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Intervention Procedures to Encourage Verbal Language in Children with Autism

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Children with autism spectrum disorder (ASD) may exhibit repetitive behaviors, selective interests, and deficits in communication skills. These children fall within a broad range and present with at least two characteristics within each of the areas of deficits listed. Deficits in social interactions and communication impairments are observable by two years of age (Haynes & Pindzola, 2008).Approximately 25-61% of these children have little or no functional speech (Schlosser & Wendt, 2008). It is necessary to address these speech behaviors immediately in order to determine the need for intervention.

Current research suggests that ASD can be reliably diagnosed at 24 months (Owens, 2010). Approximately 20% of parents report their child's development as typical prior to 24 months (Owens, 2010). Parents often describe their child's skill level as declining or plateauing around two years of age. This description is compatible with research that shows an unusual slowing in performance between 14 and 24 months in children with ASD (Landa & Garrett-Mayer, 2006).

It is extremely important to implement intervention procedures to encourage verbal language children with ASD at the earliest age possible. It is believed that children who speak by the age of six have the best outcome (Kasari, Paparella, Freeman, Jahromi, 2008). Unfortunately as many as 25-50% of children with ASD will not have developed language by the time they are 10-13 years old (Kasari et al., 2008). These statistics highlight a growing concern for parents and professionals regarding the need for early intervention emphasizing language development in children with ASD (Kasari et al., 2008).

According to the American Speech-Language-Hearing Association (ASHA), speech-language pathologists (SLPs) have a significant role in providing service and support to families and children with disabilities. As professionals, speech-language pathologists need to be included in early intervention for children who are at risk for or have communication, language, or speech impairments like those commonly found in children with ASD (ASHA, 2008). The development of communication skills begins at birth and the efficacy of such communication is fundamental to all aspects of human functioning. Therefore, it is the role and responsibility of SLPs to provide supportive care to these families and children in various forms. When working with children with ASD it is crucial that the SLP is knowledgeable of a variety of intervention procedures in order to effectively work with these children. This is important to ensure that each child receives the necessary treatment based on their individual needs, focusing on the child's best interests and following evidence-based practices supported by current research. The following is a literature review of current research concerning intervention procedures to encourage verbal language in children with autism intended to provide information to professionals within related fields.

Models to Promote Verbal Language

There are a variety of procedures to encourage verbal language for children with autism. These procedures can be divided into three broad categories based on the intervention models that are implemented. These categories include: naturalistic, behavioral, and augmentative alternative communication. The naturalistic model supports the idea that children acquire

language through interactions within a variety of environments with a variety of individuals (Delprato, 2001). This approach places particular importance on using a conversational framework and including caregivers in the intervention process. The naturalistic model strives to address functional communication which can often be achieved through play based and ritualistic activities that are a part of the child's daily routine (Delprato, 2001). The clinician's ability to build rapport with the child is extremely significant in order to be successful in therapy. Within the naturalistic model, the clinician has less control. This intervention approach is often child-led (Delprato, 2001). The clinician completes trials using items known to interest the child. A naturalistic model is appropriate for young children because the setting is relaxed and relatable to the child's environment on a daily basis (Delprato, 2001). Naturalistic settings are advantageous because the clinician may observe how the child behaves during their typical routines. A natural setting is also beneficial to the accuracy of data collected during this time; however, the setting may also make it difficult to gain cooperation due to a variety of distracters and lack of structure (Delprato, 2001).

The second category includes a behaviorally based intervention model. This model is based on the idea that language is a learned behavior. The function of behavior is observed by focusing on the child's environment and discovering ways to manipulate the environment to encourage verbal language (Holding, Bray, & Kehle, 2011). This environment is often structured and controlled by the clinician. Stimulus, reinforcement and prompting are used within this model to elicit desired responses. The behavioral model incorporates

applied behavioral analysis (ABA) techniques to work with children with disabilities and to teach behavior in small measureable units (Holding et al., 2011). ABA may also be used in naturalistic settings. In any environment, ABA is focused on intervention strategies that increase socially appropriate behaviors while decreasing inappropriate behaviors exhibited by the child. ABA has been shown to be successful when used with children with disabilities (Holding et al., 2011).

