The teacher then assists the learner to put the

plate on the placemat and complete the rest of the steps. When the learner can perform one step independently on a few occasions, the teacher requires that two steps be completed to earn reinforcement.

Chaining also can be taught using a backward chaining procedure. In this approach to chaining, the individual is led through all the steps of the chain and first learns how to do the last step independently (placing the cup, in the above example). Then, the learner would achieve independence on the final two steps, and then the final three steps, and so on until the chain is completed independently. Backward chaining has an advantage over forward chaining in some situations. This advantage is the immediate availability of natural reinforcers for completing the last step. In the above example, after the learner places his cup on the table, dinner is served. Food and drink are great reinforcers. Another example is teaching a child to put on his coat before going outside to the swings. As soon as he completes the final step(s) of the backward chain (zipping the coat), he can run outside!

This systematic approach offers many opportunities for the learner to become familiar with the task, the teacher to reinforce new skills, and both to enjoy the

Resources

Baker, B. L., & Brightman, A. J. (2003). *Steps to independence: Teaching everyday skills to children with special needs* (4th ed.). Baltimore, MD: Brookes Publishing.

Foxx, R. M. (1982). *Increasing behaviors of persons with severe retardation and autism.* Champaign, IL: Research Press.

Token Economy

Take a moment to review the two types of reinforcers. Primary reinforcers meet a basic human need such as hunger, thirst, and warmth. Secondary reinforcers are learned over time because of their association with primary reinforcers. Secondary reinforcers could include smiles from loved ones, verbal praise, preferred toys, and money. As an example, a person goes to work everyday to earn money. At the end of the week, the person looks forward to receiving the paycheck. Why? Because money is a powerful secondary (generalized) reinforcer. Money can give you access to a wide variety of both primary (food and shelter) and secondary (leisure time and preferred items) reinforcers. Money is one example of a 'token' in a token economy.

A token economy makes use of secondary reinforcers to bridge the gap between a behavior and access to other reinforcers. Token economies can be comprehensive and positive motivational systems. For example, a student is supposed to stay in his seat for an entire thirty-minute class period but he has never done so. One possible intervention is a token economy in which he earns tokens for smaller amounts of time in which he is sitting appropriately. He could earn one token for every five minutes of appropriate sitting. If he earns five of the possible six tokens, he can choose an extra snack at lunch time or some other appropriate reinforcer. In this example, the student earns a token for appropriate sitting and learns to sit appropriately for longer amounts of time. Gradually, the teacher would increase the amount of time during which he had to sit appropriately to earn the tokens. A rule of thumb is to keep the program achievable and challenging, meaning that the student should be successful on most occasions as you encourage better performance.

The token economy can also include a response cost component. A response cost means that if the student exhibits a response there is a cost. Using the above example, let's suppose the student was disruptive by throwing his pencil and papers on the floor. After attempting various positive interventions, the team decided to add a response cost component to his token economy. Every time the student threw his pencil and papers on the floor, a token was taken away. It is important to know that a response cost element is not recommended in the early stages of instruction in a token economy. As previously mentioned, token economies should be used as purely positive motivational systems whenever possible. It is also important to keep in mind other relevant guidelines for using behavior reduction procedures when implementing a response cost component.

Overall, token economies are a powerful and systematic tool to expand reinforcement options and delay the delivery of reinforcement to a more typical schedule. By doing so, we increase the types of reinforcers that will motivate learners with autism.

Resource

Ayllon, T. (1999). *How to use token economy and point systems* (2nd ed.). Austin, TX: PRO-ED.

Activity Schedules

Learning a new skill or keeping occupied during down time can be difficult for learners with autism. What can you do to help them? An activity schedule is a tool that they can use to help promote their independence during play, leisure, and academic time. An activity schedule is a set of pictures or words that cues a sequence of activities. Additionally, schedules help to promote choice and can set the occasion for initiations to others. Typical materials for an activity schedule include a photo album or three-ring binder, stickers, activity photos, and a preferred item that will serve as a reinforcer for accomplishing the task.

Learners are likely to be successful with an activity schedule when they can consistently accomplish the following prerequisite skills:

- identify pictures versus background;
- match identical objects;
- match picture to object;
- accept guidance;
- use materials appropriately; and
- obtain materials from a different location.

When selecting activities, keep in mind that they must be familiar or mastered by the learner with autism because you are teaching how to complete the sequence of the activities, not the actual tasks. The activities should be age appropriate and have a clear ending. Toys such as play-do or building blocks are not recommended at first because they do not have a clear ending. Initial items could include puzzles, nesting cups, stacking rings, etc. The schedule should end with a snack or a preferred activity (for example, tickles from a parent).

Much of the work leading up to a successful activity schedule experience is preparation. Behavior analysts prepare the materials, rewards, and tokens and organize the environment to display the materials in a visible and accessible manner. Over time, the learner will progress from prompted interaction with the materials to spontaneous interaction coupled while following the schedule. As is true for all ABA interventions, the goal is to make the learner as independent as possible so that he/she can complete the activity, ask for assistance when needed, and enjoy his/her new abilities.

The five basic steps in the activity schedule process are as follows: turn to a page, point to the photograph, obtain the materials, complete the activity, and put away the materials. The instructor provides and fades prompts based on the learner's progress and delivers rewards on the same basis. Oftentimes, beginning learners need frequent reinforcement to stay motivated and on track. The use of an activity schedule does not have to be limited to playing with toys or completing academic tasks. Some clinicians have had great success teaching children and adults with autism how to socialize with their peers using an activity schedule in the initial stages of programming.

The ability to follow an activity schedule brings many benefits to the learner such as independence and choice. It can also be generalized to many types of daily activities for learners of all ages.

Resource

McClannahan, L. E., & Krantz, P. J. (2010). *Activity schedules for children with autism: Teaching independent behavior* (2nd ed.). Bethesda, MD: Woodbine House.

Precision Teaching with Rate Building

Precision Teaching (PT) is an area of ABA that has been practiced and researched for many years. In fact, PT is a form of ABA instruction that has been widely used with typical and learning-challenged populations, with great results. It is only recently, in fact, that PT has been significantly extended to learners with autism.

