

2012

A Suggested Methodology for the Application of Parent Training in Teaching Verbal Behavior to Children with Autism

Amanda L. Moretto

Southern Illinois University Carbondale, moretto.amanda@gmail.com

Follow this and additional works at: http://opensiuc.lib.siu.edu/gs_rp

Recommended Citation

Moretto, Amanda L., "A Suggested Methodology for the Application of Parent Training in Teaching Verbal Behavior to Children with Autism" (2012). *Research Papers*. Paper 225.
http://opensiuc.lib.siu.edu/gs_rp/225

This Article is brought to you for free and open access by the Graduate School at OpenSIUC. It has been accepted for inclusion in Research Papers by an authorized administrator of OpenSIUC. For more information, please contact opensiuc@lib.siu.edu.

A SUGGESTED METHODOLOGY FOR THE APPLICATION OF PARENT TRAINING IN
TEACHING VERBAL BEHAVIOR TO CHILDREN WITH AUTISM

by

Amanda L. Moretto

B.A., Southern Illinois University Edwardsville, 2009

A Research Paper

Submitted in Partial Fulfillment of the Requirements

for the

Master of Science

Department of Behavior Analysis and Therapy

in the Graduate School

Southern Illinois University

May 2012

RESEARCH PAPER APPROVAL

A SUGGESTED METHODOLOGY FOR THE APPLICATION OF PARENT TRAINING IN
TEACHING VERBAL BEHAVIOR TO CHILDREN WITH AUTISM.

By

Amanda L. Moretto

A Research Paper Submitted in Partial

Fulfillment of the Requirements

for the Degree of

Master of Science

in the field of Behavior Analysis and Therapy

Approved by:

Dr. Ruth Anne Rehfeldt

Graduate School
Southern Illinois University Carbondale
April 2012

AN ABSTRACT OF THE RESEARCH PAPER OF

AMANDA L. MORETTO, for the Master of Science degree in BEHAVIOR ANALYSIS AND THERAPY, at Southern Illinois University Carbondale

TITLE: A SUGGESTED METHODOLOGY FOR THE APPLICATION OF PARENT TRAINING IN TEACHING VERBAL BEHAVIOR TO CHILDREN WITH AUTISM.

MAJOR PROFESSOR: Dr. Ruth Anne Rehfeldt

One diagnostic criterion of an autism spectrum disorder (ASD) is a dysfunction of or lack of communication. Many individuals with autism struggle to communicate effectively and require extensive training to use verbal behavior. Parent training has been shown to be successful in teaching a variety of skills to children with autism; this paper compiles various aspects of parent training and teaching verbal behavior to children with autism in order to form a methodology of teaching parents to help their children communicate effectively.

Keywords: verbal behavior, autism, communication, parent training, discrete trial training, naturalistic teaching procedures, mand, tact, echoic responding, intraverbal

TABLE OF CONTENTS

<u>CHAPTER</u>	<u>PAGE</u>
Abstract	i
List of Figures	iii
A Suggested Methodology for the Application of Parent Training in Teaching Verbal Behavior to Children with Autism	1
Figure: Verbal Operant Teaching Sequence	28
References	29
Vita	34

LIST OF FIGURES

<u>FIGURE</u>	<u>PAGE</u>
Verbal Operant Teaching Sequence	28

According to the Centers for Disease Control and Prevention, the current estimated rate of autism in the United States is 1 in 88 children (2012). An additional compilation of reports provided by the United States Centers for Disease Control and Prevention shows that as of 2002, \$35 billion are being spent annually by families and various agencies in treating autism spectrum disorders, from education costs to autism-specific treatments and medications used to diminish some of the symptoms associated with autism (2002). The National Autistic Society in the United Kingdom estimates that approximately 70% of individuals with autism spectrum disorders are living in government or private facilities or in any kind of care that is not strictly independent living (2010). Due to the enormous financial costs of supporting a person with an autism spectrum disorder who is unable to live independently, research has recently focused on finding methods of increasing these people's independent living skills. One such method of increasing independence in individuals with autism is to teach them to communicate effectively.

Individuals with autism frequently struggle to communicate effectively with the world around them. By aiding these individuals in the acquisition of verbal behavior, we allow them to make their wants, needs, and thoughts known to others (Sundberg & Michael, 2001; Barbera, 2007). The acquisition of language by a child with autism allows for more inclusion in schools, appropriate behavior in a variety of settings, and the ability to acquire other skills such as social skills, play skills, and adaptive skills. It has been shown that when a child is allowed some control over his environment, maladaptive behaviors such as self-injury and aggression can decrease. Given that maladaptive behaviors serve as communication in many children who have limited language skills, it is reasonable that teaching a functional alternative such as verbal communication will decrease the necessity of inappropriate behavior to communicate wants and needs. Further, once a child begins to use basic verbal behavior (e.g., mands) and is able to

control his environment, he learns the speaker-listener roles that are crucial to teaching additional verbal behavior (Sundberg & Michael, 2001).

Verbal behavior was first defined by Skinner (1957) as a process between a speaker and a listener in order to communicate. Skinner defined several key operants, including mands, tacts, echoics, and intraverbals. By studying both the form and function of language, Skinner established a theory of language that has been widely accepted and used to discuss language and communication. Verbal behavior encompasses all aspects of human life; without it, communication is impossible. While verbal behavior is not synonymous with vocal behavior, the two are not mutually exclusive. It is vocal behavior, which is a category of verbal behavior, that is commonly targeted when teaching individuals with autism to communicate (Sundberg, 2007).

Teaching Verbal Behavior

Prior to beginning any teaching intervention, it is imperative that several skills are present in the child's repertoire. According to Frea and McNerney (2008), these skills include compliance, attending and orienting to social stimuli, imitation, and choice making. Compliance in learning refers to a child having the ability to attend to stimuli and remain in his seat for several minutes at a time and should be enhanced by the use of strong reinforcers, particularly at the beginning of the intervention. Joint attention, or attending to social cues, is also necessary for a child to be able to learn. If a child is unable to respond to bids for joint attention by a caregiver it will be difficult to have him participate in sessions. Imitation skills are necessary when teaching language because a child will need to be able to imitate or approximate the sounds made by the practitioner or caregiver when learning the words necessary to acquire items, such as in mands, or identify them, such as in tacting. Finally, making choices is a necessary skill for

teaching communication, given that the child will need to be able to indicate for which items he is manding.

