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Total Communication in Children with Autism: a Review and Future Directions

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ABSTRACT (100-200 WORDS):

This review covers two methods of teaching language to children with autism including total communication (speech with sign language) and the Picture Exchange Communication System (PECS). A description of autism, early language development, communication, as well as the benefits of sign language training in comparison to PECS was taken into consideration for this review. The results of this literary review suggest that acquisition of PECS and sign language skills may vary as a function of individual student characteristics, due to the variety of symptoms and severity in autism.

Introduction

Being able to communicate effectively and efficiently is a powerful skill seeing as how our nation looks to those in power to be charismatic and speak with confidence. Benjamin Lee Whoft (1956), while noted for his hypotheses regarding the relation of language to cognition and thinking, said, "language shapes the way we think, and determines what we can think about." If that is true, then it is safe to say that not only does language form our perception of the world around us, but also gives an individual the ability to express themselves. The question, however, of what communication methods nonverbal children on the autism spectrum have to express themselves is still being examined.

Autism is a highly variable neurodevelopmental disorder that affects an individual's ability to communicate and respond appropriately to the external world. Approximately 50% of children diagnosed with autism or Autism Spectrum Disorder (ASD) will remain functionally mute in adulthood (Peeters, 1999). In order to fully understand the development of language in children with autism, one must explore the areas of: a) early expressive language development, b) childhood autism, c) learning American Sign Language (ASL) in relation to total communication, d) the use of the Picture Exchange Communication System (PECS), and e) maximization of communication with a combination of total communication and PECS for children with autism and what are the factors affecting each of these training modalities.

Childhood Autism

Autism can be characterized by impaired social interaction and communication. The American Psychiatric Association (2000) describes it as "manifested by a delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)". It is distinguished not by a single symptom but by multiple impairments relating to social interaction and

communication (Filipek, 1999). A majority of toddlers with ASD have delays that occur across multiple areas of development like nonverbal problem-solving skills, motor skills, as well as receptive and expressive language skills (Chawarska, 2007). Many experts estimate the current proportion of children with ASD who are nonverbal to be between 20% and 30%. Perhaps due to earlier intervention, the proportion of children who reach school age without spoken language has decreased which is where speech-language pathologists play a role (Rogers, 2006). To understand the importance of pre-linguistic communication to the later emergence of language in those with autism, one must first examine the nature of expressive language development.

Early Expressive Language Development

Three areas of communication that may develop during the first several years of life are joint attention, behavior regulation, and social interaction (Bruner, 1981). Joint attention is communication that directs another person's attention to an item or event. For example, a child may point to a toy on a desk and look at an adult to draw their attention to the toy. Around 9-12 months, infants begin to use eye-gaze to initiate reference of objects and events to adults. Behavioral regulation involves requesting objects and actions to get another person to respond to a need. For example, a child may give a toy and look at another person in hopes of getting that person to activate the toy. Social interaction involves gaining another's attention for social or sharing purposes. For instance, a child might engage with another person in a turn-taking game, such as passing a ball back and forth. Children may also begin purposefully gesturing or making eye-contact with adults to non-verbally request something her or she may desire (Bruner, 1981).

According to McNeill (1998), gestures generally involve actions produced with the arms, hands, and fingers. Three basic types of gestures develop between 8-24 months: deictic, representational, and conventional. Deictic gestures involve actions used to direct attention to

an object or event, such as pointing. Representational gestures are in some way symbolic of the object or event of interest, such as gesturing to mimic turning a faucet knob. Conventional gestures represent a social action rather than an object. These gestures may include actions such as waving bye or placing a finger to the mouth to signal the desire for silence (McNeill, 1998).

It is characteristic of typically developing infants to use conventional gestures such as pointing and waving as early as 8 months of age, but children with autism often have difficulty or a delay in learning to use these conventional gestures. If children with autism have difficulty using joint attention, then conventional gestures such as pointing have little meaning for them. Rather, they will often use less mature and unconventional gestures such as leading an adult by the hand to desired item or pushing items away in protest (McNeill, 1998). This is where speech-language pathologists can aid in the training and development of these skills.