Precision Teaching focuses on building the rate at which learners can demonstrate skills, and focuses on the attainment of fluency. Fluency refers to the combination of accuracy plus speed that characterizes competent performance. When people are fluent in skills, they can do them effortlessly and fluidly. They appear quite expert at them. Think about how you drive or make a sandwich. You do not think through every element of those tasks; you can perform them easily and with little or no attention to executing each movement. Sometimes, learners with autism can exhibit skills, but are not fluent at them. If compared to how others did those tasks, it often looks more laborious and takes more time to do the tasks compared to a fluent and competent peer.

Precision Teaching (sometimes called Fluency-Based Instruction) is a method of building response rates and developing fluency in a variety of skill areas. When PT is applied to learners with autism, there is a focus on the rate of skill demonstration and use of a specific measuring system to chart student progress. (This system is known as the Standard Celeration Chart.) In addition to addressing issues such as long response times (often called latency to respond) and rate of skill demonstration, PT addresses deficits in component skills which can impede progress on more complex tasks.

How does Precision Teaching work? Attention is paid to the rate at which the learner can perform the task. Generally, PT is done in short sprints, to increase rate of skill performance. Teaching includes timed practices in which the learner is expected to reach a specific goal. These goals are often referred to as performance aims and demonstrate the learner's fluency with a skill. In addition, attention is paid to the concept of component skills, which are building block skills for more complex skills. For example, component skills include reaching, pointing, and grasping, which could all impact on skills such as matching or identifying objects. Often, PT with rate-building focuses on the development of core motor skills that assist the learner in performing many other more complex tasks. Of course, PT with rate building can also be used to teach complex skills, as long as the foundation skills are already firmly established.

Resources

Binder, C. (1996). Behavioral fluency: Evolution of a new paradigm. *The Behavior Analyst, 19, 1*63-197.

Fabrizio, M. (February and March, 2003). A parent's introduction to fluency: Parts I and II. *The OARacle.* Alexandria, VA: The Organization for Autism Research. Available at http://www.researchautism.org.

Fabrizio, M. A. & Moors, A. L. (2003). Evaluating mastery: Measuring instructional outcomes for children with autism. *European Journal of Behavior Analysis, 4,* 23-36.

McGreevy, P. (1983). *Teaching and learning in plain English: An introduction to precision teaching and precision tutoring* (2nd ed.). Kansas City, MO: Plain English Publications.

Example 1

A learner working on identifying pictures could begin a session as follows (Assume the learner already had sufficient prompting and practice, has the component skills, and is now performing independently.)

Teacher: "Ok, Sammy. It's time to do your pictures. Remember go as fast as you can. Your goal is 15. Ready, set, go."

Learner: rapidly labels items on table. Teacher provides coaching encouragement along the way.

At the end of the interval the timer goes off and the teacher counts 16 correct. She says, "Terrific. You met your goal. Hooray!"

The teacher would then indicate that the goal has been met on the chart, and would make adjustments in instruction for the next day (e.g., lengthening the timing). When the student has met the goal in the terminal timing length (e.g., 1 minute) or at an earlier point in instruction if performance warrants it, the teacher would assess whether the student can demonstrate the skill with novel materials (application), in the face of distraction (stability), and for longer periods of time (endurance). If all of those criteria are met, the skill would not be practiced for about a month, and then a retention check would be conducted.

There are several ways to determine target rates. There are some resources available with normed rates, including a set from learners on the autism spectrum, collected by Fabrizio & Moors. When no target rate is available, typical peers can be sampled to determine a target range.

Examples of skills that might be targeted via PT with rate-building are motor skills such as grasping, reaching, placing, and pulling as well as other skills such as matching pictures and answering questions.

Example 2

Alternately, a child might be working on pointing. (Assume the learner knows how to point and is now working on pointing more rapidly and independently.)

Teacher: "Ok, Sally, it is time to do pointing. Remember go as fast as you can. You see your chart? We are trying to get to the red line. Ready, set, go."

Learner: points rapidly in succession.

Teacher provides coaching encouragement along the way. Teacher (at end of interval notices that the child did not meet her goal): "Great try, Sally. Let's do it again, and I'll help this time."

The teacher might then perform a guided practice to help the learner understand the target rate. The maximum number of timings conducted on a single day is10 (although timings are not successive and cease whenever the daily goal is reached). If success is not achieved, adjustments are made in instruction to increase success on the following day.

Functional Assessment & Functional Analysis

At a recent support group for parents of children with autism, five mothers and two fathers spent time discussing their children's problem behaviors. All of the parents questioned what behaviors were "because of the autism" and what behaviors were typical of children their age. These parents shared their stories about when the behavior occurred, what might have set off the problem, and the aftermath.

One parent told of the following episode. Mandy said, "We were at my four-year-old nephew's party and there was so much noise. My sister had about twenty kids running all over her house. David was actually doing pretty well. I thought it was going to be a rough day for him so I brought some of his favorite toys. After being there for about two hours, it was time to sing "Happy Birthday." Well, David just couldn't hold on any longer. He ran over to my husband and covered his ears as he screamed at the top of his lungs. People couldn't really hear him during the song but, ooohh, did they get an earful once the song was over. We had to bring him into another room to calm him down. We talked to him softly and reminded him that his favorite toys were nearby. I know we gave him a lot of attention for screaming but we didn't have too many other options given the situation. Luckily, my sister and her friends know David and the party continued during our little episode. I wonder how he's going to do at my friend's daughter's party next month."

The great news is that this parent remembered so much information about the situation. She could use this information to figure out how to make it better for the next time. First, behavior analysts find out why the problem behavior is happening by writing down what happened before and after the behavior. Events that occur well before the behavior include a full night's sleep, medication, diet, and interactions with others. These are formally known as setting events. It makes sense that setting events change the likelihood of a behavior occurring. Behavior analysts also write down the antecedents and the consequences of the behavior. This is called ABC data because information is collected on the antecedents (A), behaviors (B), and consequences (C). Second, they review many ABC episodes individually and together to look for a pattern. Third, they use that pattern to predict when the behavior is likely and unlikely to happen. Next, they take an educated guess about what is reinforcing or maintaining the behavior. This is called the function of the behavior, the purpose the behavior serves, or how the person communicates his wants and needs through this behavior. Lastly, they use this information to change the setting events, antecedents, and consequences. By doing so, we carefully encourage and reinforce appropriate behavior more often than the problem behavior. While some of this initially takes more work, the end results are often great.