Once a child has the prerequisite skills for learning, it is necessary to determine how much structure will be used during teaching sessions. One highly structured method of teaching is discrete trial training (DTT). In this teacher-directed situation, a child has a one-to-one interaction with his or her teacher; the therapist gives the child clear, concise demands and prompts the child if necessary to ensure that the child successfully follows the directions (Lovaas & Smith, 1988). There are three distinct parts of a trial: the antecedent, the behavior, and the consequence. The antecedent is any aspect of the environment which will elicit a response (e.g., an auditory or visual stimulus). The child's response, also referred to as the behavior in this chain, is any action or vocalization that the child makes; generally the response is considered correct, incorrect, or a failure to respond to the antecedent. The consequence that follows is determined based upon the child's response; if incorrect, there may be a vocal stimulus that encourages the child to try again or there may simply be a lack of reinforcement. If the child is correct, some sort of positive reinforcement is provided (Tarbox & Najdowski, 2008).

DTT is a structured form of teaching skills with several advantages as a method of teaching verbal behavior; first, skills may be rapidly acquired. There are many trials during a training session and the skills are repeated frequently. Reinforcers do not have to be based upon the skills being learned: that is, they do not have to be natural reinforcers. Further, data is easily collected during these trials. In addition, all of the verbal operants can be taught using discrete trials (Tarbox & Najdowski, 2008). However, there are several disadvantages to DTT. Anderson and Romanczyk (1999) state that DTT is effective for providing many opportunities for learning; however, it is noted that DTT may lack effectiveness when generalization is necessary. The

method of precise trials can lead to rote responding (Tarbox & Najdowski, 2008) and the structure of the sessions is less natural than in other methods of teaching.

Another method of teaching derived from the principles of applied behavior analysis is that of naturalistic teaching. Naturalistic teaching is typically believed to be more suited to teaching children language and social skills as well as imitation and spontaneous language. In particular, natural environment teaching is effective at building skills related to manding (Weiss, 2005).

There are several elements that differ in naturalistic teaching procedures as compared to analog teaching procedures like DTT. First, naturalistic procedures deal with sessions that are based in play and typical events and are semi-structured, whereas DTT includes strictly structured sessions. Naturalistic procedures are child-driven (Kaiser, Hancock, & Nietfield, 2000); this allows the child to select the stimuli that are the focus of sessions rather than implementers determining what should be taught. If a child is allowed to focus on his interests during sessions, there is a greater motivation to learn and respond to the stimuli. In addition, naturalistic teaching procedures use natural reinforcers; children access reinforcers by communicating appropriately, whereas in DTT methods children are given reinforcers that may or may not be directly related to the communication response being taught. For example, in naturalistic teaching, a child may be prompted to say “ball” when he has reached for a ball. When the child says “ball” or an approximation of “ball,” the result is that the child is granted access to the ball. The natural consequences of communication reinforce language acquisition. Because of the use of these practices in routine environments rather than in sit-down, academically based settings, naturalistic teaching has been shown to be effective in teaching early language, play skills, and social skills (Allen & Cowan, 2008).

One example of naturalistic teaching is referred to as “incidental teaching.” The name reflects the nature of this procedure; learning takes place naturally and in the child’s typical environment. In this procedure, items of interest to the child are placed out of reach of the child. The child must initiate an interaction with the parent or caregiver in order to access the items. In incidental teaching, any appropriate communication is reinforced. As the child’s ability to communicate increases, parents and teachers require elaboration, such as adding adjectives or compound sentences, as to what the child wants. For example, instead of being allowed access to a crayon when the child says, “crayon,” the child will be prompted with, “what color?” or “why?” and the child must answer with, “I want the red crayon,” or, “I want the crayon so that I can draw” (Allen & Cowan, 2008). Given that incidental teaching relies on the child’s initiation of communication, there are practical disadvantages to this style. Many times children with autism will avoid verbal communication attempts. Some children may be more motivated to engage in self-stimulatory behavior than to make the effort to communicate a desire for other items. Therefore, there are several modifications to incidental teaching that allow for greater success.

One such modification to incidental teaching is the mand-model procedure. This procedure focuses on removing the need for the child’s initiation of interactions. In this case, instead of waiting for the child to indicate an interest in an item, the teacher or parent will prompt a mand based upon the child’s perceived interests. This allows the child to have an appropriate communicative response before making an advance towards an item or the caregiver; this also allows for more opportunities to teach a child who is more withdrawn (Allen & Cowan, 2008). Another modification that is present in this procedure is that not all of the reinforcement is natural. If a child is engaged in an activity when the caregiver approaches, the caregiver may

request more information about the activity. If the child responds appropriately then attention-based reinforcers are provided for the communication. Unlike the original model of incidental teaching, this method does not require that all of the child's items or activities be restricted (Allen & Cowan, 2008). This can prevent problem behavior if the child has limited means of communicating for tangible items and is more likely to engage in problem behavior than to communicate verbally. While research on acquisition of language in children with autism using this procedure is limited, it is commonly used as part of a milieu teaching procedure (Allen & Cowan, 2008).

A second modification of incidental teaching is the use of a time-delay procedure. In this procedure, a teacher or parent may approach a child who is engaged in an activity or who wants something and use a time-delay prompt before delivering the item or desired consequence (Allen & Cowan, 2008). As in the mand-model procedure, this procedure does not rely on a child's initiation to teach communication. An example of this could be a child who is reaching for an item on a shelf but who is not tall enough to reach the item. The teacher can then approach the child and wait for the child to communicate. If, after a time delay, there is no communication from the child, the teacher can then provide a prompt. As the time-delay procedure is used, the delay between approach and prompt should be lengthened.

A third modification of incidental teaching is referred to as a behavior chain interruption. This procedure elicits communication by interrupting a chain with which the child is familiar. When access to something is limited or removed during the chain the child is required to communicate to access the item (Allen & Cowan, 2008). For example, if a child is washing his hands and realizes that there is no soap, he will need to request the soap in order to complete the

behavior chain. His parent or teacher can use a time-delay procedure to prompt communication; if no communication attempt is made, the caregiver can model appropriate communication.

Another method of naturalistic teaching procedures is the use of the Natural Language Paradigm (NLP) and Pivotal Response Training (PRT), which allows teachers and parents to know not only how to teach language, but also what, specifically, should be taught. This method also relies on the child's motivation as a precursor to teaching. Several strategies are employed in this method, including: "(a) use of the child's choice in stimulus selection; (b) use of natural reinforcers, functionally related to the task; (c) interspersal of mastered skills trials along with emerging skills trials; (d) reinforcement of communicative attempts; and (e) turn-taking" (Allen & Cowan, 2008, p. 226). In NLP, all attempts at communication are reinforced. Further, the use of NLP includes both new and mastered skills in teaching to enhance motivation (Allen & Cowan); this is similar to the concept of behavioral momentum. In addition, several responses such as self-management, self-initiation, and responding to a variety of signals are considered pivotal to the child's learning. These responses can effectively increase a child's acquisition of other behaviors (Allen & Cowan, 2008).

