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# A COMPARISON OF COMMUNICATION INTERVENTION SERVICE MODELS IN YOUNG CHILDREN WITH AUTISM

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A COMPARISON OF COMMUNICATION INTERVENTION SERVICE MODELS IN  
YOUNG CHILDREN WITH AUTISM

by

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B.A., Saint Louis University, 2011

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## **Introduction**

Speech-language pathology (SLP) services provided for individuals with autism spectrum disorders (ASD) may be divided in two main categories. In the first service provision model, intervention is provided in natural environments and implements the tenets involved in doing so, including being child-lead and participation based. The second is a traditional service provision model that can be described as being clinician-lead and incorporating applied behavioral analysis principles. A debate exists among professionals who provide language and communication intervention for young children with ASD, such as speech-language pathologists (SLPs), as to which service delivery model, those in natural environments or traditional ones, results in the best communication outcomes. The purpose of this literature review is to study naturalistic and traditional service provision models in SLP in order to find out which model results in better communication outcomes for young children with autism.

### **Traditional Service Provision Model**

In traditional service provision models, services are typically child-focused, with the SLP working directly with the child using planned methods, strategies and approaches used to address areas of concern (Campbell & Sawyer, 2007). In the traditional service model, caregivers and other family members might observe the clinician's work and may practice implementing the strategies with the clinician. Intervention activities are planned so that the child can learn or practice specific skills taught by the SLP (Campbell & Sawyer, 2007). Home-based programs may be devised for the family to work on targeted skills between clinician visits (Campbell & Sawyer, 2007). While this type of service provision may take place in a child's home, the

clinician will typically bring specific toys or activities to work on the child's acquisition of targeted skills (Campbell & Sawyer, 2007).

### **Natural Environment Service Provision Model**

The Individuals with Disabilities Education Improvement Act (IDEA) is a federal law that governs how state and public agencies provide education and early intervention to children with disabilities (Salisbury, Woods, & Copeland, 2010). Natural environments, as defined in Part C of IDEA, are “settings that are natural or typical for a same-aged infant or toddler without disabilities or delays and may include the home or community settings (Salisbury et al., 2010, p. 135).” The idea that services should be provided in natural environments arises from research showing that the everyday family and community life of children provides multiple learning opportunities in the context of their daily lives, and that such learning opportunities experienced daily promote learning that is functional for that child and helps the child to participate more fully in daily routines and activities (Dunst, Hamby, Trivette, Raab, & Bruder, 2000). Thus, natural environments are those environments in which daily life occurs and where typical daily activities and routines take place. For children receiving early intervention services, natural environments may include their home, the home of other caregivers, pre-schools, or child daycare centers.

The term “natural environment” actually describes much more than simply a locale for service provision, encompassing the location of services, the context for providing those services, and the participants involved in the provision of services. Services provided in natural environments should be both family-centered and participation-based (Dunst et al., 2000).

Family-centered services are promoted in collaboration with the family unit. Additionally, family-centered services should be individualized, culturally and linguistically

appropriate, and based upon the strengths of the family (Salisbury et al., 2010). Therefore, services must be embedded into to the family's daily routines and activities, thus, learning will be immediately functional and meaningful for the child and will generalize throughout other routines and activities in their daily lives (Salisbury et al., 2010).

The collaboration between the SLP and caregiver means that the family is involved in all aspects of the service provision, including decision-making, assessment, and intervention, insofar as they wish to be included (Woods, Wilcox, Friedman, & Murch, 2011). In natural environments, the caregiver plays the role of lead interventionist and decision maker, with the SLP taking on the role of consultant to the parent and family. In this scenario, the SLP provides the support and resources necessary to promote learning (Woods et al., 2011). It is imperative that caregivers feel informed and confident in their ability to help their children learn and succeed because they are the constants in the lives of children, as opposed to the SLP (Crais, 1991).

One primary tenet of providing services in natural environments is that interventions must be family-centered. Another main tenet of this type of service provision is that a child's participation in essential and desired routines and activities that occur in their natural environment should be embedded in therapy. This idea follows from the World Health Organization (WHO) (2001) international classification of functioning, disability, and health (ICF) model of disability and functioning, which considers the level of disability to be in direct relation to how able a person is to participate in the context of their daily life activities. According to the WHO (2001) model of disability, the degree of communication deficit is in direct relationship to participation in their daily routines and activities. It follows, then, that the goal of interventions in natural settings should be to increase participation in daily activities and

routines, which in turn will create learning opportunities within those activities, leading to new levels of participation and creating a sort of transactional feedback loop.