Going back to the birthday party example, Mandy noted some things that happened before and after David screamed. With the guidance of a behavior analyst, she wrote this information down so they could look at it together.

The above information told Mandy a number of things about David's behavior and how she might go about decreasing it. First, David was provided with attention from one or both parents following all three screaming episodes. Second, all episodes of the behavior were very intense. When

David screamed, he was loud and visibly distraught. Third, David was often not receiving a lot of attention from his parents before the behavior. When Mandy looked at this information laid out in front of her, she was surprised to see these patterns emerged. She knew that she and her husband were loving parents who gave David a lot of attention throughout the day. Why was he screaming when he didn't have their attention?

The behavior analyst pointed out that David wanted to be around them because they were so responsive to his needs, as good parents are. They have provided much reinforcement throughout David's life and as a result, he highly valued their attention. The team was well on its way to figuring out what to do to improve the situation. They knew one of David's possible reinforcers was attention from Mom and Dad. The behavior analyst asked the parents how they could more carefully use their attention to increase David's appropriate behavior. The parents decided to provide David with attention when he was acting appropriately: perhaps doing so before David was likely to scream might prevent the behavior altogether. The behavior analyst thought this was a great idea and added one more. The parents could also teach David an easy way to communicate what he wanted. While he could say some words some of the time, he often didn't use his words when he was overwhelmed or frustrated. Providing him with easy ways, such as hand signals, to quickly communicate that he wanted to leave a situation or ask for attention could also lessen the chance of the screaming behavior happening again.

This example demonstrates the process of functional assessment and the beginning phase of intervention planning. There are other components that this team could add to David's treatment plan. It is important to note that behaviors that may seem to suddenly occur out of the blue or have no connection to the immediate environment, may in fact be related to the immediate

Resources

Frea, W. D., Koegel, L. K., & Koegel, R. L. (1994). *Understanding why problem behaviors occur: A guide for assisting parents in assessing causes of behavior and designing treatment plans.* Santa Barbara, CA: University of California. Available at http://www.education.ucsb.edu/autism/behaviormanuals.html

Glasberg, B. A. (2005). *Functional behavior assessment for people with autism: Making sense of seemingly senseless behavior.* Bethesda, MD: Woodbine House.

O'Neill, R. E., Horner, R. H., Albin, R. W., Sprague, J. R., Storey, K., and Newton, J. S. (1997). *Functional assessment and program development for problem behavior: A practical handbook* (2nd ed.). Pacific Grove, CA: Brooks Publishing Company.

Romanczyk, R. (1996). Behavioral analysis and assessment: The cornerstone to effectiveness. In C. Maurice (Ed.), G. Green, & S. C. Luce (Co-eds.). *Behavioral intervention for young children with autism: A manual for parents and professionals* (pp.195-217). Austin, TX: PRO-ED.

Functional Assessment & Functional Analysis

Episode	1	2	3
Setting Event	Noisy and crowded setting with occasional attention from Mom and Dad	Elmo video playing, bad night sleep	Walking around the backyard
Antecedent	Singing Happy Birthday	Mom on the phone	Dad turned on the lawn mower
Behavior	Screamed for 3 minutes at a high volume	Screamed for 2 minutes at a high volume	Screamed for 4 minutes at a high volume
Consequence	Mom and Dad took him into a quiet room to calm him down	Mom had to get off the phone to find out what was wrong	Mom took him inside to calm him down

environment. By analyzing this information and changing the behavior's antecedents and consequences, a person's response can be greatly improved.

Typically, behavior analysts gather functional assessment information in two ways: interviewing people who know the learner and observing actual episodes of the behavior to collect ABC data. Sometimes, this information is not enough to hypothesize a function of the behavior and develop a treatment plan that is likely to be successful. In these instances, a process known as functional analysis may be conducted. Conducting a functional analysis requires a behavior analyst with knowledge and experience in the implementation of this complex process. In this procedure, the behavior analyst systematically changes the environment when the learner engages in the problem behavior. Doing so allows the team to see when the behavior is likely and unlikely to happen. Often, this information is sufficient to understand the problem behavior and begin intervention planning. Expertise in conducting functional analyses is essential to ensure that the challenging behavior is managed safely and effectively throughout the assessment process.

The take-home message of functional assessment is that all challenging behavior is seen as communication. The individual is telling us something. The next time an individual engages in challenging behavior, the information gathering described above will help create a better situation.

Antecedent-Based Interventions

As you have learned by reading the previous sections, behavior analysts attempt to change what happens before and after a behavior to make it more or less likely to occur. You have read about theoretical principles and specific antecedent and consequence strategies to change behavior. Clearly, modern ABA encompasses a wide variety of techniques. While there was a heavy emphasis on consequence-based strategies in the past, researchers and clinicians are now learning more about how to change behavior in more sophisticated ways. Let us now look more closely at antecedent-based interventions.

This focus on changing the environment before a behavior occurs is advantageous for several reasons. First, in the situation of challenging behavior, the goal is to prevent the behavior. We may achieve prevention by using antecedent-based strategies. Second, the search for effective antecedent-based strategies can improve our understanding of the learner's experiences. For example, suppose a learner tantrums when transitioning from one teacher to another. We observe the teachers' styles to identify any possible differences that would predict tantrum. It is noted that the learner behaves more appropriately for the teacher who speaks at a slower pace. The other teacher then speaks slowly and the learner's tantrums stop. While not all assessment and intervention plans will go so smoothly, this example illustrates that antecedent-intervention can be more desirable than consequence-based intervention for some situations. Third, a thorough assessment of the context can lead to endless possibilities for intervention. Possibilities include offering choices in the types, number, and order of tasks; altering the demand by reducing the effort required; mixing easy and hard tasks; reducing distractions; increasing visual supports; and incorporating the student's preferences.

Example 1

Joey often throws his worksheet halfway through his assignment. His teacher is perplexed, especially since he can do the work. One day, she notices that there is no problem when a fire drill interrupts them halfway through the period. Later that day, Joey finishes the worksheet without incident. The teacher decides ask Joey to do just a few problems on the worksheet. She gives him a choice of other activities. Later in the day, he completes the worksheet. Breaking the task up reduces the monotony and increases Joey's cooperation. In the future, the teacher will work on maintaining Joey's motivation while slowly increasing the amount of work she expects.