The third category includes augmentative and alternative communication (AAC). Children with ASD often have little or no functional speech; as a result, these children are usually good candidates for AAC approaches to supplement natural speech. There are aided and unaided AAC approaches. Aided approaches include symbols, non-electronic communication boards, speech generating devices, and exchange-based approaches, such as the Picture Exchange Communication System (PECS). Unaided approaches may include gestures, American Sign Language (ASL), and finger spelling (Schlosser & Wendt, p. 212, 2008).

Pre-language Skills

There are a variety of skills that need to be present before verbal language can be expected. Intervention procedures to encourage verbal language are concerned with shaping these skills to increase the desired behaviors and promote communication. The child must be able to attend to task. SLPs view attention behaviorally. This behavior is defined as directing the child's

eye gaze toward the stimuli. Attention can be categorized into the following groups: orienting, sustaining, and shifting (Patten & Watson, 2010).

Orienting attention is the physical adjustment of the child towards the stimuli. This is an important skill to obtain, because it is also a socially appropriate behavior used during communication (Patten & Watson, 2010). Orientation is often an area of impairment for children with autism. This deficit interferes with intervention during speech and language therapy. If the stimulus used is not successful in gaining the child's attention, the desired skill cannot be effectively taught (Patten & Watson, 2010).

Sustaining attention refers to the stimulus ability to maintain the child's attention. Research has shown that children with autism tend to remain fixated on certain stimulus and ignore other stimuli more often than their typically developing peers; however, this behavior does not necessarily reflect the child's quality of processing (Patten & Watson, 2010).

The term shifting attention refers to the child's ability to disengage from one stimulus and become oriented to a new stimulus (Patten & Watson, 2010). The child must also have a desire and means to communicate as well as a communication partner. Children typically learn the importance of communication through requesting. Communication attempts need to be encouraged. Family members and peers can encourage children by listening and responding to the child's attempts.

Joint Attention

Research has shown that joint attention ability is associated with language development (Kasari et al., 2008). Joint attention is often an accurate predictor of later developing language (Kasari et al., 2008). The ability to share focus of attention with peers is a skill that is directly related to social communication, and thus language (Kasari et al., 2008). Joint attention is a necessary component of many intervention procedures.

Kasari and colleagues (2008) hypothesized that positive changes in joint attention would result in positive changes in language development in children with autism one year after intervention. This study included 58 preschool children between the ages of three and four years. The study intended to examine predictors of language growth following treatment. The participants were attending an ABA based early intervention program for 30 hours per week in conjunction with the study (Kasari et al., 2008). Intervention for children in the treatment group included ABA as well as a developmental approach. Discrete Trial Training (DTT) was used at the beginning of the session and followed by a child-led approach that included developmental principles of the Milieu Model. Results of this study found children who received joint attention intervention showed a greater language growth within the following year than the children in the control group (Kasari, et al., 2008).

Imitation/ Echoics

In addition to joint attention skills, object and gesture imitation have been used as an intervention procedure to encourage verbal language for children with autism. According to a study performed by Ingersoll and Lalonde (2010),

imitation skills have a foundational role in the development of more complex communication skills, such as verbal language. These authors suggest that imitation skills are associated with language development in typical developing children as well as children with ASD. Imitation skills emerge early in a typically developing child. A child with ASD must develop imitation in order to develop more advanced communication skills. The clinician can begin targeting the child's expressive language deficits and encouraging verbal language once imitation and receptive language skills emerge.

Echoics are a critical target for language intervention with children with ASD. An echoic is a verbal operant commonly referred to as vocal imitation (Tarbox, Madrid, Aguilar, Jacobo, & Schiff, 2009). Clinicians working with children with the ability to produce vocalizations can use vocal modeling as a prompting method in therapy sessions. In a recent study, a chaining procedure was used to increase the complexity of echoics in two children with autism (Tarbox et al., 2009). Results of this study provided evidence that chaining procedures can be effective for increasing the length and complexity of echoics in these children.