Natural service provision models differ significantly from traditional models in the focus and purpose of services, the activities used in intervention, and the roles played by the interventionist and the caregivers. Natural service provision models are family-centered and oriented to the caregiver-child relationship (Campbell & Sawyer, 2007). The purposes of this model are to maximize a child's learning opportunities that are inherent to participation in existing daily activities and routines and to maximize the child's competence by maximizing learning occasions within their naturally occurring routines and activities (Campbell & Sawyer, 2007). Intervention activities are embedded in the family's naturally occurring daily activities and routines in which the child participates. The clinicians' primary role in this model is to be a consultant to the caregiver by interacting and engaging them, and to provide support as they implement learning opportunities into their child's daily lives while the caregiver interacts with the child (Campbell & Sawyer, 2007).

### **Assessment in Natural Environments versus Traditional Service Provision Models**

These core tenets of providing services in natural environments lead to assessment procedures that differ from those used in traditional models. When working in natural environments with children under the age of three, it is necessary to assess their communicative skills in the context of the family system (Rossetti, 2001). When assessing a child's communication skills within the natural environment paradigm, it is imperative to understand how the child uses his or her communicative skills to participate in their family's daily activities and routines (Wilcox & Woods, 2011). The primary source of such information comes from the caregivers and can be obtained from open-ended interviews or conversations. For example, such



interviews or discussions, caregivers provide information about how their child participates in family activities and routines, and how communication skills could improve such participation (Wilcox & Woods, 2011). Parents describe their daily activities and which activities and routines are challenging for their child and family, and which ones are going well. In this way, the clinician and parent can recognize both where communication breakdowns create participation difficulties and how the child's communication skills can be enhanced and facilitated to increase participation (Wilcox & Woods, 2011). Additional assessment data can be acquired through observation of the family's daily lives as well as applying formal and informal assessment tools (Rossetti, 2001), such as results of standard clinical protocols like language sample analysis and determination of speech intelligibility (Wilcox & Woods, 2011).

In contrast, assessment procedures used in traditional service provision models are primarily driven by the SLP. Formal testing and assessments are utilized in comparison to the more informal assessment procedures used when working in natural environments. These formal tests have been standardized and normalized. This allows direct comparison of a child's language and communication skills to a standardized population of other children their age. Using a normal bell curve and standard deviation, discrepancies in specific skill areas are determined. Based on results of these formal tests, intervention targets and goals that need to be addressed are set (Campbell & Sawyer, 2007).

### **Intervention in Natural Environments**

With the above description of assessment in a natural environment service provision model, it follows that intervention in natural environments should be embedded into authentic, natural interactions between the children and their caregivers. This involves capitalizing on naturally occurring learning opportunities throughout the child's daily activities and routines.

Embedding intervention strategies into these experiences leads to more frequent and longer engagement by the child, producing more learning opportunities (Salisbury et al., 2010).

Because the intervention takes place in daily activities, it leads to more meaningful and functional communication, with natural reinforcement occurring as the children are able to participate in these activities and routines (Salisbury et al., 2010). Goals should also reflect how communication skills can improve or enable participation in these activities and routines (Salisbury et al., 2010).

### **Past Research in Natural Environments Service Provision**

In support of providing communication intervention using a natural environment service provision model, a study by Strain and Bovey in 2011 used a clustered randomized design in which 28 inclusive preschool classrooms were randomly assigned to receive 2 years of training and coaching in the Learning Experiences and Alternative Program for Preschoolers and Their Parents (LEAPS) model, and 28 inclusive preschool classes received intervention manuals and other written materials only. Teachers in the control group did not receive the intensive formal LEAP protocol training and coaching that the classroom teachers in the experimental group received. All children in the classrooms were diagnosed with ASD. Parents of the children taught by the teachers in the experimental group were also trained on how to implement intervention goals. Results showed that the children in the LEAPS group had made statistically significant greater improvements in measures of cognitive, language, social, problem behaviors, and ASD symptoms than the children in the control group who received only manuals and written materials (Strain & Bovey, 2011). These results support the idea of providing communication intervention for children with ASD using a natural environment service delivery model.