Example 2

Prior to her teachers using an antecedent-based strategy, Melissa screams when she is randomly paired with Barbara (another student) to complete a task. Melissa verbally and physically protests throughout the task. Barbara does not like listening to Melissa scream. Barbara says to the teacher, "Maybe you should let her pick her own partner next time." The teacher does just that. The next time Melissa does not protest! The incorporation of choice-making improves Melissa's behavior and avoids a problematic scene.

While antecedent-based interventions are crucial to preventing challenging behavior, these strategies can also be helpful when teaching new skills.

Example 3

Danny, a teenager with autism, was not able to tell the difference between the men's and women's restroom signs. His father tried to teach him this by typing the relevant words and printing them in a large font. After a week of instruction, his father realized that Danny was not independently identifying these two signs. He still needed his father's help. His father incorporated an antecedent-based strategy: he changed the teaching materials. This time, his father used stick figure drawings commonly used on restroom doors to depict a man and a woman. With a few days of teaching, Danny could independently identify these signs.

Resources

Glasberg, B. A. (2008). *Stop that seemingly senseless behavior! FBA-based interventions for people with autism.* Bethesda, MD: Woodbine House.

Luiselli, J. K., & Cameron, M. J. (1998). *Antecedent control: Innovative approaches to behavioral support.* Baltimore, MD: Brookes Publishing.

Positive Behavior Support

When a person with a disability is aggressive or self-injurious, it is dangerous for the person and those around him or her. Planning and careful responding are required to safely and effectively reduce the dangerous behavior. Fortunately, there are many things a team can do to 1) understand why the behavior is happening, 2) teach the individual how to act more appropriately, and 3) improve the individual's quality of life. Positive Behavior Support (PBS) accomplishes these three things by combining well-researched assessment and intervention strategies of ABA with the social values of personal choice, independence, community integration, systems change, and quality of life.

Quality of life is embedded into PBS. It incorporates person-centered planning in all possible aspects of intervention and is focused on the individual and on his or her quality of life. The individual with autism is included in the intervention planning process. Preferences are taken into account in a variety of ways, including tasks to work on and leisure pursuits. Choice is of central importance, and every element of programming is sensitive to the inclusion of choice wherever possible. PBS also includes all stakeholders in the process by incorporating their input into the development of a plan. Parents' input is actively solicited and used to make an appropriate plan that can easily be implemented at home and in the community. Whenever possible, the individual with autism has a voice in the development of goals and plans. Socially meaningful goals are developed for the individual, to put the individual in more contact with people and experiences they find rewarding, and that increase the positive aspects of their relationships.

Comprehensive multi-component interventions are another feature of PBS plans. They program for success by addressing many related issues and skills. Someone who is having difficulty with completing assigned work might have components of a plan that include asking for a break, assistance with difficult tasks, choosing the order and location of tasks, interspersing solitary work and social time, and responding appropriately to feedback on performance.

PBS often inspires people to make small, yet creative and important, shifts in various aspects of teaching. Perhaps a person will learn more effectively if given a peer buddy or allowed to take breaks from work to go outdoors several times throughout the day. Sometimes, a team can generate some strategic changes in scheduling, locations, roles, or staff assignments to maximize the success and happiness of the individual with autism. The combination of individual and systems change can produce effective, durable, and meaningful outcomes for all involved.

There is considerable overlap between ABA and PBS. Virtually all applied behavior analysts agree with the social values emphasized in PBS. Similarly, proponents of PBS rely heavily on ABA methods and research design to improve

their methods. There is some debate in the field regarding the nature of PBS as separate from ABA or as an outgrowth of ABA. For our purposes in this manual, PBS is a well-researched methodology that provides effective and comprehensive measures to help individuals with challenging behavior and those around them.

Resources

Carr, E. G., Dunlap, G., Horner, R. H., Koegel, R. L., Turnbull, A. P., Sailor, W., Anderson, J. L., Albin, R. W., Koegel, L. K., & Fox, L. (2002). Positive behavior support: Evolution of an applied science. *Journal of Positive Behavior Interventions, 4*, 4-16.

Jackson, L., & Panyan, M. V. (2002). *Positive behavioral support in the classroom: Principles and practices.* Baltimore, MD: Brookes Publishing.

Koegel, L. K., Koegel, R. L., & Dunlap, G. (1996). *Positive behavioral support: Including people with difficult behavior in the community.* Baltimore, MD: Brookes Publishing.

Lucyshyn, J. M., Dunlap, G., & Albin, R. W. (2002). *Families and positive behavior support: Addressing problem behavior in family contexts.* Baltimore, MD: Brookes Publishing.

Generalization

Generalization occurs when a person learns something in one environment and can independently apply it in another. Spontaneous generalization occurs when the learner can do so without any additional training. Learners with autism often have a difficult time generalizing skills to new environments. They may need more intensive teaching to learn how to exhibit new skills outside of the teaching situation. While it may be important to teach new skills in a controlled manner, it is also important to make sure that the person can use the skill in a functional and meaningful way.

There are three main types of generalization. **Stimulus generalization** means that the learner can respond the same way with different cues in place. For example, drivers stop at red lights and stop signs. When a driver stops for a policeman directing traffic, the driver has demonstrated stimulus generalization. The driver had the same response even though the cue (stimulus) was different. **Response generalization** means that a learner exhibits different responses in the same situations. For example, a teacher says good morning to her student. On Monday, the student responds with a wave. On Tuesday, the student acknowledges the teacher's greeting with eye contact and a smile. The student exhibited a different response even though the situation was the same. The third type of generalization is generalization over time, also known as **maintenance**. This refers to the ability to demonstrate skills long after responses are no longer reinforced as they were in the training setting. Generalization and maintenance refer to the learner's performance for both skill acquisition and behavior reduction goals.

When teaching learners with autism, we have to plan for generalization to occur. One way to convey that is to say, 'We cannot just teach and hope.' While teaching a new skill is certainly the first step, there are likely to be many more steps in teaching when to do the skill, when not to, and how to behave just right in a particular situation. The learning process is not complete until widespread generalization has occurred in meaningful situations.

