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Total Communication or the Picture Exchange Communication System? Increasing the Vocabulary Growth of Children with Autism Spectrum Disorder (ASD)

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TOTAL COMMUNICATION OR PECS? INCREASING THE VOCABULARY GROWTH OF CHILDREN WITH ASD

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This thesis is dedicated to the children who I met and who touched my heart while working at the Meadowood Springs Speech and Hearing Camp during the summer of 2006 in Pendleton, Oregon.

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Abstract

Total Communication or PECS? Increasing the Vocabulary Growth of Children with ASD

(Under the direction of Dr. Lennette Ivy)

This study had two main purposes. The first purpose was to determine which communicative treatment approach: Total Communication (TC) or the Picture Exchange Communication System (PECS) was more effective in increasing the vocabulary growth of children diagnosed with Autism Spectrum Disorder (ASD). The second purpose of this study was to determine which approach was preferred by speech-language pathologists (SLPs) to increase vocabulary growth. In order to address the first research question for this study, two preschool age (3-5 year old) children enrolled in speech-language therapy at the University of Mississippi Speech and Hearing Center were selected as participants. In order to address the second research question for this study, 25 experienced SLPs were selected as participants. Due to the fact this was a small case study carried out with only two participants, it was unclear as to which approach was the most effective for increasing vocabulary growth. However, results showed an increase in initiated conversation for both participants with a greater increase using the TC approach. The results from the questionnaire, on the other hand, indicated that the SLP respondents believed the PECS approach to be more effective in increasing vocabulary growth of children with ASD than the TC approach.

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CHAPTER ONE

INTRODUCTION

Autism Spectrum Disorder, (ASD), comprises a wide spectrum of cognitive and behavioral disorders, which include autism, Asperger syndrome and pervasive developmental disorder-not otherwise, specified (PDD-NOS), (Attanasio, Carbone, Delaney, Sweeney-Kerwin, Zecchin-Tirri, 2007). A diagnosis of PDD-NOS includes problems of social interaction and communication as well as the failure of individuals to retain all features of autism (Bolman, 2008). Many times, ASD and the term autism are used interchangeably but inaccurately. As noted above, autism is just one point on the spectrum and not a separate disorder. From 2000 to 2004, the number of students within schools ages 6-21 who were diagnosed with ASD doubled from 80,000 to 166,000, and in 2004, the Centers for Disease Control and Prevention, (CDC), found prevalence rates for ASD to be between 2 and 6 per 1,000 children. The CDC has therefore summarized that 1 in 150 children are currently being diagnosed with ASD (CDC, 2009). According to the Autism Society of America, more than a million people in the U.S. are living daily with ASD (Bialik, 2006). Furthermore, the estimated lifetime cost of caring for a child with ASD ranges from $3.5 million to $5 million, and the United States is facing almost $90 billion annually in costs for ASD (Bialik, 2006). With the cost of caring for a child with ASD reaching such heights, many states have and are currently approving legislation that will help to better provide for the needs of these children. For example, President Bush signed into law the Combating Autism Act of 2006 (S.843), authorizing nearly $1 billion over five years to combat autism through research, screening, early detection, and early intervention (Office of the Press Secretary, 2006). In addition, former Senator Hillary Clinton and Senator Wayne Allard introduced "Expanding the Promise Act", (S.937), which authorizes demonstration and planning

projects to expand services and support for children and adults with ASD (United States Senate, 2007). Also, the states of Georgia, Kentucky, Maryland, New York, Tennessee, and Indiana all currently have specific laws governing coverage for ASD (Kaminski, 2006).

Despite all the attention given to ASD and the legislation that has been passed, it is still important to note that there is more research to be done and more to be learned. Every child who is diagnosed with ASD must seek treatment that is unique to his or her diagnosis. Therefore, it was the purpose of this study to determine which communicative treatment approach: Total Communication, (TC), or the Picture Exchange Communication System, (PECS), was more effective in increasing the vocabulary growth of children diagnosed with ASD. Total communication is the most commonly used training procedure to teach sign language to children with ASD, involving the simultaneous presentation of both a manual sign and an associated spoken word. (Carbone, Dixon, Lewis, Louden, Quinn, & Sweeney-Kerwin, 2006). Although there has been little recent research on sign language intervention for children with ASD who are verbal, there is evidence that simultaneous communication training in teaching signs and speech produces favorable communication outcomes for children with ASD as well as children with other developmental disabilities (Tincani, 2004). The PECS approach is another communication treatment approach that can be selected for children with ASD. "PECS helps individuals with ASD acquire communicative skills through the application of a system which uses basic behavioral principles and techniques such as shaping, differential reinforcement, and transfer of stimulus control via delay to teach children functional communication using pictures as the communicative referent "(Carpenter, Charlop-Christy, Kellet, Le, LeBlanc, 2002, p.213-214).