Caregiver Interaction & Natural Environment

Research has shown a correlation between parent's child-directed verbal behavior and the frequency of the child's verbal behavior (Smith, Michael, & Sundberg, 1996). This research supports the idea that the child's environment is relevant to his/her language acquisition. The naturalistic model, discussed earlier, provides a familiar environment to encourage verbal language. One

study examined the use of automatic reinforcement and punishment in infant vocal behavior (Smith et al., 1996). The procedure consisted of pairing a specific phoneme with punishment or reinforcement that had been previously established (Smith et al., 1996). This study incorporated aspects of the naturalistic and behavioral models. The study was conducted in the child's home and paired vocal responses with reinforcement. Results were similar to previous research that shows automatic reinforcement and punishment play a significant role in a child's language acquisition; however, there were some differences. Positive pairing produced an increase in the child's vocal behavior on the majority of occasions; however it failed to produce an immediate emission when a novel vocal topography was paired with an established reinforcer during the post-pairing observation (Smith et al., 1996).

Naturalistic Intervention Procedures

Naturalistic therapy relies on spontaneously occurring events and utterances that take place during play, daily routines and/or instructional activities (Norris & Hoffman, 1990). There are a variety of intervention procedures within the naturalistic model such as: Reciprocal Imitation Training (RIT), Developmental Individual Difference Relationship-Based Model (DIR/Floor time), Early Start Denver Model (ESDM), the Enhanced Milieu Teaching Model (EMT). RIT uses naturalistic techniques to teach imitation skills during a play-based activity (Ingersoll & Lalonde, 2010). During RIT, the therapist promotes reciprocity by imitating the child's verbal and nonverbal behavior, describing the child's actions with simplified language and expanded on utterances made by the

child. The goal of RIT is to encourage the child to imitate most of the play partner's actions. This differs from other procedures within the naturalistic model, because multiple actions are targeted simultaneously based on the context of the child's play, instead of teaching specific imitation actions to criterion (Ingersoll & Lalonde, 2010). Research shows that using RIT to teach gestural and object imitation training simultaneously can create greater gains in language use in children with ASD than when object imitation is targeted alone (Ingersoll & Lalonde, 2010). The introduction of gesture imitation training may improve language beyond the use of imitation training alone. These findings may suggest that children with ASD are more likely to learn verbal imitation through gesture imitation training, although improvements in rate of language showed an overall change across both gesture and object sessions following the introduction of gesture training (Ingersoll & Lalonde, 2010). A recent study intended to examine the effects of RIT for object and gesture imitation on language behavior in four children with ASD between the ages of 35-41 months (Ingersoll & Lalonde, 2010). This study provides additional support for the efficacy of RIT at improving language use in children with ASD. The findings suggest that teaching gesture use to children with ASD using a naturalistic approach, such as RIT, may be an effective approach for improving the child's language skills. These results appear to benefit both verbal and nonverbal children with ASD (Ingersoll & Lalonde, 2010).

The Early Start Denver Model (ESDM) is a naturalistic intervention procedure heavily based on Pivotal Response Training (PRT) (Vismara &

Rogers, 2008). The purpose of ESDM is to determine what the child needs to work on as well as what the child likes. This may be done in a variety of ways, such as assessments, observation and parent report. The clinician then finds a way to embed objectives and interests in order to create a functional and child-led therapy session. This differs from RIT, because objectives are targeted individually to criterion. The curriculum for the ESDM includes language development within a social context (Vismara & Rogers, 2008). This approach is aimed at children with autism between the ages of 12 to 48 months (Rogers, Dawson, Munson, Smith, Winter & Greenson, 2009.). The ESDM, unlike other therapy approaches, is not tied to a specific delivery setting. It can be implemented by therapy teams, parents or in individual therapy sessions in a clinical setting or in the home (Rogers et al., 2009). The ESDM is believed to create more motivation, better generalization, more spontaneous responding, and less problem behavior than intervention procedures in the behavioral model (Vismara & Rogers, 2008). This approach is the only comprehensive early intervention model that has been validated in randomized clinical trials when used with children with autism at only 18 months of age (Rogers et al., 2009). The ESDM has been found to be effective for children with ASD with a wide range of abilities and learning styles. It has been shown to benefit children with significant learning challenges as well as those without such learning challenges (Rogers et al., 2009) Research has shown that children with ASD who received ESDM therapy for 20 hours a week make greater improvements in language

abilities and adaptive behavior than children who participated in other available therapies (Rogers et al., 2009).