A final application of naturalistic teaching procedures is milieu teaching. Kaiser, Hancock, and Nietfeld refer to milieu teaching as a, "hybrid approach to naturalistic, early language intervention" (2000, p. 424). Milieu teaching is a combination of the previously described naturalistic teaching procedures. It can include aspects of NLP, PRT, incidental teaching, and may include time delays and mand-model procedures. Milieu teaching allows for more individualization of techniques used to teach communication. By focusing on parents and caregivers as teachers, this allows for a broader application of the previously mentioned techniques (Allen & Cowan, 2008).

Both discrete trial training and naturalistic teaching procedures have advantages to teaching children to communicate effectively. Discrete trial training may be the most effective method to help children acquire the prerequisite skills to learning and when presenting new verbal operants. When the child has begun to acquire the skills to indicate what he wants (for manding sessions) or can name items (in tacting sessions), the parent should be encouraged to include these skills in the natural environment (e.g., when the child is asking for a drink). This will avoid any problems with generalization and will allow the child to begin using his communication skills in a functional manner.

Parent Training

Parent education programs have been shown to be effective in teaching children a variety of skills, from the use of an intensive toilet training protocol (Kroeger & Sorensen, 2010) to speaking. One reason for this is that many practitioners are unable to meet with children frequently enough to provide an adequate amount of time for training and maintaining a skill, whether due to working with multiple clients during a time period or because services are limited to the number of available practitioners. If a client is on a waiting list to receive services in a treatment setting, the crucial early intervention stage may pass before the client is seen (Coolican, Smith, & Bryson, 2010). Other times a family is unable to provide the time and resources necessary to facilitate a practitioner's frequent visits. Given that a parent will spend hours each day with the child in his natural environment, the potential to frequently practice skills and maintain them is typically greater than that which a practitioner can provide (Brookman-Frazee, Vismara, Drahota, Stahmer, & Openden, 2009). Parents are considered the key to success in this type of intervention (Lovaas, Koegel, Simmons, & Long, 1973). Parent training interventions focus on specific skills to teach parents in order for them to help their

children acquire skills (Brookman-Frazee et al., 2009). This method allows for individualization of the program based upon the characteristics of the child as well as the needs presented by each family; further, it allows for individualization of teaching curricula long after the practitioner has finished working with the child. Parent training has also shown increases in positive interactions between parents and children and has led to decreases in aberrant behavior in children.

Several studies have shown the effectiveness of parent training using a variety of techniques. One study focused on training parents to use discrete trial teaching procedures with their children with autism (Crockett, Fleming, Doepke, & Stevens, 2007). Parents were taught to use antecedents, deliver consequences, and facilitate sessions by correcting and prompting behaviors as well as taking data. The parents attended up to nine two-hour sessions each week. At first, the focus of the intervention was to ensure that the child was attending to the stimuli and that instructional control was attained. Lectures were presented and videotapes modeling the appropriate use of DTT were used; parents were asked to identify which DTT procedures were correct and which were incorrect as well as explain the logic behind their answers. Role-playing followed the video modeling portion and parents then practiced the steps with their children. Feedback was given to the parents based upon the target behaviors they exhibited (e.g., presenting antecedents and delivering consequences). After the parents administered four consecutive trials correctly they were videotaped and did not receive feedback. Each subsequent session then focused on the skill over which the parent had shown the least mastery during the previous session. Further, parents were not instructed to practice at home, although this was allowed and the parents indicated that they were doing so. The results showed that parents were able to acquire the skills to use discrete trial teaching with their children and that as the parents' skills increased in one area, the other skills targeted increased as well. The children's behaviors

did not improve significantly; this was attributed to the small amount of child participation in the study. However, research has indicated that using DTT in a method of parent training combined with classroom instruction can have significant effects on a child's behavior.

Devlin and Harber (2004) implemented DTT to determine if less hours of DTT than originally recommended by Lovaas (30-40 hours weekly) would be effective in changing the behavior of a child with autism. Discrete trial training was used to address the areas of receptive language, expressive language, grammar, syntax, and conversation skills. The child's parents, teachers, and speech and language pathologist were the implementers in this study; therefore, the intervention took place in several locations: the child's home, the special education classroom he attended, and the speech classroom at his school. The speech and language pathologist used DTT methods three times a week for one hour per session. The special education teachers used DTT and utilized manipulatives, visual supports, and center-based activities. As the study progressed, the instruction was expanded to include natural environment teaching as well. The results of the study showed that the child's skills at attending to the instruction rose from 75% pre-intervention to 100% post-intervention, receptive language skills increased from 0% to 58%, expressive language skills showed a 43% gain (21% pre-intervention to 64% post-intervention), and pre-academic skills rose 53% (0% pre-intervention). It was determined that between 20 and 24 hours of intervention each week when combining DTT, collaboration between caregivers and school personnel was sufficient to induce a significant change in behavior.

Discrete trial teaching has been an effective method of changing the behavior of children and has been taught successfully to caregivers (Crockett et al., 2007). Further, the use of both DTT and naturalistic teaching has been seen in Devlin's and Harber's (2004) research. Naturalistic teaching has also been used in parent training to teach communication through

pivotal response treatment (PRT; Coolican et al., 2010) and enhanced milieu teaching (EMT; Kaiser et al., 2000). Coolican and colleagues assessed parents' acquisition of PRT skills by training parents in three two-hour sessions. This was done to determine whether a brief introduction into PRT would be sufficient to teach parents to implement behavior change in their children. Parents' skills in PRT methods were assessed before, after, and two to four months following training using questionnaires and video recordings. The results showed that the parents' PRT skills improved during the training and the improvements were maintained during the follow-up evaluation. Further, the children's communication skills increased after training.

Similarly, Kaiser and colleagues (2000) used Enhanced Milieu Training (EMT) to increase the social communication skills of children with autism using a parent-implemented process. Six children with autism, each with a minimum of a six-month delay in expressive language, and their mothers participated in the study. After a baseline with no feedback or coaching, the parents were provided training sessions twice each week; each session was 45 minutes in duration. The first 15 minutes of the training session focused on providing the parents with novel information as well as feedback for their previous sessions. Next, 15 minutes were utilized in practicing the information provided for the EMT procedures. The final 15 minutes of the sessions were used to provide immediate feedback, generate ideas for use during home sessions, and planning for upcoming sessions. Three components of EMT were discussed: environmental arrangement, response interaction strategies (i.e., modeling new language and methods to build social and conversation skills), and milieu teaching. Generalization sessions were also conducted in the home; three took place at the end of the baseline period, three took place at the end of the intervention, and three took place at the end of the follow-up period. After the sessions were complete, the participants returned once per month for six months to determine

their level of maintenance. No feedback or coaching was given during these follow-up sessions. Results generated from this study determined that an increase in the children's social communication and parental implementation of EMT was maintained over the follow-up period as well as across settings.