Difficulties with language and communication are defining features of ASD. Therefore, it was fundamental to this study to define the relationship between language and communication.

Communication of language encompasses speech, signs, gestures, and pictures as well as other forms of alternative or augmentative communication that can be used to convey a message. In addition, communication must be linked to specific referents (e.g., objects, actions, ideas) that are generally understood by others within the same culture (Stone & Yoder, 2006). Useful speech, also known as speech that is frequent, communicative, and referential, obtained by the age of 5 is considered to be a strong predictor of later adaptive functioning for children who have been diagnosed with ASD (Stone & Yoder, 2006). Many treatment plans for children diagnosed with ASD target communication skills as goals with a variety of approaches developed to assist speech-language pathologists in meeting these goals. Since communication impairments are often associated with a diagnosis of ASD, it is important for parents and professionals to take an in depth look into the variety of treatment approaches; focusing on the evidence. An additional focus should be which approach increases a child's vocabulary. Most children with ASD experience delays in expressive vocabulary and non-verbal communication. Increasing the vocabulary growth of children with ASD was the overall purpose of this study.

CHAPTER TWO

LITERATURE REVIEW

As a camp counselor at Meadowood Springs Speech and Hearing Camp this past summer in Pendleton, Oregon, I was able to see first hand the communication struggles that children who have been diagnosed with Autism Spectrum Disorder, (ASD), face on a daily basis. Therefore, I, along with many research professionals, became interested in the various communication treatment approaches that are currently available for children who have been diagnosed with ASD.

General Information

Individuals who have been diagnosed with ASD can be found in all nations and regions of the world. ASD fails to discriminate among race, social status, or religion (Cooper, 1999). Furthermore, ASD diagnoses are steadily on the rise. From 2000 to 2004, the number of students within schools ages 6-21 who were diagnosed with ASD doubled from 80,000 to 166,000. In 2004, the Centers for Disease Control and Prevention, (CDC), found prevalence rates for ASD to be between 2 and 6 per 1,000 children. Therefore, CDC summarized that 1 in 150 children are being diagnosed with ASD (Centers for Disease Control and Prevention, 2009). The Autism Society of America estimates that the lifetime cost of caring for a child with ASD ranges from $3.5 million to $5 million and that the United States is facing almost $90 billion annually in costs for ASD (Bialik, 2006). With the cost of caring for a child with ASD reaching such heights, many states have and are currently approving legislation that will help to better provide for the needs of these children. For example, President Bush signed into law the Combating Autism Act of 2006 (S.843), authorizing nearly $1 billion over five years to combat autism through research,

screening, early detection, and early intervention (Office of the Press Secretary, 2006). In addition, former Senator Hillary Clinton and Senator Wayne Allard have introduced "Expanding the Promise Act", (S.937), which authorizes demonstration and planning projects to expand services and support for children and adults with ASD (United States Senate, 2007). Also, the states of Georgia, Kentucky, Maryland, New York, Tennessee, and Indiana have all implemented specific laws governing financial coverage for individuals who are diagnosed with ASD (Kaminski, 2006).

Two of the defining features of ASD include difficulties with language and communication. Therefore, defining the relationship between language and communication is key in ASD research. Speech is not crucial to language. Speech requires the ability to plan and execute coordinated movements of vocal chords and supralaryngeal structures. It also requires careful analyses of pitch, intensity, and duration. Communication of language encompasses speech, signs, gestures, and pictures as well as other forms of alternative or augmentative communication used to convey a message. In addition, communication must be linked to specific referents (e.g., objects, actions, ideas) that are generally understood by others within the same culture (Stone & Yoder, 2006).

Until recently, ASD was rarely diagnosed prior to age three. In the past decade, however, advances in early diagnosis research and documents stressing the significance of early intervention have caused research professionals to direct their attention to the implementation of various treatment approaches with children who have been diagnosed with ASD (Chawarska, Cicchett, Fowler & Paul, 2007). However, before a recommendation for a treatment approach can be made, a child must first display certain pre-linguistic predictors of vocabulary.

Vocabulary growth is defined as vocalizations that are meaningful. For example, a subject must exhibit a vocalization upon the presentation of stimuli.