Speech-language pathologists treat children with autism because communication deficits are a primary component of both the diagnostic criteria and the focus of educational services for children with autism (Paul, 2008). That being said, multiple methods are currently in use with the goal of training children with autism to communicate more effectively and expressively. Therefore, it is necessary that further research is conducted in order to find the best method that fit each individual child's needs according to their ability to learn.

Total Communication Training

Because the lack of expressive language is often the most obvious symptom and cause for concern for toddlers who are diagnosed with autism, differing methods of training may need to be implemented to encourage expressive language through gestures, signing, or

picture exchange (Ticani, 2004). Augmentative and Alternative Communication (AAC) is a

term to describe communication methods used to supplement speech or writing for those with

impairments in the production or comprehension of spoken language (Paul, 2008). Differing

AAC methods like the Picture Exchange Communication System (PECS) and American Sign

Language (ASL) show promise for teaching communication to non-vocal learners and may

encourage expressive language. One method used in conjunction with ASL is called Total

Communication (TC) and this is comprised of several communication options including

manual, written, oral, and auditory. Total Communication can involve fingerspelling, sign

language, writing, lip-reading, gestures or miming, in conjunction with a verbal aspect, like

voicing.

> "Sign languages use space as a grammatical and semantic device. For
>
> example, in ASL the noun assigned referring to a particular person or object
>
> can be assigned to a location in space, typically to one side or the other of the
>
> signer. Referring back to that place in space by pointing to it then acts as an
>
> anaphoric pronoun" (Kent, 2004).

Sign language is beneficial to teach because signs are symbolic for representing

objects and actions in a child's world in hopes of motivating children with autism to make

requests and comment upon things. American Sign Language is a natural language that

contains phonology, morphology, semantics, syntax and pragmatics. It is a visual language so

the information is expressed not with the combinations of sounds but with combinations of

hand shapes, palm orientations, movement of the hands, arms and body, and facial

expressions (Kent, 2004). Signs are less transient than words and for children with autism,

gestures and signs are easier for speech pathologists and parents to prompt than verbal

productions. "Total Communication appears to be a viable treatment strategy for teaching

receptive and expressive vocabulary to individuals with autism" (Goldstein, 2002). In TC

training, children may be taught to request items, engage in conversation, and exhibit verbal behavior under the control of various stimulus conditions. A common form of TC is simultaneous communication (also known as "sim-com") which is the use of spoken words simultaneously with a signed version of the spoken utterance. As expected, the presentation of verbal speech alone is less effective for individuals who have poor verbal imitation skills so it would appear that presenting signs, as well as verbal speech, is an effective strategy for encouraging early vocabulary learning (Goldstein, 2002). In a study comparing speech-only treatment to treatment augmented with sign language, Sign or TC training resulted in quicker and more complete learning of vocabulary than speech training alone. "The use of augmentative and alternative communication systems has spurred the development of language skills with a great number of children who had extremely limited communication abilities" (Goldstein, 2002). Although there has been little recent research on sign language intervention for children with autism, there is evidence that simultaneous communication training in teaching signs and speech produces favorable communication outcomes for children with autism and other developmental disabilities (Sundberg, 1998).

Baby Sign Language

Baby sign language is defined as a method using hand shapes and motions to convey words and meanings to a pre-verbal infant. These hand shapes and motions are executed typically using ASL. The main motivation to teaching an infant baby sign language is the hope that this special type of communication will significantly reduce frustration for the child when it comes to communication. Baby sign language is composed of hand and finger signs that indicate words, concepts, and ideas babies need and want to communicate. Some examples are signs for words like "more," "hungry," "milk," "sleepy," etc. (McNeill, 1998). The main justification for teaching baby sign language to an infant is that there is often a gap

between the desire and actual ability to communicate. This gap may lead to frustration, tantrums, and possible future behavioral issues (Acredolo, 1990).