Teaching Verbal Operants

Before teaching verbal behavior, some prerequisite skills must be present in the child's repertoire. First, many of the verbal behavior teaching processes require generalized verbal imitation. If a child is unable to independently repeat words or parts of words, it is not likely that he will acquire these skills without first beginning with nonverbal imitation. This can take the form of gross motor or fine motor imitation. Once the child has established a pattern of imitation, verbal imitation can follow (Stark, Giddan, & Meisel, 1968; Thomas, Lafasakis, & Sturmey, 2010).

Next, training sessions should focus on vocal imitation of simple sounds. Stark and colleagues (1968) successfully taught one child with autism to imitate simple vocalizations. The experimenters determined which sounds the child already emitted as well as simple sounds (i.e., those that could be prompted by physical means) and those were used to teach vocal imitation. Once the child was capable of imitating simple sounds, consonant sounds and vowel sounds were combined to form parts of words. When necessary, the experimenters shaped successive approximations of the sounds to reinforce the formation of phonemes. This methodology allowed the child to acquire the prerequisites for learning verbal operants. Similarly, Thomas and colleagues (2010) followed the acquisition of non-vocal mands (e.g., pointing) by beginning to teach simple sounds and phonemes to children with autism. Using differential reinforcement and prompting, it was determined that the children could begin to use simple mands.

Mands

According to Sundberg and Michael (2001), the most important verbal operant to teach in an early language stage is the mand. A mand is defined as a verbal operant that allows the speaker to communicate wants and needs (Skinner, 1957). The mand is what allows the child to control his environment in the most basic sense (Sundberg & Michael, 2001). To mand and be reinforced for manding is to have one's needs met. Because manding is based upon motivation, a child who is learning to speak may have the easiest time learning to mand first (Barbera, 2007). It is important to immediately reinforce a mand in the early stages of acquisition in order for that mand to become mastered. The prerequisites for teaching manding are based upon the parent's ability to provide an appropriate environment, the availability of and ease of delivering the reinforcers, and the child's ability to produce words or word approximations.

First, the parent should ensure that there is an area in which to start teaching mands that is paired with reinforcement. If necessary, a work area can be established in which sessions will take place; however, rather than beginning with sessions focused on teaching language, the parent should play with the child and engage in activities that the child prefers. If the child views the area as one that is only used for difficult activities, he may display inappropriate behavior if he is continually made to sit and perform difficult tasks. However, if this area has been an area in which he has gotten to engage in his favorite activities, he is more likely to comply with requests to enter the area or may approach the area independently.

It is also important that the child view the parent as a reinforcing stimulus as well. The parent should be engaging and display a positive demeanor when working with the child. Even the beginning sessions, in which the child is allowed to engage in his own activities, should include the parent; the parent should talk with the child and show interest in the child's interests.

Novel situations are frequently difficult for children with autism spectrum disorders (Filipek et al., 1999). Because of this, building rapport with the child outside of a typical activity, and particularly a difficult activity, is crucial. Similarly, it is important that the child's most recent interaction with the parent be positive before attempting to engage in any kind of teaching sessions. If the child has recently been scolded or has had an unpleasant experience with the parent, it will likely be difficult for the parent to motivate the child to engage in something that is not a preferred activity. The parent should plan ahead for sessions and spend some positive time with the child to avoid a child having a negative reaction when in the teaching environment.

Next, the mands that are taught need to be based upon items that are highly reinforcing for the child. Because a mand is a request, it is imperative that the mands being taught correspond with items or activities that the child enjoys. A child will not consistently request an item he does not want. Therefore, it is important to analyze what items the child frequently requests by other means (e.g., by reaching for an item or by leading an adult to it). Making a written list of toys or items with which the child frequently engages or edibles that the child consumes can aid in determining which items will be most successful as mand reinforcers (Barbera, 2007). It is also important to consider which preferred items are readily accessible to the parent. A child may consistently enjoy making a trip to a local restaurant. However, teaching the name of the restaurant as an initial mand will prove difficult, because making repeated trips to the restaurant during a session is impractical. Similarly, if one of the first mands being taught is a food item that requires preparation, it may be difficult to ensure that the food is available at all times. Since mands should be reinforced immediately with children who are beginning to mand, it is important to have items available at all times.

After making a list of the items that the child will find reinforcing, parents should also list what words, if any, the child already has in his repertoire (Barbera, 2007). By making a list of the child's preferred items, both edible and non-edible, and any words the child says, parents can determine if any items on the list overlap with intelligible words. For example, if the child has been observed to tact "bubbles" in a movie or repeat the word "bubbles" in an echolalic fashion, and the child also enjoys playing with bubbles, this is likely a mand that the child will quickly acquire. If the child does not tact items but makes word approximations or sounds, these approximations can be reinforced and shaped into functional words (Stark et al., 1968).

According to Barbera (2007), most children who are beginning to acquire a manding repertoire should be taught three to five mands at the start of teaching. Teaching several mands will avoid over-generalization of a mand. If a child is only taught to say one word as a means of requesting an item, it is possible that he will over-generalize that word and believe that it is a method of manding for any item he desires. Barbera (2007) also suggests using several food items as well as several toys or activities as beginning mands. This will avoid any over-generalization with believing, for example, that times when food is being presented are the only times to attend to mand teaching.

Jennett, Harris, and Delmolino (2008) utilized two concurrent multiple-probe designs across participants when determining the different effects of mand training and discrete trial instruction (DTI) in increasing independent mands in children. Six children with autism, each with varying degrees of verbal fluency, were put into two separate groups. One group received a series of mand training sessions followed by discrete trial instruction while the other group received DTI prior to mand training. The experimenters determined 24 items that were considered reinforcers for children; each of the items was part of a functional pair (e.g., a mitt

and a softball). The items were separated into two groups, Set A and Set B, where Set A would be the first of a pair (e.g., the mitt) and Set B would be its companion (e.g., the softball).

Different sets were targeted based upon the type of training being administered.

In this experiment, sessions were 20 minutes in length and occurred no more than twice daily; each session took place in a clinical room. One-to-one instruction was used in both the mand training and the DTI sessions. The mand training procedure first consisted of a baseline in which the child was allowed access to any of the items of one set (i.e., Set A) and the items from the other set were placed out of reach in an opaque container. When the participant approached an item in the room and requested it in some means, the instructor showed the child the item from the complementary set, played with the items together for a few seconds, and then handed the first item back to the child. The experimenter then held up the item from Set B without prompting for five seconds. If the participant made a correct response (as determined by his or her own criteria), he or she was given the item and allowed to have access to it for up to 30 seconds. If, after five seconds, the child did not make a correct response, the experimenter gave the item to the child; however, this was marked as an incorrect response. The training phase of the mand training sessions were identical to the baseline except that in these sessions the experimenter kept the target item and modeled the response for the child. The child's successive approximations of the target response were reinforced with 30-second access to the item as well as with social praise. The appropriate response was again modeled for the child if he or she did not provide an acceptable approximation of the target response. The experimenter continued to deliver prompts every five to 10 seconds until the participant lost interest in the item. Once the participant had given the target response twice in a session the following trials' prompts were faded.