Stimulus Generalization

1. The mailman greets the child, saying, "Hi. How are you?"
2. The child says, "Fine." This skill has only been taught in Discrete Trial Instruction at school.
3. You have taught the child to ask, "Can I have a turn?" when others have highly preferred toys at home. At a family gathering at his aunt's house, he asks a cousin, "Can I have a turn?"

Response Generalization

4. Repetitive video rewinding has been targeted for reduction. This has been successful. Parents report that the tendency to increase the volume when watching tapes has also declined.
5. Through DTI, you have taught the child to request, "I want banana." when presented with a choice of snacks. (You start off with banana because the child seems to really like bananas.) The child also begins spontaneously saying, "I want raisins."

Maintenance

6. Six months ago, Joey learned to identify the letters of the alphabet. On many occasions throughout the week, he demonstrates this skill in natural contexts. He may label letters in an alphabet puzzle, letters in his name on a bulletin board, letters in signs in the community, etc.
7. Jennifer learned how to use the toilet in the month of June. Her parents and teachers still collect data during July, August, and September to see if she maintains her toileting skills over time.

Resources

Baer, D. M. (1998). *How to plan for generalization* (2nd ed.). Austin, TX: PRO-ED.

Koegel, L. K., Koegel, R. L., & Parks, D. R. (1992). *How to teach self-management to people with severe disabilities: A training manual.* Santa Barbara, CA: University of California. Available at http://www.education.ucsb.edu/autism/behaviormanuals.html

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis, 10,* 349-367.

Evaluation of ABA Programs

Data Collection and Analysis

Data are collected within an ABA program for multiple purposes. Data inform the decisions we make about programming. Data are taken to document both the acquisition of skills and the improvement in challenging behaviors. Here are some of the most common ways to collect data.

Frequency
How often, for example, the number of times a learner requests a toy: five times

Rate
How often within a certain amount of time. For example, the number of times a learner requests a toy within a twenty -minute class period - five times in twenty minutes equals 0.25 times per minute. One advantage of converting frequency to rate is that you can take data for different amounts of time and still be able to evenly compare the number of times a behavior occurred.

Duration
How long. For example, the length of time that a preschooler sits appropriately during circle time - three minutes.

Intensity
How severe. For example, a tantrum could range from mild to severe.

As one might imagine, there are some behaviors that are better tracked by one method than another. For advantages and disadvantages for each type data, please see the resource section below.

Data analysis involves graphing the data and analyzing the following elements:

Level (How much is the behavior happening?).

Trend (Is the behavior increasing, decreasing, or maintaining?).

Stability (Are the behaviors [data points] close together or highly variable?).

The level, trend, stability, and other information about the behavior are then used to make decisions about appropriate interventions and goals for performance.

Before an intervention begins, behavior analysts collect information about the behavior. This is called baseline data. Baseline data are collected on both challenging behaviors and targeted skills. Data are then collected during the course of an intervention to determine if the learner is making progress, how much progress, and if modifications to the intervention plan are necessary.

One hallmark characteristic of ABA is ongoing data collection. While you can take data every time a behavior occurs, it is not necessary to do so. There are many efficient and reliable means of collecting "probe" (occasional) data that do not require continuous "trial by trial" data recording. One goal is to collect as much data as possible without detracting from the teaching interaction. These data are important when making decisions about what and how to teach. Data guide instructors on a constant basis.

Demonstration of a functional relation

Another hallmark characteristic of ABA is the demonstration of a systematic relation between two variables. For example, if a learner had a tantrum when and only when there was a change in the class schedule, one might suspect the schedule change caused the tantrum. A behavior analyst would explore this possible connection to determine if these events simply occurred together in time or if one caused the other. Behavior analysts identify relations between variables and use this information to change the environment and behavior in the most positive and efficient way possible.

Running an Intensive ABA Program

ABA intervention is a complex and multi-faceted endeavor. A good ABA program is intensive, individualized, and comprehensive.

Intensive

A good ABA program provides intensive teaching. Intensity usually means a low teacher to student ratio (one teacher for one or two students), a large number of instructional hours, and many learning opportunities. People often ask, "How many hours?" Most experts recommend 30 to 40 hours. (Recall that naturalistic teaching done throughout activities can be counted as hours if there is a systematic focus on the development of skills at these times.)

Individualized

A good ABA program will be highly individualized. It will not be a cookbook or one-size-fits-all approach. The foundation of individualization is the assessment process. Initially, a thorough and comprehensive assessment is done to help understand the learner's areas of strengths and deficits. The assessment itself will be individualized in terms of the types of instruments used and tested skills. A good assessment offers critical information to answer the question: Where should we start teaching? During the course of an intervention, a learner's progress is analyzed in order to support him/her in the most positive and effective ways possible. Children with autism are quite different from one another; their programs should reflect this diversity.

Comprehensive

A good ABA program will incorporate several of the instructional methods that comprise ABA. For example, a program that only utilizes DTI will not allow enough

opportunities for spontaneity. Since different instructional methods have distinct advantages, there are reasons to use multiple methods of instruction to ensure that a wide range of skills are taught.

Who can put together a comprehensive ABA program? Credentialed professionals in Applied Behavior Analysis are in the best position to provide comprehensive ABA services. The Autism Special Interest Group of the Association for Behavior Analysis International (ABAI) provides consumers with guidelines that can be used to learn more about professional competencies in ABA. There are also other resources available to help make this important decision (see to the left).

Resources

The Autism Special Interest Group of the Association for Behavior Analysis International (ABAI). (2007). *Consumer guidelines for identifying, selecting, and evaluating behavior analysts working with individuals with autism spectrum disorders.* Available at http://www.abainternational.org/Special_Interests/AutGuidelines.pdf.

Harris, S. L., & Weiss, M. J. (2007). *Right from the start: Behavioral intervention for young children with autism* (2nd ed.). Bethesda, MD: Woodbine House.

Leaf, R., McEachin, J., & Harsh, J. D. (Eds.). (1999). *A work in progress: Behavior management strategies & a curriculum for intensive behavioral treatment of autism.* New York, NY: DRL Books.

Maurice, C., Green, G., & Foxx, R. M. (Eds.). (2001). *Making a difference: Behavioral intervention for autism.* Austin, TX: PRO-ED.

Maurice, C (Ed.)., Green, G., & Luce, S. C. (Co-eds.). (1996). *Behavioral intervention for young children with autism: A manual for parents and professionals.* Austin, TX: PRO-ED.