When using baby sign language, it is strongly recommended to say the sign out loud so the child can not only see what the sign is, but also what it sounds like and therefore, encourage verbal communication. Promoting the use of the gestural modality to augment babies' attempts to talk might be advantageous to infants, both in terms of early communication with parents and later expressive language skills (Acredolo, 1990). Research on baby sign language has found that teaching baby signs improved cognitive and emotional development. McNeill (1998) comments that "far from slowing down speech, baby sign language actually increases the rate of language development and increases the parent/child bond at the same time." When infants successfully use a gesture before they can say the corresponding word, they are revealing the fact that much of the underlying work of learning and encoding that word has already been done. This demonstrates their understanding of not only the concept the gesture stands for but it demonstrates they recognize the string of sounds as equivalent to the gesture. Lastly, they have figured out the symbolic function of the sign as it applies to language.

PECS Training

The Picture Exchange Communication System (PECS; Bondy & Frost, 2002) is a popular system used to teach children with autism to exchange picture symbols to request items. Studies performed by Bondy and Frost (1994) suggest that most children that have been taught PECS acquire independent use of the system and many even acquire functional communication skills, whether verbal or nonverbal. It must be noted though that although the acquisition of verbal speech can be viewed as a byproduct of the PECS approach, it is not its direct focus. Rather, the focus is to teach how to request items and learn to communicate, even if it is nonverbally.

Research studies have been performed to test the effectiveness of PECS training. A study performed by Tincani (2004) was adapted from Bondy and Frost's (2002) *Picture Exchange Communication System Training Manual*. Two trainers were used for PECS training: the listener/exchange partner was seated in front of the participant and the second trainer was seated behind the participant. Phases I through III of Bondy and Frost's PECS training were implemented to teach the unassisted exchange, increase distance from the speaker to the exchange partner and increase distance from the exchange partner to the participant's communication book, and teach discrimination between picture symbols (Bondy, 2002).

In Phase I, the trainer in front of the participant presented a reinforcing item where the he or she provided no prompts or cues for the participant to exchange a picture to request the item. The second trainer, seated behind the participant, provided physical assistance to pick up and exchange the picture symbol. The second trainer gradually faded her physical assistance from full physical prompts where the trainer would guide the participant with his or her hand, to partial physical prompts. This lasted until the participant required no prompting to make an independent picture exchange. These prompt fading procedures used in PECS training resulted in a correct response for every opportunity presented (Bondy, 2002).

Phase II began once the participant was capable of exchanging a picture symbol with at least 80% independence across two consecutive PECS training sessions. In this next phase, the picture symbol was placed on the front of a communication book, and the exchange partner gradually moved a distance of up to 5 meters from the participant. The communication book was also gradually moved a distance of up to 5 meters away from the participant. Once again, the second trainer provided physical prompts from behind for the participant to travel to the trainer in front of the communication book. These prompts were gradually faded out until none were necessary. Like Phase I, training at Phase II continued

until the participant was able to travel to the exchange partner and communication book at varying distances with 80% or greater independence across two consecutive sessions.

Lastly, in Phase III, the participant was taught to select and exchange a picture symbol from a variety of picture symbols in the communication book. Specifically, the participant was taught to discriminate between a preferred and a non-preferred picture symbol. If the participant gave the trainer the picture symbol for the preferred item, he or she received that item. If the participant gave the trainer the picture symbol for the nonpreferred item, the trainer modeled the correct response by removing the correct picture symbol from the book, presenting it to the participant, and saying the name of the object. He or she also prompted the participant to pick up the correct symbol by pointing to it and allowing the participant to exchange the symbol, but the participant did not have access to the item. The trainer then presented the book again, allowing the participant to request the preferred item. If the participant made two consecutive errors, the same procedure was followed.

Training continued at this level until the participant was able to discriminate between one preferred item picture symbol and one nonpreferred item picture symbol for 80% of trials across two sessions (Bondy, 2002).