The Developmental, Individual Difference, Relationship-Based Model is an intervention model that falls under the naturalistic approach, but incorporates delays and prompts that are common in ABA. DIR was designed based on the strengths and challenges of children with ASD and other developmental deficits (Greenspan & Wieder, 2007). DIR is a play-based therapy that should be used in conjunction with other therapy approaches in order to encourage verbal language. This procedure differs from the ESDM, because it is conducted primarily in the child's home due to its play-based nature; however, certified professionals initiate this model and train the child's caregivers (Greenspan & Wieder, 2007). The purpose of DIR is to create a healthy foundation for interactions. It is important to understand where the child is developmentally and consider the child's differences in order to establish a treatment plan. The clinician must build a relationship with the child and gain an understanding of the child's relationship with caregivers in order to be successful in therapy. DIR requires the clinician to observe and approach the child. The clinician follows the lead of the child and attempts to expand on the child's utterances and ideas during this time (Greenspan & Wieder, 2007). For example, if the child wants to line cars in a row, the parent or therapist may join in this game by moving or blocking one of the cars and asking where it's going. This intervention strategy is used by professionals in other disciplines as well as speech-language pathologists. The therapist may implement DIR while simultaneously providing

training to the caregiver by directing them during therapy sessions using this model. Many clinicians and caregivers are implementing this model because of its proven long-term effectiveness. A 10-15 year follow-up study of children who had participated in this model showed that "some children with ASD can master the core deficits and reach levels of development formerly thought unattainable with a family-oriented approach that focuses on the building blocks of relating, communicating, and thinking" (Greenspan & Wieder, p. 39, 2005). Additional research shows support of this model as a treatment, but suggests there is a lack of proven relationships between the child's progress and a specific intervention method (Greenspan & Wieder, 2005).

Enhanced Milieu Teaching is considered to be a bridge between ABA and a naturalistic approach. EMT has been shown to increase communication skills in children with language delays, including those with autism (Olive, Davis, & O'Reilly, & Dickson, 2007). This model has been effectively used with children with ASD; however, children with the following abilities reflect more initial success: verbally imitative, have at least 10 words, and have a mean length utterance of 1.0-3.5. The goal of Milieu is to increase language and communication skills. This goal is achieved by making modifications to the environment, choosing appropriate language skills, and responding to the child's appropriate vocalizations (Olive et al., 2007). EMT includes incidental teaching as a key component. Incidental teaching involves taking advantage of naturally occurring situations to promote learning opportunities for the child; however, there are core differences between the two. For instance, EMT is more closely

related to the naturalistic model whereas incidental teaching is often related to applied behavioral analysis because it incorporates behavioral techniques in day-to-day experiences and interactions. EMT also follows the lead of the child and does not require as rigorous of data collection when compared to incidental teaching (Olive et al., 2007).

The efficacy of EMT was examined in a research study including six preschool children with significant language delays (Kaiser & Hester, 1994). Trainers implemented EMT during play-based interactions in the children's classrooms. The children showed an increase in their use of targeted language skills during these sessions (Kaiser & Hester, 1994). This increase was maintained when the treatment was discontinued. These changes were examined with untrained teachers, peers and parents. In all cases, some generalization was observed for all children (Kaiser & Hester, 1994). EMT approaches have been shown to be associated with increased ability to initiate communication in young children (Gilbert, 2008). A recent study of EMT included 39 prelinguistic toddlers. This study intended to test the effect of EMT on children's communication and productive language development (Yoder & Warren, 2002). Communication and language skills were assessed at the beginning of the study and every three months for a year. Results varied from pretreatment to post treatment on child-initiated comments and requests, and growth of productive language (Yoder & Warren, 2002). Modifications to EMT were suggested to determine which nonspeaking children are appropriate for treatment using this method.