Sundberg, M. L., & Partington, J. W. (1998). *Teaching language to children with autism or other developmental disabilities.* Pleasant Hill, CA: Behavior Analysts, Inc.

ABA and the Family

As parents, we teach our children everyday. However, given the neurological limitations that autism imposes, parents may need additional skills to effectively teach their children. ABA methods offer many strategies for assessment and intervention. It is recommended that parents learn as much as they can about ABA. While increasing your "ABA repertoire" will benefit your child and your family, each parent has to decide how much they want to know and do. One parent may be comfortable knowing the basic terminology and a few skills to follow up on what the child is learning in school. Another parent may read volumes of literature and "live and breathe" ABA. Other parents may fall somewhere in between by having a good understanding of ABA, working with the school on specific skills, and implementing consistent ABA strategies at home to reinforce appropriate behavior throughout the day.

For those parents who want to learn ABA methods, we recommend starting with the following: reinforcement, shaping, and mand training (in the Natural Environment Training section). These strategies are likely to increase your child's appropriate behavior and motivation.

See resources on the next page.

Resources

Parents' perspectives on ABA are available from the following resources:

Bondy, A. S., & Frost, L. A. (2008). *Autism 24/7: A family guide to learning at home and in the community.* Bethesda, MD: Woodbine House.

Braxton, E. (1996). Peter's story. In C. Maurice (Ed.), G. Green, & S. C. Luce (Co-eds.). *Behavioral intervention for young children with autism: A manual for parents and professionals.* (pp.377-382). Austin, TX: PRO-ED.

Harrington, E. (1996), Rebecca's story. In C. Maurice (Ed.), G. Green, & S. C. Luce (Co-eds.). *Behavioral intervention for young children with autism: A manual for parents and professionals.* (pp.365-372). Austin, TX: PRO-ED.

Harris, M. (1996). In search of Michael. In C. Maurice (Ed.), G. Green, & S. C. Luce (Co-eds.). *Behavioral intervention for young children with autism: A manual for parents and professionals.* (pp.359-364). Austin, TX: PRO-ED.

Kleinfield-Hayes, C. (1996). Brandon's journey. In C. Maurice (Ed.), G. Green, & S. C. Luce (Co-eds.). *Behavioral intervention for young children with autism: A manual for parents and professionals.* (pp.373-376). Austin, TX: PRO-ED.

Maurice, C. (1994). *Let me hear your voice: A family's triumph over autism.* New York, NY: Ballantine Books.

Richman, S. (2000). *Raising a child with autism: A guide to applied behavior analysis for parents.* London: Jessica Kingsley Publishers.

Siblings

Children with autism present special challenges and opportunities for their siblings. These resources offer great suggestions on how to include siblings in ABA programming, decrease sibling rivalry, and help siblings make the most of their relationship.

Resources

Autism New Jersey. (2010). *Kids booklet on autism.* Robbinsville, NJ: Author. Available at www.autismnj.org.

Feiges, L. S., & Weiss, M. J. (2004). *Sibling stories: Reflections on life with a brother or sister on the autism spectrum.* Shawnee Mission, Kansas: Autism Asperger Publishing.

Harris, S. L., & Glasberg, B. A. (2003). *Siblings of children with autism: A guide for families* (2nd ed.). Bethesda, MD: Woodbine House.

Luce, S. C., & Dyer, K. (1996). Answers to commonly asked questions. In C. Maurice, (Ed.), G. Green, & S.C. Luce (Co-eds.). *Behavioral intervention for young children with autism: A manual for parents and professionals* (pp. 345-356). Austin, TX: PRO-ED.

Meyer, D., J., & Vadasy, P. F. (1994). *Sibshops: Workshops for siblings of children with special needs.* Baltimore, MD: Brookes Publishing.

Running a Home-based ABA Program

This section addresses administrative issues.

As previously noted, intensive programs for learners with autism can be intense experiences for those who are responsible for them. This section highlights some of the common issues parents face when maintaining a home program. There are some advantages and disadvantages to having a child's education take place at home. The issues presented will be helpful in determining if a home program is appropriate for an individual family.

When a child goes to school, there is a natural separation of home and school life. The teacher does not enter the home, or at least not on a regular basis. A home-based program presents very differently. Teaching is taking place where the child and family live. If a difficult discussion needs to take place with the teacher, it may happen in the living room or at the kitchen table. The natural separation of home and school that is inherent in sending a child to a school evaporates. Everything happens at home. Alternatively, this could be seen as a good thing. Communication may be more regular and thorough, and it may not require a scheduled meeting.

From the child's perspective, there are learning opportunities throughout the day. For young children, this learning would occur in the most natural setting – his/her home. The child has plenty of opportunities to learn, use, and generalize new skills in a functional manner across people and settings. Frequently in the home program, opportunities for social development require more planning than in a school. Arranging play dates can take on a new meaning when the child has beginner-level play and social skills.

There are also factors to consider related to the staff of the program. The home environment may cause some professionals to behave more casually than they would in a classroom. This puts some parents at ease, while others find it unprofessional. Parents should be aware of their preferences and make them known to their child's instructors. Perhaps these expectations should be included in their performance appraisals. The Autism Special Interest Group of the Association for Behavior Analysis has created guidelines for consumers of ABA services. This document may be helpful in selecting behavior analysts and reviewing their performance with standard criteria in mind. The information gathered from both informal and formal sources can be used in a systematic way to determine the feedback, incentives, and raises that are provided for the child's instructors. Some parents welcome this opportunity and are very comfortable in the role of employer. Others rise to the occasion with mixed feelings along the way. The program supervisor can largely determine the quality of the home program. He/she sets the tone for professionalism, communication, collaboration, and the integrity of the ABA program itself. Service delivery coordination and financial arrangements with state early intervention programs, local school districts, and state offices for individuals with developmental disabilities are substantial tasks that are beyond the scope of this book.

There are also implications for siblings when a home-based program is in effect.

Many siblings enjoy the presence of another caring and fun adult. However, it is also common for siblings to become jealous of their brother or sister's "special friend." Often, a sibling's perspective can be improved by giving them a comfortable role (participating in turn taking or a circle time activity). Letting siblings see what happens with the instructor can go a long way to increase their comfort level and reduce negative feelings. Of course, a sibling's participation should be entirely voluntary. Parents and instructors should take their lead from the sibling and create an experience tailored to his or her level of interest and concerns.