Rickards and colleagues (2009) conducted a study examining whether a home-based program provided over 12 months resulted in sustained improvement in development and behavior one year following the intervention in families with children with ASD and other developmental delays. The control group received therapy in a center-based program. The home-based program fit into the family's schedule and aimed to generalize learning across the child's natural environments. Parents and siblings were included in intervention and were taught how to implement learning into the family's daily life and routines. Results of the study demonstrated that in the experimental group, improvements in aspects of cognitive development were sustained one year after the intervention was concluded. This was not seen in the control group at one year post-intervention. This suggests that generalization is more likely to occur in children with ASD and other developmental delays when intervention is provided across all natural environments and is implemented in the child's home with their family (Rickards, Walstab, Wright-Rossi, Simpson, & Reddihough, 2009).

Paul and Roth (2011) wrote an article describing the guiding principles in early intervention (EI) according to the American Speech-Language Hearing Association (ASHA) describing how SLPs can apply these principles to best serve infants and toddlers with communication disorders. The first guiding principle described is that services should be family centered and culturally and linguistically responsive (Paul & Roth, 2011). The second guiding principle stated that services should be developmentally supportive and promote participation in natural environments (Paul & Roth, 2011). The third principle stated that services should be comprehensive coordinated, and team based (Paul & Roth, 2011). The final principle states that services should be based on the highest quality of evidence available (Paul & Roth, 2011). Therefore, according to these principles set forth by ASHA, services should promote

participation in a child's natural environments. This supports communication intervention that focuses on the child's family and their everyday routines and activities.

Woods and Wetherby (2003) reviewed evidence-based intervention practices for children with ASD and set forth to develop a set of guiding principles for providing intervention for infants and toddlers who are at risk for ASD. The study specifically aimed to characterize "the active ingredients of treatment approaches along a continuum from traditional discrete trial to more contemporary behavioral approaches that use naturalistic language teaching techniques to developmentally oriented approaches" (Woods & Wetherby, 2003, p. 184). The authors first describe massed discrete trial methods used with children with ASD. Discrete trial training is an approach that uses one-to-one, distraction free instruction to teach specific skills in a controlled and systematic manner. Discrete trial training incorporates tenets of applied behavior analysis including the use of antecedents, consequences, and reinforcement (Holding, Bray, & Kehle, 2011).

Such language intervention approaches have led to improvements in IQ and in other communication domains. Even so, researchers have also described severe setbacks of such discrete trial training, primarily the lack of spontaneity and generalization of the language learned due to the use of unnatural reinforcers (Woods & Wetherby, 2003). According to the authors, this use of unnatural reinforcers leads to verbalizations from children with ASD that are very restricted and situation specific. Because of the highly manipulated and unnatural structure of discrete trial training, children with ASD receiving this type of language therapy typically fail to generalize learned language or behaviors into their more natural environments (Woods & Wetherby, 2003). In addition, Woods and Wetherby (2003) described contemporary behavioral approaches that implement naturalistic teaching methods and the specific ingredients that

comprise such methods. For example, the authors explained what working in natural environments entails, i.e., that children learn functional and meaningful skills, learning occurs within daily caregiving, play and social interactions, and that caregivers mediate the teaching and learning process for the child as it occurs (Woods & Wetherby, 2003). The authors give specific examples of naturalistic methods, such as the natural language paradigm, incidental teaching, time delay and milieu intervention, and pivotal response training. In each of these methods, common components of naturalistic teaching can be found. All of these intervention approaches (a) implement language learning attempts that are initiated by the child and are focused on the interests of the child, (b) are embedded in the child's natural environment, and (c) use natural reinforcers that follow what the child is trying to communicate (Woods & Wetherby, 2003). Furthermore, Woods and Wetherby stated that, while only a limited number of studies have been conducted comparing traditional discrete trial language intervention approaches versus naturalistic language approaches, results of such studies have reported that naturalistic approaches lead to better generalization of language gains into natural contexts than do discrete trial approaches (Woods & Wetherby, 2003).