In the discrete trial instruction procedure, the baseline consisted of a pre-determined order of presentation of items; the non-target items were given to the participant and the target items were kept with the instructor. The instructor and participant sat at a table together during sessions and the instructor presented each item from the target list in turn incorporating a behavioral momentum procedure of two simple tasks prior to each novel task. During the 20-minute session, the instructor presented each item on the list for one trial and subsequently moved to the next item on the list. Training sessions involved the use of prompt delays; after the participant was able to meet an 80% correct criterion, the delay of the prompt was increased to two seconds. A five-second prompt delay and, subsequently, a removal of the prompt was utilized after the 80% correct criterion had again been met. If a child made an error, a correction procedure was utilized and the response was prompted immediately. During these sessions, manding for the target items was considered mastered if the child was able to respond appropriately 80% of trials across two consecutive sessions. Manding itself was considered mastered when the participants had met this criterion for ten of the target item pairs.

The results showed that out of the six participants, five were able to mand for items more independently in the mand training condition. Further, these participants were able to master the skills taught faster in the mand training condition than in the DTI condition. The mand training condition results also showed that participants made better eye contact and had less inappropriate behavior in the mand training condition. Therefore, Jennett and colleagues (2008) determined that the mand training condition was more effective in teaching the participants to request items independently.

Tacts

Tacting is defined as a verbal operant that consists of a speaker identifying items and behaviors with which he has come into contact (Skinner, 1957). Tacting is simply labeling what is experienced in one's environment. To tact is to comment on what is seen as well as experienced by any of the other senses. A "pure" tact is not elicited by another person's question; rather, it is a statement that is evoked by a sensory experience (Egan & Barnes-Holmes, 2009). Given that children who do not have tacting repertoires must be taught to tact items, tacts that are targeted will need to be prompted. Asking a child, "what is this?" is a prompt that is frequently used. This allows the child to understand that he is expected to label an item. When labeling is followed by reinforcement and that reinforcement is faded, the child will begin to label items independently (Barbera, 2007).

Barbera (2007) suggests that mastered mands be used to teach tacting. For example, if a child is able to correctly mand for a ball he should be able to tact a ball if properly trained to do so. Having a preferred item available may create motivation in a child and therefore cause him to mand for the item. Therefore, using pictures of items will decrease the motivation for the actual item and increase the understanding that the item is not available for use or consumption.

Before teaching tacting, it is important to probe tacting with many items to determine if the child already possesses any tacts. Parents should have a data sheet with a list of items on it. Pictures of various items should be shown to the child; if the child tacts the item independently, it should be noted on the data sheet. Many children will not offer tacts during the first probe session because they will not know what is expected of them. If this is the case, parents can prompt the child by asking for the name of the item in the picture. While showing the child a picture of an item, the parent should ask, "what is it?" If the child names the item, it can be noted

as a correct answer. Prompt delays can be used in this instance to fade out the necessity of asking for the name of the item. If a child cannot correctly respond to “what is it?” the parent will have to train the child to tact the item. There are several methods of teaching tacting. One such method is to transfer from a receptive task to a tact. The parent should have pictures of the items or the items themselves and ask the child to “touch [item].” The parent should then ask the child, “what is it?” The child should then state the name of the item. At this point, the child receives reinforcement for his answer. It is also possible to use a match-to-sample procedure to train tacting. A parent should have pictures of three different items laid out. The parent should then give the picture to the child and say, “[name of item].” The child then matches the picture of the item to the identical picture on the table. The parent takes the top picture, says, “what is it?” and the child repeats the name of the item. A third method of teaching tacts is to transfer mands to tacts (Egan & Barnes-Holmes, 2009). The child mands for the item he wants; the parent then holds up the picture of the item and says, “what is it? [item].” Afterwards, the child should echo the name of the item. The parent then praises the child and asks, “what is it?” again. After the child repeats the name again, he receives the actual item as reinforcement (Barbera, 2007).

Echoic Responding

Echoic responding is defined as a verbal operant in which another person’s verbal behavior is reiterated by the speaker (Skinner, 1957). There are several methods of teaching echoic skills. If a child does not spontaneously echo words, then it is possible to begin teaching the echoic response by starting with mands that the child has already acquired (Barbera, 2007). If necessary, the echoic targets can be broken into smaller parts and chained together (e.g., “mo” and “vie” for “movie”; Tarbox, Madrid, Aguilar, Jacobo, & Schiff, 2009). Drash, High, and Tudor (1999) taught echoic responding to children with autism in this manner. After the children

had successfully acquired a manding repertoire the mands that occurred with the greatest frequency were used to establish the echoic repertoire. The experimenters echoed the children's verbalizations and prompted them to repeat the experimenter's word before receiving access to a reinforcer. Because of this, children quickly learned to echo the experimenter's words in order to receive access to the reinforcer. By using a reinforcing stimulus and repeating the name associated with the item, the child can learn to respond to the parent's words by repeating them (Barbera, 2007). For example, if a child's toy car is a reinforcer, then the parent can model use of the car and can say, "car" several times. The parent can then remove the car and wait for the child to say, "car." If the child does not say "car" then the parent can continue this process. This is very similar to the method in which mands are taught. The child will learn that reinforcement will be available upon echoing the parent's words. Naturalistic teaching procedures can be effective when using this method; the child will be provided with the item when he provides a correct response. Unlike mands, which are spontaneous, the child will repeat the words of the caregiver.

The second method of teaching echoic responses is by using items or pictures of items that are not considered reinforcers. This method should be taught if the child has previously been observed to echo words. A picture should be presented to the child and the parent should say the word (e.g., "table") and wait for the child to repeat the word. The parent should then turn the card over, repeat the word, and wait for the child to say the word again (Barbera, 2007). This method of echoic training is more similar to the method of teaching tacts. Because of the way that this method is used, it is recommended that parents use either discrete trial training or time-delay procedures to prompt the child to echo the response; since the items used are not reinforcers, the items will not be provided to the child upon the appropriate response. Other

sources of reinforcement (e.g., attention or other tangibles) should be provided when utilizing this method. Drash and colleagues (1999) used this procedure to expand the echoic repertoire that the children acquired during the mand-based intervention. After the child had made progress in echoing several words, novel items were introduced. Items and pictures of items were used during this procedure; if the child did not respond to a modified prompt (i.e., “say [item]”) then the child was shown a reinforcing item. The item was provided as a reinforcer when the child echoed the name of the previously presented picture.