Bondy and Frost reported that vocalizations generally developed during the later phases of PECS training. They later cautioned against requiring students to speak as they exchange picture symbols. They comment:

> "We teach students to use PECS in order to teach them functional communication skills. . . . Therefore, we do not teach PECS as a way to learn to speak; we teach PECS as a way to learn to communicate. . . ." (Bondy, 2002).

In the study Bondy and Frost performed, they noticed that the participants' speech that developed with PECS training appeared to decline until modifications were made.

Reinforcement for picture exchanges was delayed by up to 4 seconds until some participants emitted a word vocalization. Future modification of the study aimed to enhance speech development without hindering functional communication (Bondy, 2002).

Discussion

A number of factors, including cognitive and motor abilities, may influence a child's acquisition of an AAC system (Bonvillian, 1991). Given the positive reported outcomes for each modality, choosing between sign language and PECS may be difficult. Although some have argued for the benefits of teaching one AAC system over others (PECS or TC), it is unlikely that any single system best meets the diverse needs of all children with autism.

In a study performed by Sundberg in 1990, dexterity allowing for the formation of signs was demonstrated prior to the intervention but some of the participants with development disabilities may have had motor imitation difficulties that limited sign language acquisition. Additionally, the study compared the effects of training on participants' acquisition of requesting, which is the first verbal operant taught within the PECS system. The results of the study suggest that acquisition of picture exchange and sign language may vary as a function of individual student characteristics, specifically, motor imitation skills prior to intervention. However, further research is needed to determine the optimal procedures for teaching both modalities to students with communication difficulties (Tincani, 2004).

Although the primary goal of AAC training is to teach nonverbal communication skills, verbal speech development may be a secondary benefit for some learners (Bondy, 1994). Sign language training actually produced more correct responses, as well as more rapid acquisition, than picture-based training. It is possible that these participants' acquisition of sign language, however, have been enhanced by the availability of preferred items only in this condition (Bondy, 2002).

Factors that Affect Acquisition of ASL

It is important to take into consideration whether the client has any other developmental delays which would impact not only motor abilities, but language development in general. Imitation skills are grossly essential to the learning of sign language. Imitation in children displays the developing ability to construct internal representations of the behavior of others and to duplicate them. To imitate physically, the child must be able to perform tasks such as turn-taking, attending to the action, and replicating (Owens, 1996). Sometimes, as these physical imitation skills are taught, imitation of speech sounds and simple words can be addressed at the same time.

Another factor affecting ASL acquisition is if the child has a sensory integration problem. Sensory integration refers to the method the nervous system uses to receive, organize and understand sensory input. It enables individuals to figure out how to respond to environmental demands based on sensory information, such as auditory and visual input (Miller, 2002). In those who have sensory integration problems, senses may be either over- or under-reactive to stimulation and thus not conducive to sign language training. Lastly, it may be difficult to conduct TC training for a child with behavior problems because he or she may be challenging and uncooperative due to frustration from extreme communication difficulties.

Factors that Affect Acquisition of PECS

Comparison studies provide unclear evidence about the effectiveness of picture-based systems of teaching expressive language, specifically PECS. Bondy and Frost (1994) suggested that PECS may be a better avenue of AAC training because it does not require the learner to have certain pre-existing skills, such as imitation. Successful acquisition of sign language, as discussed above, may depend on the learner's imitative skills prior to training.

Sensory integration disorders may come into play for the acquisition of PECS because, depending on the severity of the sensory integration problem, pointing to pictures to

communicate may not be enough for those with sensory integration disorders. Sensory processing involves taking in information through touch, movement, smell, taste, vision, and hearing. Children must then interpret this information to make a meaningful response. In the case of under-stimulation, a child may need to work with an occupational therapist to actively recognize a picture by jumping on it or making an exaggerated motion of that sort to register the action in their mind (Schaaf, 2005). In the case of over-stimulation, a therapist will help the child to attend and learn by adapting to the environment and activities to their over-stimulating environment. Occupational therapists may provide the child with tools and coping techniques for use within school, home, and other social environments (Schaaf, 2005).