One study that exemplifies the effects of natural learning techniques on language learning in young children with ASD was conducted by McGee and colleagues in 1999. This study specifically used techniques such as natural reinforcers of vocalizations, speech shaping, and incidental teaching (Woods & Wetherby, 2003). At the onset of the program in McGee et al (1999) study, 36% of the toddlers studied were using verbalizations. After one year, this percentage increased to 82%. Therefore, Woods and Wetherby (2003) concluded, upon review of past research, that naturalistic behavioral approaches lead to more effective generalization of language gains to natural environments than do traditional discrete trial approaches (Woods &

Wetherby, 2003). Furthermore, the authors summarized the findings of the National Research Council (NRC) regarding best teaching practices for children with ASD concluding that “learning in natural environments is likely to be the most effective intervention approach to address gains in initiation and generalization for children with ASD” (Woods & Wetherby, 2003).

Delprato (2001) provided continued evidence to support the claim that SLP services provided in natural environments, result in better communication outcomes for young children with ASD than services provided using a traditional service model. Delprato (2001) reviewed a series of 10 controlled studies in which traditional behavioral procedures were compared to normalized interventions for teaching language to young children with ASD (Delprato, 2001). This review begins by comparing procedural characteristics of both intervention approaches. Components of the discrete trial training approaches were summarized as follows: (a) sessions should be very structured and paced by the teacher, who initiates all teaching episodes by providing the occasions for the child to respond, separated by a specific time interval (Delprato, 2001), (b) instruction should be direct and conducted with the teacher and child seated for the discrete trials while distractions are minimized, (c) antecedent stimuli are selected by the teacher and re-presented until the child reaches the specified criterion (d) the same response is targeted for several successive teaching trials (e) the prompt strategies remain constant for particular target responses (f) reinforcers are functionally unrelated to target responses and vary minimally across teaching trials and (g) reinforcers are presented for correct responses or for approximations (Delprato, 2001).

The components of normalized interventions were summarized as follows: (a) sessions are loosely structured and are paced by the child, who initiates teaching trials by independently

attending to stimuli or evidencing a specific want (Delprato, 2001), (b) indirect instruction trials are conducted with the teacher and child in varying positions with varying stimuli; i.e. a play setting, (c) antecedent stimuli are selected by the child and vary among teaching trials, (d) there is no particular order of target responses throughout the session, (e) prompt strategies vary according to the child's initiating responses, (f) reinforcers are functionally related to the target responses and vary across teaching trials, and (g) positive reinforcers are presented for attempts to respond (Delprato, 2001).

Delprato (2001) also reviewed results of eight separate studies with language criterion responses in which traditional discrete trial training was compared to normalized language training for children with ASD. One of the eight studies indicated that discrete trial and normalized language learning methods were equally effective in promoting acquisition of language. The remaining seven studies, however, concluded that normalized language learning methods are more effective for promoting acquisition of language. More importantly, all eight studies examined in Delprato's (2001) review concluded that normalized language learning methods were more effective than discrete trial methods in promoting generalization of language across natural and unfamiliar environments.

For example, some of the reviewed studies included measures of the mean frequency of correct preposition use in a new setting with a new teacher and measures of the children's correct use of prepositions to describe novel positions of stimuli during a free-play setting (Delprato, 2001). Such measures of the use of a learned skill in novel settings are examples of generalization measures. Generalization refers to the appropriate use of a newly acquired skill in novel situations or in natural environments and contexts. During these tests of generalization, all

of the children in the studies had a much higher percentage of correct responses in the normalized teaching condition in comparison to the discrete trial conditions (Delprato, 2001).

Koegel, Koegel, and Surratt (1992) provided an insightful look at the reasons behind why naturalistic approaches to language intervention for children with ASD are more effective than the more traditional approaches. Reasons for conducting this particular study included that, while severe disruptive behaviors are common in children with ASD, these behaviors are more likely to occur during difficult teaching tasks in attempts to escape or avoid the tasks (Koegel et al., 1992). Language tasks appear to be very difficult for children with ASD to learn and are associated with increases in disruptive behaviors (Koegel et al., 1992). By decreasing disruptive behaviors during learning tasks, it follows that learning can be facilitated more easily, resulting in better learning outcomes. The purpose of this study was to determine if the incorporation of natural language and motivational teaching techniques would aid in reducing disruptive behaviors during language learning tasks. For this experiment, two different language teaching conditions were implemented to determine what helps reduce disruptive behaviors during language learning. In one condition, traditional discrete trial training methods were used (i.e., instructions, prompts, and reinforcers for correct responses). In the second condition, naturalistic learning parameters were utilized (i.e. functional and varied stimuli, natural reinforcers, natural language exchanges were utilized, and all communicative attempts were reinforced) (Koegel et al., 1992).