Intraverbal Responding

By using previously mastered verbal operants such as mands, tacts, and echoics, parents and teachers can next facilitate acquisition of intraverbal responding. An intraverbal is a unit in which a speaker responds to the verbal behavior of another speaker (Skinner, 1957); unlike the echoic operant, this is not a repeated word or phrase. Instead, an intraverbal is a differential response without point-to-point correspondence (Sundberg, 2007). Intraverbals are used during daily conversation; they are brought on by previous statements. Like an echoic response, an intraverbal response is preceded by a verbal stimulus (Skinner, 1957). The most common method of teaching intraverbal skills is by using familiar songs or sayings with a child. Barbera (2007) suggests prompting the child to finish the last word in a line of a song with which he hears frequently and enjoys. The parent or teacher can originally fill in the word and should emphasize the word strongly. Then the parent should repeat the line and use a prompt delay to encourage the child to fill in the word. If he does not respond, the parent can repeat the trial and use a slightly faded verbal prompt (e.g., instead of “cat,” the parent might say, “c...”). If the child does not answer when presented with the verbal prompt or a time delay, Barbera (2007) suggests using a picture of the item as a visual prompt. The parent should have only a few targets in each

song when beginning to teach this skill; as the child becomes more successful, more songs should be introduced, each with only several targets. Once the child has been mastered several words in a few songs, backward chaining can be used to include more words into the phrase.

After the child has mastered filling in phrases in songs, the next target should be to have the child answer intraverbals related to features, functions, and classes of items for which the child already has tacts; further, these should be tacts that the child has mastered (Barbera, 2007). If a child is taught to fill in a phrase about the function of an item that he cannot tact, he will not have meaningful communication and the intraverbal word will not generalize to the item when he sees it. Therefore, if the child can tact “ball,” a starting phrase might be, “You bounce a...” and the child should be prompted to say, “ball.” Barbera (2007) also notes that nouns should be used when beginning this part of intraverbal acquisition; if the child is unable to fill in the phrase, a picture can be used to prompt the correct answer. Once the child is successfully completing feature, function, and class intraverbals then questions beginning with “what,” “where,” and “who,” can be introduced. The child can then fill in the phrase (e.g., “You bounce a...ball”) and answer the question, (e.g., “What do you bounce?” “Ball.”). Goldsmith, LeBlanc, & Sautter (2007) taught children to respond to questions about functions and classes in four categories of items. The experimenters placed five picture cards for each class (e.g., clothing) in front of the child and presented a verbal stimulus (e.g., “What are some types of clothing?”). The child was immediately prompted using an errorless learning procedure and a tact prompt (e.g., “say ‘shirt’”). After five trials the experimenters no longer used the tacting prompt; instead, a three-second time delay procedure was instated. If the child provided at least one independent answer the time delay procedure was used throughout the remaining trials; if the child was unable to answer any of the questions independently the experimenters reverted to the errorless

learning procedure. This method was used until the child was able to independently respond to all of the intraverbals for the set and then for the remaining categories. After the child was able to provide at least one correct intraverbal for three consecutive trials, differential reinforcement was provided for independent responding. Once the child was capable of providing four independent responses, schedule thinning was initiated to allow for maintenance. When follow-up sessions were conducted, it was noted that the children had difficulty maintaining the intraverbal responses; further, generalization was limited. Because of the contrived environments in which these sessions occurred, it is possible that the lack of generalization was due to the effects of a discrete trial training protocol, which is less likely to promote generalization (Anderson and Romanczyk, 1999).

Additionally, Ingvarsson and Hollobaugh (2010) taught children to mand for answers to intraverbals by saying, “I don’t know, please tell me.” Questions related to academics, personal information, and knowledge of routine activities were targeted during this procedure. The researchers conducted a 56-question pretest in these areas; if the children answered the questions correctly 100% of the time, the question was marked “known” and if the children answered the question incorrectly 100% of the time or failed to provide an answer, the question was marked as “unknown.” If a child answered a question correctly on some trials and incorrectly during other trials the question was not used. Questions marked as “known” and “unknown” were used during the baseline. If a child answered questions incorrectly no response was given and the next question was presented. If the child answered correctly he was provided with descriptive praise. During the first training phase (“I don’t know, please tell me”; IDKTP), the experimenter provided echoic prompts to teach the children to use the IDKPTM response. After the participants repeated the IDKPTM phrase the experimenter provided the correct answer. The

child was then prompted to repeat the correct answer if he did not independently provide it. Following two consecutive trials with appropriately repeated IDKPTM responses, the experimenters used a five-second time delay procedure between asking the question and providing the prompt. If the child used the IDKPTM response during the time delay the experimenter prompted the rest of the chain (i.e., the correct answer portion). Generalization of the IDKPTM response was tested using questions that had not been targeted during the intervention; further, probes were conducted in settings and with people not present during the previous phases. The results showed that all of the participants were able to acquire the IDKPTM phrase in response to the target questions; three of the four children acquired this skill and generalized it to other questions.

Parent Training Methodology

Based upon previous research, it is suggested that the operants of verbal behavior be taught sequentially, starting with mands. Tacts, echoic responding, and intraverbals should be taught when the prerequisite skills are present (Figure 1). However, the requisite skills of parents who teach their children to communicate must be acquired prior to training the child. Therefore, the following setup of a parent training protocol is suggested.

First, the practitioner should provide parents with the information necessary to begin an in-home program with the child. This should include several components, including working with the parents to determine a child's current level of expressive language, information regarding the various facets of verbal behavior (i.e., mands, tacts, etc.), and basic information as to how to implement the procedures. This can be done in either a group or individual setting; group settings can provide parents and caregivers the opportunity to learn from each other's questions; further, they are more cost-efficient and require less time of the practitioner

(Brookman-Frazee, Vismara, Drahota, Stahmer, & Openden, 2009). However, individual settings can allow a parent with time constraints the ability to learn at his own pace and allow for flexibility in the teaching location (2009).

After the basic information has been provided, role playing should take place between caregivers; this can be done with parents, other family members, or individuals who have key interactions with the child in his environment. The practitioner should be available to coach the caregivers through these sessions and should present potential situations that are likely to arise during training sessions with the child such as aberrant behavior or a child having low motivation to participate.

Next, the practitioner should demonstrate the techniques to be used with the child. Strategies and information regarding each step should be provided both at the beginning of parent training as well as during the transition steps of the child's learning. Skill practice and demonstrations should be completed in the home to adhere to the research that suggests a child should be provided education in the least restrictive environment possible; this will also allow the child to become acquainted with sessions as well as allow the practitioner to demonstrate how to manage any problems that arise. During the initial training, the practitioner should begin with the child's current level of functioning. After the child has mastered the skills necessary to communicate on that level of functioning (e.g., tacting) the skills necessary to teach the child to communicate on the next level of functioning should be provided to the parents. After the practitioner has demonstrated these skills the parent should be coached through sessions and given feedback as to the degree to which he adheres to the protocol provided. Eventually the parent should conduct sessions independently and the practitioner should provide feedback at the end of the session. Parents should be encouraged to conduct sessions during the times that the

practitioner is not available and they should be taught to keep data on the child's progress as well as write down any questions or concerns that may arise.