Conclusion

As mentioned, it is unlikely that any single system best meets the diverse needs of all children with autism and multiple disabilities. Comparison studies provide mixed and unclear evidence about the relative effectiveness of ASL/TC and picture-based systems. What is most important is the skill and investment of therapists and parents to train children with autism to communicate expressively. As explored, a major factor in treatment success will be recognition of the relationship of pre-existing skills to the acquisition of each modality.

Bibliography

Acredolo, L. P., & Goodwyn, S. W. (1990). Sign language in babies: The significance of symbolic gesturing for understanding language development. In R. Vasta (Ed.), Annals of Child Development, Vol. 7 (pp. 1-42). London: Jessica Kingsley Publishers.

American Psychiatric Association. (2000). Pervasive developmental disorders. In Diagnostic and statistical manual of mental disorders (Fourth edition---text revision (DSM-IV-TR). Washington, DC: American Psychiatric Association.

B.L. Whorf and John B. Carroll ed. (1956). *Language, Thought, and Reality: Selected Writings of Benjamin Lee Whorf*. Cambridge, Mass.: Technology Press of Massachusetts Institute of Technology.

Bondy, A., & Frost, L. (1994).The picture exchange communication system. Focus on Autistic Behavior, 9.

Bondy, A., & Frost, L. (2002). The picture exchange communication system. Newark, DE: Pyramid Educational Products.

Bonvillian, J. D., & Blackburn, D. W. (1991). Manual communication, Factors relating to sign language acquisition. In P. Siple & S. D. Fischer (Eds.), Theoretical Issues in Sign Language Research: Vol. 2. Chicago: University of Chicago.

Bruner, J. (1981). The social context of language acquisition. *Language and Communication, 1.*

Chawarska, K., Klin, A., Paul, R., & Volkmar, F. (2007). Autism spectrum disorder in the second year: Stability and change in syndrome expression. *Journal of Child Psychology and Psychiatry, 48.*

Filipek PA, Accardo PJ, Baranek GT *et al.* The screening and diagnosis of autistic spectrum disorders. *J Autism Dev Disord.* 1999;29(6).

Goldstein, H. (2002). Communication intervention for children with autism: A review of treatment efficacy. Journal Of Autism and Developmental Disorders, 32(5).

Kent, Raymond D. *The MIT Encyclopedia of Communication Disorders*. Cambridge, MA: MIT, 2004. Print.

McNeill, D. (1998). Speech and gesture integration. *New Directions for Development, 79.*

Miller, L. & Lane, S. (2000). Toward a consensus in terminology in sensory integration theory and practice: part 1: Taxonomy of neurophysiological processes. Sensory Integration Special Interest Section Quarterly (23:2), American Occupational Therapy Association, Rockville Maryland.

Owens, R. (1996). Language development: An Introduction. Needham Heights, MA: Allyn & Bacon.

Paul, R., Chawarska, K., Cicchetti, D., & Volkmar, F. (2008). Language outcomes of toddlers with autism spectrum disorders: A two-year follow-up. *Autism Research, 1.*

Peeters, T., & Gillberg, C. (1999). Autism: Medical and educational aspects. London: Whurr.

Rogers, S. (2006). Evidence-based intervention for language development in young children with autism. In Charman, T., & Stone, W. (Eds.). *Social and communication development in autism spectrum disorders: Early identification, diagnosis, and intervention.* New York: Guilford.

Seal, B. C., Bonvillian, J. D. (1997). Sign language and motor functioning in students with autism. Journal of Autism and Developmental Disorders, 27(4).

Schaaf R.C., Miller L.J. (2005). Occupational therapy using a sensory integrative approach for children with developmental disabilities. *Mentally Retarded Developmental Disability Resource,* 11 (2).

Sundberg, C. T., & Sundberg, M. L. (1990). Comparing topography-based verbal behavior with stimulus selection-based verbal behavior. The Analysis of Verbal Behavior, 8.

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

Tincani, M. (2004). Comparing the Picture Exchange Communication System and sign language training for children with autism. *Focus On Autism and Other Developmental Disabilities,* 19(3).