Importance of Pre-linguistic Predictors and Vocabulary Growth in Children with ASD

There is a strong relationship between early vocabulary usage and later usage of multiword utterances in typically developing children (McDuffie, Stone & Yoder, 2005). One parameter of children with ASD, however, is a vocabulary regression. Studies that focus on the relationship between pre-linguistic behaviors and the vocabulary growth of children with ASD have been conducted. One example includes the 2005 study (McDuffie, Stone & Yoder, 2005), that examined the relationships of commenting and requesting, attention-following, and motor imitation to vocabulary acquisition among forty children with ASD. The study used a longitudinal correlation design to identify a discreet set of predictors of vocabulary comprehension and production, and discovered that two pre-linguistic behaviors, motor imitation and commenting, were significant predictors of vocabulary comprehension (McDuffie, Stone & Yoder, 2005). The ability to imitate others allows young children to both learn and master new behaviors. Early imitation abilities have been linked to later language performance in children with ASD (Stone and Yoder, 2001). From this study and others, imitation is labeled as a brief system used by preverbal infants to communicate and is often considered to be one mechanism of early language development. "The role of imitation in preverbal social interactions and the association between early imitative skills and later language underscore the importance of this early social-communicative skill", (Charman & Stone, 2006 p. 286). In addition to imitation, joint attention is also positively related to later language development in children with and without ASD. Studies have linked early joint attention with later language in children with ASD (Charman & Stone, 2006; Stone & Yoder, 2001). It is possible for vocabulary expansion to occur

without visual joint attention (the ability to change the direction of the head and eyes in response to a change in the direction of visual stimuli), but it is joint attention skills (skills of sharing, following, and directing focus between communicative partners) that aid in the ability of children with ASD to reference words to both objects and events (Charman & Stone 2006). A second study (Brady, Fleming, Marquis, & McLean, 2004), which researched the relationship between pre-linguistic predictors of vocabulary growth and children with ASD and other developmental disabilities, likewise found that both joint attention and nonverbal requesting were moderately strong predictors of expressive language. The study also found that pre-linguistic commenting was significantly related to later language outcomes in one sample of children with Down syndrome (Brady, Fleming, Marquis, & McLean, 2004). In addition, a third parallel study (Smith & Zaidman-Zait, 2007), looked more specifically at the predictors of expressive vocabulary growth in 35 children with ASD. This study also found significant relations between vocabulary development and the ability to display verbal imitation skills and joint attention gestures.

A fourth longitudinal parallel case study (Rollins, 1999), designed to follow the development of pragmatic accomplishments in the vocabulary development of five children with ASD discovered that children whose vocabulary development was statistically significant all engaged in routine, joint attention, direct attention, and behavioral regulations (instrumental communicative intentions that cause one to understand that another individual can cause an action to take place), with the combined total of joint focus and direct attention totaling more than 40% of the children's communicative activity. This study therefore concluded that an increase in the diversity of conventional pragmatic skills combined with an increase in joint attention skills produces an increase in the rate of vocabulary acquisition. Furthermore, this

study found that the children who increased their vocabulary also experienced a decreased use of behavioral regulations to less than 40% of the communicative activity (Rollins, 1999). Therefore, this study indicated that the use of behavioral regulations by children with ASD can play a less important role in vocabulary acquisition than the ability to regulate and maintain joint attention. The ability of children with ASD to understand and respond to affective signals of caregivers and the ability to communicate these to conversational partners is important for both social and communication development (Charman & Stone 2006). It is important to gain from these various studies how the ability of pre-linguistic behaviors of emotional communication demonstrated a child's future development of interpersonal understanding and also served as an indicator of future social behaviors, language, and cognitive abilities. The results recorded in these studies demonstrated the important role that pre-linguistic behaviors could have on vocabulary growth. Speech-language pathologists as well as parents should therefore strive to understand this role in order to select a communication treatment approach that will be effective in increasing the vocabulary growth of a child with ASD.

Gestures and Vocabulary Growth

In correlation with understanding the role that pre-linguistic behaviors can have upon the vocabulary growth of children with ASD, it is also important to examine the growing body of evidence that supports the role of gestures enhancing vocabulary growth. The use of gestures, speech, and language are intertwined both neurologically and developmentally (Capone & McGregor, 2004). Gesture-speech synchrony (the ability to communicate via gestures and speech at the same time) begins in early activities involving the child's use of his or her hands and mouth. For example, at birth, infants open their mouths when pressure is applied to their palm. Later, more advanced movements for first words and gestures co-occur as motor control

for both a child's hands and mouth advances. Representational gestures (gestures which display meaning through the symbolization of an action or object, e.g. using fingers to represent bunny ears) then emerge before the onset of a child's 25-word milestone. It is through the observation of gestures that researchers are able to gain predictive evidence of later spoken-language levels (Capone & McGregor, 2004). Developments of representational gestures accompany spoken development in the symbol types and contexts in which they are learned. Similar trends of early spoken vocabulary are found in gesture vocabulary, including a high proportion of object labels in both. "Children with more object gestures in their repertoire tend to have larger vocabularies and meet their first 10-word milestone earlier than children with fewer object gestures" (Capone & McGregor, 2004, p.175-176). In one study, (Acredolo, Brown, & Goodwyn, 2000), researchers compared three groups of normally developing infants: a control group without intervention, a second group in which parents were encouraged to increase their spoken labeling behavior, and a third group in which infants were exposed to gesture-plus-verbal input from their parents as often as possible. The results showed a larger collection of gestures for the infants exposed to gesture-plus-verbal input than was previously reported for spontaneous repertoires. The research from these studies concerning the role of gestures in increasing the vocabulary of children with ASD should be analyzed by professionals and considered in the process of selecting a communicative treatment approach that will be effective in increasing vocabulary growth.