Behavioral Intervention Procedures

The goal of applied behavior analysis (ABA) is to improve socially important behaviors by using interventions based on the principles of the learning theory (Holding et al., 2011). ABA methods aim to support individuals with ASD in many ways, including: increasing behaviors to teach new skills, maintaining behaviors, transferring behaviors to a variety of situations with varying appropriate responses, modifying the environment to promote learning and decreasing interference, as well as reducing interfering behaviors within the child (Holding et al., 2011). Discrete Trial Training (DTT), and Prompts for Restructuring Oral Muscular Phonetic Targets (PROMPT) are examples of intervention procedures that fall within the behavioral model.

Discrete Trial Training differs from the naturalistic approach by providing structure and control during therapy sessions. This approach incorporates visual aids and token systems to encourage attention and participation while providing reinforcement for desired behaviors (Goldstein, 2002). Unlike naturalistic models, DTT is not a play-based approach. It is comprised of a structured, clinician-led session that incorporates multiple trials of various goals in a drilling fashion (Kane, Connell & Pellecchia, 2010). Research has shown structure with reinforcement positively impacts verbal language skills in children with autism (Kane et al., 2010). DTT involves three basic steps that are consistent with the ABC's approach found in ABA (Holding et al., 2011). The clinician presents the stimulus and cues a response. Once the child responds there is an immediate consequence. The child is either granted access to a reinforcer for an

appropriate response, or is denied access to the reinforcer because his/her response was incorrect or because the child did not respond at all (Dib & Sturmey, 2006). Initially, this approach should be implemented in an area that is quiet and free of distractions, however, the goal is to work towards training in the functional and natural environment (Dib & Sturmey, 2006).

DTT is used to encourage verbal language in children with ASD, because it provides multiple opportunities for the child to practice the skill. It is easy to implement and target responses are repeated making them more identifiable to the child. The main criticism of DTT is that it uses stimuli and reinforcers that are not present in a natural environment (Kane et al., 2010). As a result, DTT may lack generalization of the skills to other settings. The setting and approach used in DTT are contrived, as a result, critics argue that the instructional approach produces rote responding and lacks the ability to teach sequential chains (Kane et al., 2010). Supporters of DTT argue that although the program may initially appear rigid, once programming for generalization begins the sessions become more flexible. The goal of this programming is for the child to be able to perform new skills with multiple partners in various settings and situations with alternating instructions (Kane et al., 2010).

A recent study examined treatment efficacy of DTT in children with autism in the areas of acquisition, stimulus generalization, and retention of noun labels (Holding et al., 2011). Participants in this study were chosen based on the following screening criteria: a single diagnosis of autism, ability to click a computer mouse, ability to receptively identify noun pictures, and the ability to

engage in vocal imitation at the single word level (Holding et al., 2011). The study included four participants between the ages of three and six years old. All participants received intensive behavioral intervention services in their home for 20-30 hours per week prior to this study. Research for this study was also collected in the child's home during regularly scheduled therapy sessions in order to maintain a consistent and natural environment (Holding et al., 2011). Pictures of common objects from the Picture This software program were arranged in a slide show and used during intervention. When a picture of an object appeared on the computer screen the implementer would prompt the child by asking, "What is it?" while pointing to the picture. The implementer would then wait three seconds for the child to respond, before supplying the correct noun label for the picture (Holding et al., 2011). Results of this study found a limited generalization and retention of skills learned at a 100% accuracy criterion. It was concluded that accuracy was not enough for the skills to be maintained and/or applied to other stimuli (Holding et al., 2011). In addition, all of the participants required a significant amount of instructional time with DTT in order to learn the labels of the noun pictures (Holding et al., 2011).