Running a home-based instructional program is an enormous undertaking. Parents assume central roles not just in the instruction of their child, but also in the management of an educational team.

ABA as a Profession

We have provided a lot of information in this book. Yet, this is only a fraction of the ABA knowledge base. Professionals in this field are responsible for knowing how to successfully implement a wide range of assessment, intervention, and quality assurance methods. To do so requires extensive training including academic coursework, hands-on experience, and supervision. A national certification is well underway to ensure a minimum level of competence for those who practice ABA. This certification became available on a national level in 1999 and is a major advancement for the profession and for consumers of ABA services. The criteria for this certification offer guidelines for consumers when choosing a behavior analyst.

The following resources offer many specific qualifications for behavior analysts and those they supervise. A few basic skills are worthy of mention in this overview of ABA to foster your identification of the major areas of competence within behavior analysis.

A behavior analyst should:

1. Spend time with the learner and those who play a role in his educational programming (parents, teachers, etc.) in order to gain an appreciation of the learner's preferences and skills and the team's values and goals.
2. Observe the learner on multiple occasions to become familiar with what the learner can do with and without intervention.
3. Conduct objective assessments that capture a true picture of the behavior.

4. Implement (or train others to implement) an intervention that is acceptable to the team, individualized for the learner, increases appropriate behavior, and makes a meaningful difference in the learner's life.
5. Collect and analyze data to be able to describe the learner's progress and to ensure service accountability.
6. Overall, act in accordance with the Behavior Analyst Certification Board® (BACB) *Professional Disciplinary Standards*® and *Guidelines for Responsible Conduct for Behavior Analysts*®.

The skills noted in numbers 1-5 above are basic level skills. Good behavior analysts practice within the conduct guidelines mentioned in number 6. Please refer to these guidelines to become familiar with ABA's professional expectations and standards.

While many qualified behavior analysts serve learners with autism, the demand for ABA services far exceeds the supply. Given this low supply and high demand state, many under-qualified or unqualified providers are well positioned to offer their services. It is important to mention that all professionals who utilize ABA methods should comply with the standards of the profession. For example, many people who provide "ABA services" only know how to use a particular curriculum or training protocol. This professional should provide that information to the consumer by detailing his/her training experiences and by referring to another professional for services beyond that topic. This professional should not assume that one particular curriculum or treatment protocol is appropriate for all learners nor withhold information about more comprehensive programs. For more information on the Behavior Analyst Certification Board (BACB), please visit their web site: www.bacb.com.

Resources

The Autism Special Interest Group of the Association for Behavior Analysis International (ABAI). (2007). *Consumer guidelines for identifying, selecting, and evaluating behavior analysts working with individuals with autism spectrum disorders.* Available at http://www.abainternational.org/Special_Interests/AutGuidelines.pdf.

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Myths & Facts

Top Ten Misconceptions of ABA

To complete this overview of ABA, it may be helpful to review some of the popular misconceptions about what ABA is and is not. Often an approach can be minimized, discounted, or incorrectly described by people with minimal information or misinformation. When this happens, people can get the wrong idea about what an approach represents, how effective an approach is, who an approach is appropriate for, etc. ABA has been subject to many misconceptions for a variety of reasons. Below are some of the misconceptions that parents and professionals are most likely to hold about ABA.

MYTH

ABA is a one-size-fits-all approach.

FACT

ABA is highly individualized in every way Behavior analysts begin by assessing an individual's skills and develop learning objectives. From the goals selected to the methods used, ABA is focused on maximizing an individual's performance. By observing a person's behavior and collecting objective data, behavior analysts are able to monitor progress and adjust interventions on a daily basis. ABA teaching is a very dynamic process.

MYTH

ABA increases compliance and some other skills but does not address "higher-level" skills such as play and social skills.

FACT

ABA can be used to build skills in all areas, including abstract thought and social skills. Common objectives include reciprocal conversation, joining a game, and problem-solving skills.

MYTH

ABA results in similar outcomes for all individuals with autism.

FACT

Autism is a neurobiological disorder that is evident in a person's behavior. ABA can significantly impact a person's behavior by teaching him new skills, sometimes to the extent that he can become indistinguishable from his peers. For the majority of individuals with autism who do not "recover," they do make substantial progress throughout their lives as a result of ABA.

MYTH

There is evidence that other approaches are just as effective as ABA.

FACT

According to the information available at this time, ABA is the only approach with substantial, documented evidence of its effectiveness for learners with autism. Behavior analysts have conducted systematic research and provided documented, peer-reviewed evidence of its effectiveness for thousands of people. In addition, the documentation of ABA's effectiveness covers many types of interventions, age groups, and skill levels. The proponents of other approaches have limited or no objective data to demonstrate improvement for learners with autism.

MYTH

An intensive ABA program is a guarantee that a child will be able to enter kindergarten without supports.

FACT

There is a range of outcomes for learners in intensive ABA intervention. Some children enter into inclusive settings part-time and still receive some specialized instruction in another setting. Some children continue to need specialized and intensive services in a full day program. Other children enter into full-time kindergarten settings, but require supports such as a shadow (an instructional assistant assigned just to them or to several children with special needs) or a speech therapist. And some children do attend full-time regular education without supports. Most importantly, while it may be tempting to equate a child's educational placement with success or failure, it often is more meaningful to look at a child's progress on multiple dimensions.

MYTH

Intensive ABA is no longer justified when children are past pre-school age.

FACT

ABA has received tremendous recognition for the impact at the pre-school level. However, it remains the best documented and effective approach for older learners as well. This is so because it is a science based on the principles of human behavior, which span all age and ability ranges.

MYTH

ABA consists mostly of compliance training, resulting in children who are resistant to

learning and tantrum to escape learning situations.

FACT
Historically, compliance training was used a great deal in ABA. We now know much more about how to motivate behavior, and compliance is gained in many positive ways. In a good ABA program, children are very fond of their instructors, eagerly anticipate learning, and enjoy their instructional time.

MYTH
ABA uses a lot of punishment.