Once the parent is completing sessions independently the practitioner should be available for questions and to help address any issues that arise but parents should conduct the sessions with the child independently. Practitioners should then check in with the parents throughout the course of the child's training; if progress is not being made, the practitioner can help the parent determine what course of action should be taken. Further, practitioners should be prepared to meet with the families when the transition from one verbal operant to the next is appropriate.

Discussion

Previous research on the use of parent teaching in order for children with autism to acquire skills has shown that this method is effective, time-efficient, and less costly than other interventions (Sallows & Graupner, 2005). By teaching parents to work with their children, practitioners can ensure that children are being taught in the least restrictive environment; that is, the environment in which they live, learn, and play, as well as the environment in which their non-disabled peers are present (McGivern & Marquart, 2000). Using a parent training protocol for teaching verbal behavior also provides parents to be effective teachers in helping their children acquire communication skills, which increase independence and decreases inappropriate behavior in children with autism (Sundberg & Michael, 2001). The research shows that by applying Skinner's (1957) work to a training protocol, children can acquire communication skills. It is recommended that both discrete trial teaching and naturalistic procedures be used when teaching children with autism to communicate; this can allow for rapid acquisition of skills (Anderson & Romanczyk, 1999) when necessary while promoting generalization and allowing the child to exhibit some control over the environment (Sundberg & Michael, 2001), which in

turn will lead to a more successful intervention. Further, the independence gained by the child will allow him to lead a more productive, fulfilling life; he will be less likely to rely on others as an adult for help in daily skills and will therefore live in a less restricted environment as an adult.

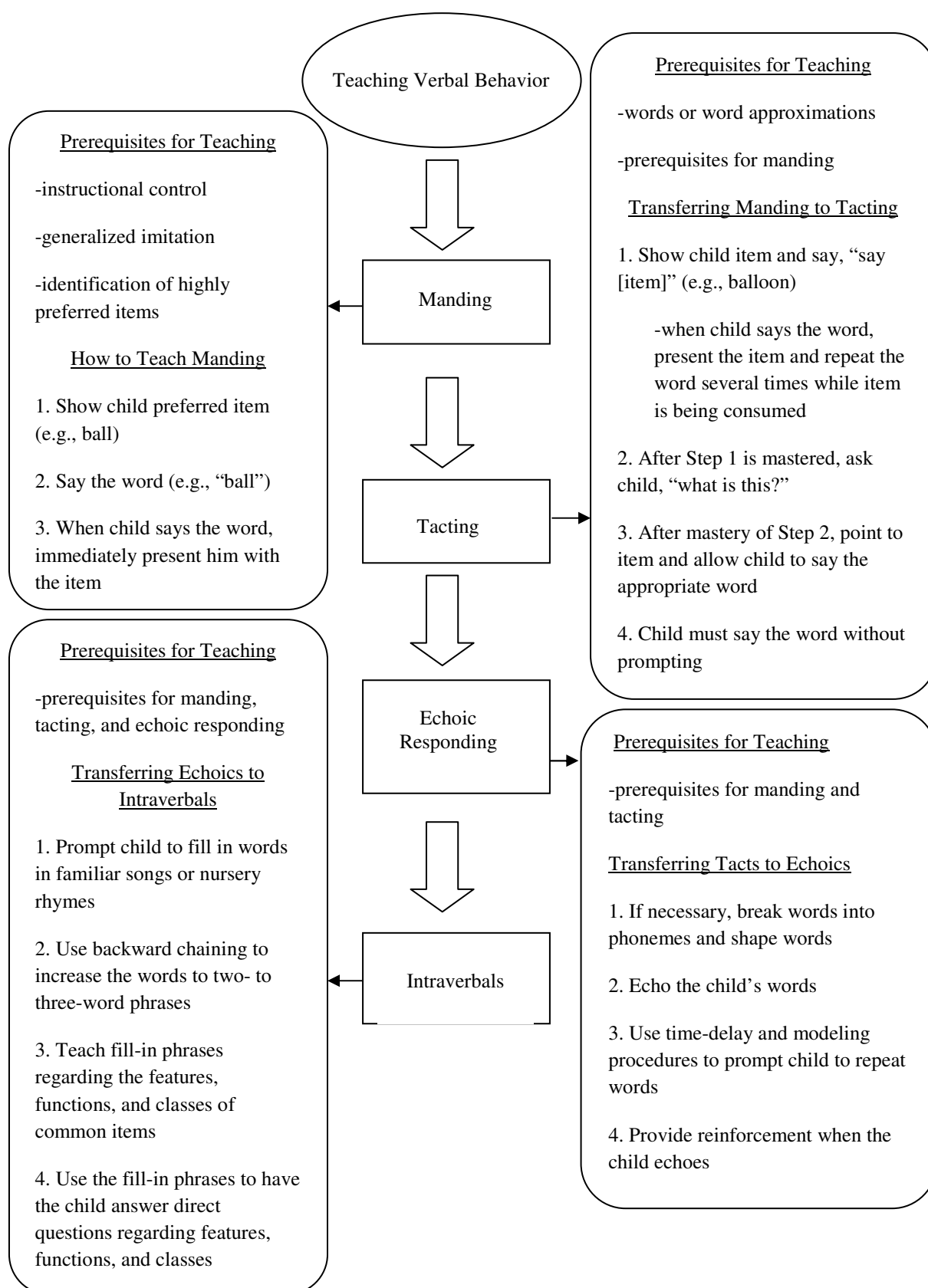


Figure 1. Flowchart depicting progression of teaching verbal operants.