Prompts for Restructuring Oral Muscular Phonetic Targets is another behavioral approach that is based on touch, pressure, and kinesthetic cues (Rogers, Hayden, Hepburn, Charlifue-Smith, Hall, & Hayes, 2006). The clinician manually guides the child's articulators in order to produce a specific sound. The goal of PROMPT is for the child to have a more functional use of their speech (Rogers et al., 2006). The clinician must gain joint attention and use a target

word that is significant to the child. Initially the clinician should slow his/her rate of production and allow more time for the child to respond (Rogers et al., 2006). Additional cues may be necessary including tactile, auditory and visual methods. This approach is unlike most others because it was originally developed for individuals with motor speech disorder; however, it is often used in non-verbal children to encourage speech production (Rogers et al., 2006). PROMPT should not be thought of as a way to facilitate oral-motor skills alone, but as a means of developing motor skills necessary to promote the development of language needed for interactions (Rogers et al., 2006).

A recent study examined the efficacy of the PROMPT intervention procedure versus the ESDM on ten children with autism between the ages of 20-65 months (Rogers et al., 2006). The participants were randomly assigned to a treatment group for a one hour session every week for a 12 week period. The number of word/approximations and number of phrases produced by the child were recorded in both intervention procedures (Rogers et al., 2006). During ESDM treatment, one new skill was targeted during each session and practiced with the child and parent. The parents were asked to spend 45 minutes each day working on the goal with their child and to record the child's performance to be discussed with the therapist. During PROMPT treatment, parents were permitted to observe therapy and were given specific words to practice at home with their child through verbal models without the use of tactile cues (Rogers et al., 2006). Parents were asked to work on practice words with their child for 30 minutes a day during various activities and record the child's performance. Eight of the ten

children demonstrated spontaneous use of five or more words and generalization by the completion of therapy (Rogers et al., 2006). One child within each study did not meet these requirements of functional speech, which was operationally defined as the use of at least five spontaneous words. Children in the ESDM treatment group demonstrated gains in imitation while children in the PROMPT treatment group showed gains in the area of functional play (Rogers et al., 2006). The PROMPT model is further described in this study as being an effective means of decreasing problem behaviors which may be especially beneficial to children with ASD. This is especially true when the model is introduced early in the child's life and implemented in an intensive/frequent manner.

Augmentative and Alternative Communication

Augmentative and alternative communication (AAC) refers to methods of communication that enhance or replace spoken language. Individuals with significant impairments in communication skills, such as those with ASD, may rely on AAC systems in order to express their needs, wants and feelings (Schlosser & Wendt, 2008). Many authors believe that AAC intervention facilitates speech production in children with ASD. It is important for professionals to understand if using this intervention encourages or hinders speech production. A recent study was performed in order to determine the effects of AAC intervention on speech production in children with ASD (Schlosser & Wendt, 2008). This study specifically looked at the use of manual sign and PECS. Measures included speech tied to the immediate physical or discourse context that was initiated by the child and the number of different non-imitative

words (Schlosser & Wendt, 2008). Participants included 98 children with autism between the ages of three and five years old (Schlosser & Wendt, 2008). The data collected did not support the idea that this intervention hindered speech production. Outcomes of this study showed some gains in speech production for most participants, although these gains were minimal and may vary across individuals (Schlosser & Wendt, 2008).

The Picture Exchange Communication System (PECS) is a visually-based communication system often used with children with ASD who have little or no verbal language (Yoder & Lieberman, 2009). This system requires the child to attend to the message recipient by engaging in a behavior that does not rely on eye contact. There are three steps within this approach that build upon the child's communication skills including: handing a picture card to the communication partner, discriminating between two pictures, and scanning in order to locate the picture card at a distance (Charlop-Christy, Carpenter, Le, LeBlanc, & Kellet, 2002). The goal of this intervention technique is to provide the child with a means of communicating. In the first step the child learns that there is a cause and effect pattern in communication. For example, "if I give you this card, I'll get the toy I want" (Charlop-Christy et al., p. 217, 2002). The second step teaches scanning and differentiating between the cards (Charlop-Christy et al., 2002). The distance step also teaches the scanning behavior. This step works at generalizing the skills learned into a more realistic setting. The child learns that the things he/she wants will not always be directly in front of them. Overall, this system teaches the child an appropriate way of communicating by

incorporating attending, turn-taking, discrimination, self-correcting, and scanning skills that are necessary tools for communication (Charlop-Christy et al., 2002).