FACT
This is a very serious issue and will be answered in two parts.

a. Punishment is NEVER used as part of a teaching program. ABA always uses items and activities that motivate learners to participate in instruction. Increasing appropriate behavior is the major focus of all ABA programs.

b. When an individual exhibits challenging behaviors that place the individual or others in danger, a treatment team must carefully and effectively respond to reduce the behavior. Comprehensive positive behavioral supports (see page 41) should be utilized to the fullest extent to reduce dangerous behavior through assessment and positive interventions. Most of the time, positive approaches sufficiently reduce the dangerous behavior. The use of punishment procedures is a last resort. Most punishment procedures are consistent with techniques that parents use with typically developing children such as verbal reprimands and loss of privileges. If punishment procedures are used, they should be done so very cautiously, with full consent of parents, and with procedural safeguards to ensure benefit to the individual. Using behavior reduction procedures without informed consent and documented effectiveness is unacceptable. All parents should find out how their child's behavior is addressed and discuss the procedures for which you would and would not provide consent. For more information on guidelines for the use of behavior reduction procedures, please see Autism New Jersey's Position Statement on the Use of Restrictive Procedures within Comprehensive Behavior Support Plans (see resource section). This position statement advocates for the extinction or limited use of punishment procedures. It outlines extensive procedural safeguards for the safe and effective use of punishment procedures within the contexts of behavior plans and crisis management, should they be deemed necessary by a treatment team. While clinicians and legislators continue to discuss the merits of regulating such procedures as a component of a plan or crisis management, the individual's rights and safety are primary concerns.

MYTH
ABA is limited to one or a few specific strategies, such as Discrete Trial Instruction.

FACT
ABA incorporates many strategies to improve people's abilities and quality of life. Sometimes these strategies are grouped together by practitioners and

given a specific name. On a similar note, the procedures used at particular schools are sometimes labeled the same name as the school. Given society's tendency to put things into categories, it is important to keep in mind that every learner with autism requires an individualized educational plan. Behavior analysts should use their knowledge and experience to create and monitor such a plan. Doing so may require using a combination of strategies that have research support. You should proceed with caution with any professional who knows only one set of strategies or "brand" of ABA.

MYTH

All professionals are created equal and all explain ABA in the same way.

FACT

All professionals do not receive equivalent training. In fact, there is some variability in the training of behavior analysts and even greater variability in the training of behavioral "consultants." Be wary of taking one professional's perspective. Obtain a second opinion, if necessary. In terms of using the same terminology, many behavior analysts do. However, there are many examples of similar strategies with different names and slightly different components. Hopefully, this book will make these similarities and differences more clear. (For more information on the qualifications and credentialing of behavior analysts, please see chapter 10.)

Resources

Association of Professional Behavior Analysts. (2009). *The use of restraint and seclusion as interventions for dangerous and destructive behaviors.* Available at www.apbahome.net.

Autism New Jersey. (2010). *Position statement on the use of restrictive procedures within comperhensive behavior support plans.* Robbinsville, NJ: Author. Available at www.autismnj.org.

Summary

ABA is a powerful teaching technology for learners with autism. During the past several decades, it has become more sophisticated and more complex. There are a wide variety of instructional strategies, each of which has a distinct purpose and unique advantages. A comprehensive ABA program addresses the range of deficits that learners exhibit and utilizes a wide array of these instructional strategies. All of the strategies discussed in this book are compatible and can be included together in a comprehensive intervention package.

What makes it ABA?

Regardless of which instructional strategy is being used, the following elements characterize an ABA program.

1. Assessment: Behavior analysts conduct a thorough initial assessment and continual assessment of behavior change over time. Assessment is the first step in every ABA endeavor and remains a constant presence in every program. Assessment is not a one-shot deal but instead a regular feature in the ABA process.
2. A link between assessment and intervention: Intervention is guided by assessment and is individualized to the learner's unique needs.
3. Data-based decision making: Data are collected and analyzed to evaluate how a learner is doing on a particular program. Decisions about what to do next are determined by rate of progress and other objective indicators of progress, not on someone's impression or pre-determined criteria.
4. Dynamic and responsive programming: The constant data collection and analysis allows for dynamic programming. Learners should not

be distressed, fail to attain skills, or exhibit increasing rates of challenging behaviors. Such problems signal to the behavior analyst that a change in instruction is warranted.

5. Social significance: The issues addressed should be socially significant; they should make real differences in the lives of people served and should increase their access to rewarding activities. At its core, ABA is focused on helping people make meaningful progress.

What is the message?

The goal of ABA intervention is to build socially significant behaviors in a meaningful way and to a meaningful degree. The broad array of ABA interventions helps us accomplish this important goal. Generalization and spontaneity are essential components of successful intervention. The ultimate goal is the demonstration of skills in natural contexts leading to richer personal and social experiences.

Resource Section

Organizations

The Association for Behavior Analysis International (ABAI)
www.abainternational.org
- Autism Special Interest Group
- Parent-Professional Partnership Special Interest Group
- State, Regional, and International Chapters of ABA

The Association for Science in Autism Treatment (ASAT)
www.asatonline.org

The Association for Positive Behavior Support
www.apbs.org

The Association of Professional Behavior Analysts (APBA)
www.apbahome.net

Autism New Jersey
www.autismnj.org

Behavior Analyst Certification Board (BACB)
www.bacb.com

The Cambridge Center for Behavioral Studies
www.behavior.org (Autism link)

Organization for Autism Research (OAR)
www.researchautism.org

List of Peer-Reviewed Journals

While not an exhaustive list, the following journals are well-regarded sources of ABA information. Publication in these journals involves a process known as peer review in which a study is evaluated, critiqued, and eventually determined to be scientifically and clinical valuable by a group of experts.

- *Analysis and Intervention in Developmental Disabilities*
- *Analysis of Verbal Behavior*
- *Autism*
- *Behavioral Interventions*
- *Behavior Therapy*
- *Child and Family Behavior Therapy*
- *Focus on Autism and Developmental Disorders*
- *Journal of Applied Behavior Analysis*
- *Journal of the American Academy of Child and Adolescent Psychiatry*
- *Journal of Autism and Developmental Disorders*
- *Journal of the Association for People with Severe Handicaps*
- *Journal of Consulting and Clinical Psychology*
- *Journal of Positive Behavior Interventions*
- *Research in Developmental Disabilities*

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