Data was collected on both disruptive behaviors and language target responses for each of the three pre-school aged participants in this experiment. Behaviors were described as disruptive if they caused any disruption in a session; i.e. producing an interruption in the presentation of task stimuli, directing behavior away from the task, or interfering with



responding to a task stimuli (Koegel et al., 1992). Language target responses were defined for each child individually based on their level of baseline language skills. Results demonstrated that all three participants evidenced significantly less disruptive behaviors when using natural learning parameters than when using the more traditional discrete trial methods. Results also showed that all of the children produced more correct language target behaviors during the natural language parameters condition than during the traditional condition (Koegel et al., 1992). The results of this experiment have significant implications for language intervention for young children with ASD. Teaching language skills to children with ASD using natural learning parameters leads to a decrease in disruptive behaviors. With decreased disruptive behaviors, language learning is more likely to occur and better language outcomes are achieved under these natural conditions as opposed to traditional discrete trial conditions (Koegel et al., 1992).

In 2012 Ingersoll and colleagues added to the evidence supporting the claim that SLP services provided in natural environments result in better communication outcomes for young children with ASD than services provided using a traditional service model. The authors compared language outcomes of three interventions, all of which can be classified as using varying components of naturalistic environments and teaching. The three interventions used were a developmental social-pragmatic (DSP) approach, a naturalistic behavioral approach, and a combined intervention. The primary difference among the two naturalistic intervention approaches was the degree that the adult used prompting to directly elicit a specific child behavior and used facilitative strategies that encouraged adult responsiveness (Ingersoll, Meyer, Bonter, & Jelinek 2012). For instance, the naturalistic behavioral approach places more emphasis on direct prompting while the DSP approach places more emphasis on adult responsiveness. The combination of these two interventions can be compared to enhance milieu

teaching (Ingersoll et al., 2012). Five pre-school age males diagnosed with ASD participated in this study. Each child participated in baseline sessions, followed by three weeks of each treatment condition. Participants were scored on different language types and functions across the three conditions, i.e., prompted requests, spontaneous requests, prompted comments and spontaneous comments. Results showed that, for children with ASD, all three of the naturalistic language interventions promoted language learning and social engagement. While all of the conditions lead to increases in language learning, results indicated that the combined intervention resulted in greater increases in the overall rate of expressive language targets for all of the five participants (Ingersoll et al., 2012).

Finally, Spreckley and Boyd (2009) provided evidence that traditional discrete trial learning methods (applied behavioral intervention (ABI)) are not more effective in encouraging language learning in young children with ASD in comparison to standard therapy. Discrete trial learning methods were described as methods that core tenets of applied behavioral analysis such as antecedents, consequences, and reinforcement. The authors conducted a systematic review of 13 studies that examined the effects of ABI on the language outcomes of this population. Results of this meta- analysis led to the conclusion that ABI programs did not significantly improve the cognitive-linguistic outcomes of children and that no additional benefit over standard care for expressive language, receptive language, or adaptive behavior was noted (Spreckley & Boyd, 2009).

In summary, there is significant evidence supporting SLP services provided using a natural environments service provision model. Thus far, evidence supporting the claim that SLP services provided in natural environments result in better communication outcomes for young children with ASD than services provided using a traditional service model has been vast and

concrete. Studies by Strain and Bovey (2011), Rickards et al. (2009), Paul and Roth (2011), Woods and Wetherby (2003), Delprato (2001), Spreckley and Boyd (2009), Ingersoll et al. (2012), and Koegel et al. (1992) have all resulted in evidence that SLP services provided using a natural environments service provision model leads to language learning in young children with ASD. This evidence also supports the claim that language skills learned using the tenets of this model are better generalized to novel situations than are the skills learned using a traditional service model. There are, however, some scholarly articles that refute this claim, including studies completed by Matson, Tureck, Turygin, Beighley, and Rieske (2011), Yoder and Stone (2006), and Goldstein (2002). Such studies provide evidence supporting the use of more traditionally based interventions to achieve better, more generalized language outcome for young children with ASD as opposed to naturalistic teaching methods.