A recent study examined the effects of PECS on communication and speech outcomes of 113 children under age 18 with a diagnosis of ASD (Flippin, Reszka & Watson, 2010). This study has shown small to moderate effects for the short-term efficacy of PECS at improving communication outcomes for children with ASD, however, evidence for maintenance and generalization through this system is limited and mixed (Flippin et al., 2010). This research has concluded that PECS is not equally effective at improving speech outcomes for all children with ASD based on varying results in individual children (Flippin et al., 2010).

Another study examined the use of acquisition of PECS on three children with ASD (Charlop-Christy et al., 2002). The participants were between the ages of 3-12 years old and had a history of ineffective verbal speech training (Charlop-Christy et al., 2002). The effects of PECS training on spoken language, social-communicative behavior, and problem behavior were examined in bi-weekly treatment sessions that consisted of free-play and academic settings (Charlop-Christy et al., 2002). Five spontaneous speech and imitation opportunities were provided in both settings. In addition, PECS training was conducted during 15 minute sessions twice per week (Charlop-Christy et al., 2002). All three children mastered PECS in a relatively short period. Results showed an increase in spontaneous speech, imitation, and appropriate social-communicative behavior, as well as a decrease in problem behavior (Charlop-Christy et al., 2002).

Research has also explored the effects of American Sign Language (ASL) on intraverbal skills with children with autism. ABA terms are often used with this intervention procedure. A mand is a request that is controlled by the person's motivation (Scattone & Billhofer, 2008). For example, a child asking for milk when he is thirsty is considered a mand. A tact is a term that simply means labeling. ASL is often used simultaneously with spoken language as a model for children. Initial signs are used with children with autism to provide the child with a means of requesting an item, and thus receiving the desired object. These signs are used to motivate the child and indirectly teach the importance of communication. The therapist verbalizes while making the sign, to promote vocalizations from the child. Research has shown that mands give children with autism an aspect of control over their environment, and thus should be a part of the child's language program early on (Scattone & Billhofer, 2008). Mands have also been shown to be more easily acquired and may in turn increase a nonverbal child's motivation for participating in therapy (Scattone & Billhofer, 2008). Many argue that the use of sign language may impede the development of verbal language, and thus, conclude that PECS is superior to ASL (Scattone & Billhofer, 2008). Others claim that ASL is not ideal because of the lack of listeners available that are able to comprehend sign which may cause the child to become isolated (Braam & Sundberg, 1991). A relevant study involving two children with ASD, found that PECS produced a higher percentage of independent mands for one child while ASL was more successful for the other child. The use of ASL produced a higher percentage of vocalizations for both of

these children during training (Braam & Sundberg, 1991). PECS and ASL have been shown to be effective for helping children with ASD communicate; however, the use of ASL with speech may be more successful at encouraging verbal communication. ASL can be paired with words, in order to increase the likelihood that the sign itself may trigger the verbalization "automatically" from the child. A verbal approximation of the word used with sign may also allow the clinician to incorporate the PROMPT technique to enhance the accuracy of the spoken word.

Voice Output Communication Aids (VOCA) are another type of AAC device often used simultaneously with other intervention techniques to improve communication skills. Research has demonstrated that VOCAs are effective communication aids when used with children with limited expressive ability (Olive et al., 2007). A recent study, attempted to evaluate the effects of combining EMT with a VOCA and found positive benefits (Olive et al., 2007). The researchers in this study believed that using these intervention strategies in unison would result in an increase in communicative behaviors, such as gestures, vocalizations, and verbalizations (Olive et al., 2007). The use of PECS and VOCA have also been researched and found to be effective ways of teaching children with autism. Since both methods are effective researchers have suggested allowing the child to decide which system they want to work with in order to allow them to feel included in therapy decisions (Son, Sigafoos, O'Reilly, & Lancioni, 2006).