REFERENCES

- Allen, K.D. & Cowan, R.J. (2008). Naturalistic teaching procedures. In J.K. Luiselli, D.C. Russo, W.P. Christian, & S.M. Wilczynski (Eds.), *Effective practices for children with autism: Educational and behavioral support interventions that work* (pp. 213-240). New York: Oxford University Press.
- Anderson, S.R. & Romanczyk, R.G. (1999). Early intervention for young children with autism: Continuum-based behavioral models. *Journal of the Association of Persons with Severe Handicaps*, 24(3), 162-173.
- Barbera, M. L. & Rasmussen, T. (2007). *The Verbal Behavior Approach: How to Teach Children with Autism and Related Disorders*. London: Jessica Kingsley Publishers.
- Brookman-Frazee, L., Vismara, L., Drahota, A., Stahmer, A., & Openden, D. (2009). Parent training interventions for children with autism spectrum disorders. In J.L. Matson (Ed.), *Applied behavior analysis for children with autism spectrum disorders* (pp. 237-257). New York: Springer Science + Business Media.
- Coolican, J., Smith, I.M., & Bryson, S.E. (2010). Brief parent training in pivotal response treatment for preschoolers with autism. *Journal of Child Psychology and Psychiatry*, 51(12), 1321-1330. doi:10.1111/j.1469-7610.2010.02326.x
- Crockett, J.L, Fleming, R.K., Doepke, K.J., & Stevens, J.S. (2007). Parent training: Acquisition and generalization of discrete trials teaching skills with parents of children with autism. *Research in Developmental Disabilities*, 28, 23-36. doi: 10.1016/j.ridd.2005.10.003
- Devlin, S.D. & Harber, M.M. (2004). Collaboration among parents and professionals with discrete trial training in the treatment for autism. *Education and Training in Developmental Disabilities*, 39(4), 291-300.

- Drash, P.W., High, R.L., & Tudor, R.M. (1999). Using mand training to establish an echoic repertoire in young children with autism. *The Analysis of Verbal Behavior*, 16, 29-44.
- Egan, C.E. & Barnes-Holmes, D.B. (2009). Emergence of tacts following mand training in young children with autism. *Journal of Applied Behavior Analysis*, 42(3), 691-696. doi: 10.1901/jaba.2009.42.691
- Filipek, P.A., Accardo, P.J., Baranek, G.T., Cook, E.H., Dawson, G., Gordon, B., Gravel, J.S., Johnson, C.P., Kallen, R.J., Levy, S.E., Minshew, N.J., Prizant, B.M., Rapin, I., Rogers, S.J., Stone, W.L., Teplin, S., Tuchman, R.F., & Volkmar, F.R. (1999). The screening and diagnosis of autistic spectrum disorders. *Journal of Autism and Developmental Disorders*, 29(6), 439-484.
- Frea, W.D. & McNerney, E.K. (2008). Early intensive applied behavior analysis intervention for autism. In J.K. Luiselli, D.C. Russo, W.P. Christian, & S.M. Wilczynski (Eds.), *Effective practices for children with autism: Educational and behavioral support interventions that work* (pp. 83-110). New York: Oxford University Press.
- Goldsmith, T.R., LeBlanc, L.A., & Sautter, R.A. (2007). Teaching intraverbal behavior to children with autism. *Research in Autism Spectrum Disorders*, 1, 1-13. doi: 10.1016/j.rasd.2006.07.001
- Ingvarsson, E.T. & Hollobaugh, T. (2010). Acquisition of intraverbal behavior: Teaching children with autism to mand for answers to questions. *Journal of Applied Behavior Analysis*, 43(1), 1-17.
- Jennett, H.K., Harris, S.L., & Delmolino, L. (2008). Discrete trial instruction vs. mand training for teaching children with autism to make requests. *The Analysis of Verbal Behavior*, 24, 69-85.

- Kaiser, A.P., Hancock, T.B., & Nietfeld, J.P. (2000). The effects of parent-implemented enhanced milieu teaching on the social communication of children who have autism. *Early Education and Development, 11*(4), 423-446. 10.1207/s15566935eed1104_4y
- Kroeger, K. & Sorensen, R. (2010). A parent training model for toilet training children with autism. *Journal of Intellectual Disability Research, 54*(6), 556-567. doi: 10.1111/j.1365-2788.2010.01286.x
- Lovaas, O.I., Koegel, R., Simmons, J.Q., & Long, J.S. (1973). Some generalization and follow-up measures on autistic children in behavior therapy. *Journal of Applied Behavior Analysis, 6*, 131-166.
- Lovaas, O.I. & Smith, T. (1988). Intensive behavioral treatment for young autistic children. In B.B. Lahey & A.E. Kazdin (Eds.), *Advances in clinical child psychology* (Vol. II, pp. 285-323). New York: Plenum.
- McGivern, J.E. & Marquart, A.M. (2000). Legal and ethical issues in child and adolescent assessment. In E.S. Shapiro & T.R. Kratochwill (Eds.), *Behavioral assessment in schools* (pp. 387-434). New York: The Guilford Press.
- Skinner, B.F. (1957). *Verbal Behavior*. New York: Appleton-Century-Crofts.
- Stark, J., Giddan, J.J., & Meisel, J. (1968). Increasing verbal behavior in an autistic child. *Journal of Speech and Hearing Research, 33*(1), 42-48.
- Sundberg, M.L. (2007). Verbal behavior. In J.O. Cooper, T.E. Heron, & W.L. Heward (Eds.), *Applied behavior analysis* (pp. 526-547). Upper Saddle River, New Jersey: Person Education, Inc.

- Sundberg, M.L. & Michael, J. (2001) The benefits of Skinner's analysis of verbal behavior for children with autism. *Behavior Modification*, 25, 698-724. doi: 10.1177/0145445501255003
- Tarbox, J., Madrid, W., Aguilar, B., Jacobo, W., & Schiff, A. (2009). Use of chaining to increase complexity of echoics in children with autism. *Journal of Applied Behavior Analysis*, 42(4), 901-906.
- Tarbox., R.S. & Najdowski, A.C. (2008). Discrete trial training as a teaching paradigm. In J.K. Luiselli, D.C. Russo, W.P. Christian, & S.M. Wilczynski (Eds.), *Effective practices for children with autism: Educational and behavioral support interventions that work* (pp. 181-194). New York: Oxford University Press.
- The National Autistic Society. (2010). *Housing options*. Retrieved from <http://www.autism.org.uk/en-gb/living-with-autism/benefits-and-community-care/care-and-benefits-for-adults-with-an-asd/housing-options.aspx>
- Weiss, M.J. (2005). Comprehensive ABA programs: Integrating and evaluating the implementation of varied instructional approaches. *The Behavior Analyst Today*, 6(4), 214-221.
- U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2002). *Prevalence of the autism spectrum disorders (ASDs) in multiple areas of the United States, 2000 and 2002: Community report from the Autism and Developmental Disabilities Monitoring (ADDM) Network*. Retrieved from <http://www.cdc.gov/mmwr>
- U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center on Birth Defects and Developmental Disabilities. (2012). *Autism*

Spectrum Disorders (ASDs). Retrieved from
<http://www.cdc.gov/ncbddd/autism/data.html>

VITA

Graduate School
Southern Illinois University

Amanda L. Moretto

moretto.amanda@gmail.com

Southern Illinois University Edwardsville
Bachelor of Arts, Psychology, December 2009

Research Paper Title:

A Suggested Methodology for the Application of Parent Training in Teaching Verbal
Behavior to Children with Autism

Major Professor: Dr. Ruth Anne Rehfeldt