### **Past Research in Traditional Service Provision Models**

Matson et al. (2011) discussed the evidence supporting using applied behavior analysis (ABA) methods to help improve functioning of persons with ASD, particularly young children. This study reviewed several empirical studies about the use of various forms of ABA and their effectiveness in teaching young children with ASD. One specific variation of ABA investigated by Matson et al. (2011) was early intensive behavioral intervention (EIBI). Peter-Sceffer, Didden, Korzilius, and Sturmey (2011) completed meta-analysis of 11 studies with 344 children with ASD that supported the effectiveness of EIBI (Matson et al., 2011). Shi, Yu, Guo, and Li (2007) conducted a follow up study using 48 children from an initial group of 85, ages two to six years old, who had previously received 30-40 hours of EIBI for three to 12 months. This study found that 43 of the 48 children continued to improve after discontinuation of EIBI, with 29 of the children entering into normal kindergarten classes (Matson et al., 2011).

Another study done by Granpeesheh, Tarbox, and Dixon (2009) goes so far as to say that “a subset of children achieve a level of functioning that is indistinguishable from typically developing peers” (Matson et al., 2011, p. 1413). In the article, positive reinforcement, stimulus control, shaping, fading, chaining, functional assessment and generalization are listed as examples of the demonstrated efficacy of ABA methods (Matson et al., 2011).

More past research done on traditional service provision models includes Yoder and Stone (2006), who compared the efficacy of two communication interventions on spoken communication in 36 preschoolers with ASD. One intervention studied was Responsive Education and Prelinguistic Milieu Teaching (RPMT), which implements several of the naturalistic teaching components that have previously been discussed. The second intervention studied was the Picture Exchange Communication System (PECS), which incorporates discrete trial training as its general teaching approach. Efficacy of each of these interventions was judged based on two aspects of spoken communication: frequency of non-imitative spoken communication acts and the number of different non-imitative words spoken (Yoder & Stone, 2006). Results from this experiment showed that there was a significant growth for both of these measures of spoken communication from the beginning to the end of treatment, regardless of the treatment group (Yoder & Stone, 2006). After controlling for any initial differences between groups, however, there was a moderate treatment effect size favoring the PECS treatment group for both measures of spoken communication six months after treatment had ended (Yoder & Stone, 2006). Because this study included testing for the two measures of spoken communication six months after the termination of the treatment conditions, it implies that more language generalization occurred for participants in the PECS treatment condition than for the RPMT treatment condition.

In 2002, Goldstein completed a review that summarized the treatment efficacy of different communication interventions for children with ASD. Interventions involving sign language, discrete-trial training, and Milieu teaching procedures were reviewed as well as interventions designed to replace challenging behaviors and to promote social and scripted interactions. Interventions that included parent and classroom training were also analyzed and reviewed. The review results showed that interventions involving sign language, discrete-trial training, and Milieu teaching procedures each have successfully been used to increase the communication skills in young children with autism. Overall, the review concluded that one specific approach cannot, without further research, be said to result in the best communication outcomes for young children with autism (Goldstein, 2002).

### **Conclusion Remarks**

Upon reflecting on the evidence both supporting and refuting the claim that SLP services provided in natural environments result in better communication outcomes for young children with ASD than services provided using a traditional service model, it is concluded that the claim has sufficient evidence to support it. For example, in Ingersoll et al.'s (2012) study on the effect of three naturalistic language interventions on language use in children with ASD particularly, the results demonstrated that each of the three naturalistic approaches to language intervention with children with ASD resulted in significant language learning. This demonstrates that the tenets that make up the natural environments service provision model (i.e. participation-based and family centered practices in daily routines) lead to significant learning in the target population. While an abundance of empirical evidence is found supporting the superiority of naturalistic teaching methods (Delprato, 2001, Rickards et al., 2009, and Strain and Bovey, 2011) over more traditional discrete trial training methods, little can be found supporting the

opposite. Even the evidence in support of traditional methods is relatively weak. For example, in Yoder and Stone's (2006) study, involving a comparison of a naturalistic intervention to an ABA intervention model, while the naturalistic RPMT group resulted in less expressive verbal language gains than in the PECS group, significant gains were still noted.