Recent studies have shown improving communication skills for children with ASD with little or no verbal communication when ABA teaching methods are

implemented to teach AAC (Goldstein, 2002). However, children with good verbal imitation skills have shown better speech production than those with poor imitation skills with or without the use of AAC systems (Goldstein, 2002). Research has also shown that the use of simple signs can help children with no or limited speech, however, it is unusual to find a child with ASD who uses sign fluently and flexibly (Goldstein, 2002). Studies exploring PECs have produced similar findings. These AAC approaches may help initiate a child's communication and may serve as a building block for future speech production, but are often not successful in providing flexible and fluent skills needed for more complex communication when used alone(Goldstein, 2002). Therefore, professionals must provide an additional intervention strategy to use with this approach in order to increase communication skills and encourage the use of verbal language.

Implementing Intervention

A traditional intervention approach is often designed in a highly structured manner that incorporates DTT, artificial reinforcers, response shaping, and is clinician-led. Naturalistic intervention is a more recent intervention approach that is loosely structured, child-led, includes natural reinforcers, and teaches the child within everyday situations (Delprato, 2001). DTT and normalized behavioral language intervention (naturalistic approach) were compared in a study by Delprato (2001) who suggested that the application of naturalistic intervention may appear more humanistic than DTT. According to this study, parents are

often more receptive to this treatment as a result of its humanistic characteristics (Delprato, 2001).

A recent study examined the effects of naturalistic and behavioral intervention approaches on spoken language for 65 children between 2-13 years of age with autism. Behavioral approaches were compared to naturalistic approaches during intervention, generalization, and maintenance conditions by calculating the percentage of non-overlapping data between the two (Kane et al., 2010). The results of this study show that naturalistic interventions were more effective when compared to contrived intervention approaches from baseline to intervention and baseline to follow-up conditions (Kane et al., 2010). In contrast, behavioral approaches were found to be more effective when comparing baseline to generalization conditions (Kane, et al., 2010). Within the same study, naturalistic approaches were found to have a higher maintenance effect (Kane et al., 2010). Maintenance measures are defined as the occurrence of a response over time. This is a very important factor when teaching spoken language, especially for children with autism because there is a tendency to lose language skills over time (Kane et al., 2010). Stronger maintenance measures in naturalistic intervention approaches may be attributed to the availability of naturally occurring contingencies throughout the environment (Kane et al., 2010). These findings suggest that it may be more effective to create a language intervention that focuses on naturalistic teaching for acquisition and then advances to contrived/behavioral approach in order to train generalization skills.

Many intervention procedures for children with autism also include social skills training. This training has resulted in meaningful communication patterns in many of these children. Social skills training may be incorporated within naturalistic and behavioral models and can be used with AAC devices. The specific intervention procedures discussed within each of these categories have been proven effective in many research studies. When a child presents with severe autism, the use of AAC devices may be necessary (Roseberry-McKibbin & Hedge, 2006). In many instances, these intervention procedures are molded based on the specific child. Pieces of different intervention approaches may be combined in order to meet the needs of the child and promote verbal communication.

Conclusion

It should be noted that no matter what intervention route is taken, overall, the effectiveness of therapy depends on many factors. Client motivation, parent involvement, frequency, generalization, functionality and consistent practice in a variety of settings are just a few of these factors. When choosing an intervention procedure the professional and family should make their decision based on the specific strengths/challenges of each child and consider what would work best for the child and family. Each child with autism is unique; therefore, each intervention approach should be tailored to address specific needs.

Current research demonstrates an overwhelming preference for the use of naturalistic intervention models to encourage verbal language in children with ASD. There appears to be a surplus of evidence to support this approach.

Further research should be conducted regarding verbal language gains in children with ASD using the behavioral approach as well as the use of AAC systems simultaneously with each of these procedures.

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