It appears that traditional discrete trial training approaches will result in quicker language acquisition, but naturalistic approaches will result in greater generalization of language across different settings. This claim is supported by the studies by Delprato (2001), Ingersoll et al. (2012), Koegel et al. (1992), Paul and Roth (2011), Rickards et al. (2009), Spreckley and Boyd (2011), Strain and Bovey (2011), and Woods and Wetherby (2003). For example, Woods' and Wetherbys' (2003) suggested that naturalistic intervention models result in increased generalization to their natural environments in comparison to traditional discrete trial training methods.

Moreover, Delprato's (2001) comparison of discrete trial methods and normalized behavioral language intervention for children with ASD also supported the claim that traditional discrete trial training approaches will result in quicker language acquisition, but naturalistic approaches will result in greater generalization of language across different settings. The study conducted by Delprato (2001) was a critical review of 10 controlled studies that all compared traditional operant behavioral methods to normalized interventions for language learning and outcomes. The majority of the 10 studies reviewed by Delprato (2001) resulted in greater generalization outcomes for the normalized, naturalistic conditions in comparison to the discrete trial conditions.

While the majority of the evidence supports the idea that naturalistic language interventions will result in greater language generalization in comparison to traditional discrete

trial interventions, this same body of evidence also refutes the part of the claim that states that traditional discrete trial training approaches will result in quicker language acquisition. In Delprato's (2001) review, most studies reviewed concluded that the naturalistic conditions were more effective than the discrete trial conditions in promoting language acquisition. Only one of the studies reviewed led to the conclusion that both conditions were equally as effective in promoting language acquisition.

Upon reflecting on the evidence both supporting and refuting the claim that traditional discrete trial training approaches will result in quicker language acquisition, but naturalistic approaches will result in greater generalization of language across different settings, it is concluded that the claim lacks sufficient evidence to support it. In order to get a better understanding of the validity of this claim, or lack of validity, more research would have to be conducted on the actual rate of acquisition of language for children with autism under the two different conditions being studied.

While numerous studies have been conducted on the effectiveness of either traditional discrete trial training methods or naturalistic intervention models on language learning in young children with ASD (Rickards et al., 2009 & Delprato, 2001), the body of evidence lacks adequate research experiments actually comparing the two different intervention models. Future research needs include adding to the body of empirical evidence comparing the effects of traditional discrete-trial methods versus naturalistic methods on language learning in the population of interest.

It would be beneficial for such studies to include participants with similar language skills and randomly sort them into the two different treatment groups, with one group receiving traditional discrete trial therapy throughout the entire study, and the other group receiving a

naturalistic intervention throughout the entire study. This would increase the validity of the research because each participant would be receiving only one treatment, so any gains in language could most likely be attributed to whichever treatment that participant was receiving. Several current studies comparing the two interventions have been conducted in a manner in which all participants received both interventions, with a baselining session in between the two treatment protocols (Delprato, 2001 & Rickards et al., 2009).

In addition, several of the current studies on the topic are single-subject studies, while many others include only 3-6 participants. Because of this, future research calls for a large-scale, comprehensive language outcomes research study that directly compares a discrete-trial language intervention program to a naturalistic language intervention program.

Furthermore, past research has looked at expressive language, or single words used by the participants. Very few of the studies specified what functions of language were being served. Future research should focus on more specific data on the type and function of language they are addressing with the interventions of interest, and even which intervention methods are more successful. Moreover, teaching strategies from both traditional discrete trial and naturalistic interventions should be implemented simultaneously in a combined treatment protocol. This combined treatment condition can then be compared to a purely discrete trial condition and a purely naturalistic condition. In this way, it is possible that the best possible outcomes for all parts and functions of language can be achieved. This type of experiment would provide evidence for which intervention strategies, naturalistic versus traditional, are correlated with better outcomes for specific language skills (i.e. syntax, semantics, pragmatics).

A review of the evidence about providing speech-language pathology services using a natural environment service provision model compared to using a traditional service provision



model that incorporates discrete trial training for young children with ASD suggests that while debate on the subject still exists, there is more empirical evidence supporting the use of naturalistic interventions as opposed to more traditional intervention methods. The majority of comparisons between the two methods result in greater language outcomes and generalization for the naturalistic approach. It is hoped that future research would aid in the continued building of this specific body of evidence.

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