The sequence of language and communication development in individuals with ASD varies greatly. In fact, recent studies show that only 25% of individuals diagnosed with ASD have language skills considered to be within normal range (Smith & Zaidman-Zait, 2007). Furthermore, approximately half of young children diagnosed with ASD fail to acquire speech as

their primary mode of communication (Carbone, Janeckey, McCarthy, Murrary, Sweeney-Kerwin & Zecchin-Tirri, 2007). It is not yet known why exactly some children with ASD acquire speech and others do not, but research has shown that the ability to effectively communicate at a young age is related to positive long-term outcomes (Charman & Stone, 2006). Additionally, verbal skills are considered to be strong future predictors of social-adaptive success (McDuffie, Stone & Yoder, 2005). Anderson, D, DiLavore, P., Lord, C., Pickles, A., Risi, S., Shulan, C., et.al. (2007), found that early language abilities and verbal skills often served as indicators of academic achievement and positive psychiatric outcome in both late childhood and adulthood. With communication success and effective verbal skills being some of the strongest longitudinal predictors of social-adaptive success, research professionals have turned their attention to various treatment approaches that seek to both enhance verbal abilities and to generate vocabulary growth with children diagnosed with ASD. It is important for parents and professionals to take an in depth look into the variety of treatment approaches that are available focusing on the evidence. It is also important to note that because ASD is a spectrum, the needs of individuals diagnosed with ASD vary, therefore making the aim of treatment approaches not to provide a cure (a cure has yet to be found), (Cooper, 1999), but to instead enable children with ASD to effectively communicate and interact in family settings, experience academic success in school, and to one day be successful within a career.

The Total Communication Approach (TC)

There are a variety of communicative approaches that exist in order to address the growing communicative needs of children who have been diagnosed with ASD. However, this study focuses on the use of only two approaches: the Total Communication (TC) approach and the Picture Exchange Communication System (PECS). Total communication is the most

commonly used training procedure to teach sign language to children with ASD, and it involves the simultaneous presentation of both a manual sign and an associated spoken word. (Carbone, Dixon, Lewis, Louden, Quinn, & Sweeney-Kerwin, 2006). Its effectiveness has been outlined by the research from previous studies (Anderson et al., 2007; Baldwin & Schuler, 1981; Carbone, Dixon, Lewis, Louden, Quinn, & Sweeney-Kerwin, 2006; Carr & Kologinsky, 1983; Tincani, 2004). In sign language training, children may be taught to mand or request preferred items, engage in conversation, and emit verbal behavior under the control of stimuli conditions (stimulus is presented to aid in referencing a sign with an object or action). Although there has been little recent research on sign language intervention for children with ASD, there is evidence that simultaneous communication training in teaching signs and speech produces favorable communication outcomes for children with ASD (Tincani, 2004). Creedon (1973) carried out one of the first extensive investigations into the effectiveness of sign language with children diagnosed with autism. She found that all twenty-one children participating in her program learned to use signs with successful gains (Creedon, 1973). According to Creedon's rationale, signs were easily prompted. She also stated that signs provided the children within the study many opportunities for reinforcement. It is important to note, however, that in this study signs were taught to children who had no speech, who exhibited limited eye contact, and who did not play appropriately with objects or interact with peers (Creedon, 1973). In 1976, Fulwiler and Fouts used the TC approach for teaching American Sign Language, (ASL), to a non-vocal five year-old boy with ASD. In their study, they found not only an increase in the child's use of manual signs but also an increase in the child's vocal responses following the training (Fulwiler & Fouts, 1976). In another study, Baker and Layton, (1981) conducted a year and a half longitudinal study tracking the acquisition of both manual signs and vocal responses in one child

with ASD. Prior to TC training, the participant occasionally used single vocal words to express his needs and wants and he vocalized upon command. However, his lack of spontaneous language resulted in his being labeled mute. Following TC training, this participant demonstrated a decrease in the use of signs alone and an increase in the use of TC. Additionally, the participant began occasionally to use vocal responses alone (Baker & Layton, 1981). While the above research concerning TC does support the idea of increasing vocalizations with children diagnosed with ASD, it is important to note that minimal research is available concerning the effectiveness of TC in the generation of vocabulary growth with children diagnosed with ASD.

The Picture Exchange Communication System (PECS)

In addition to the Total Communication approach, the Picture Exchange Communication System, (PECS), is a type of communication treatment approach administered often to children who have been diagnosed with ASD. PECS, developed by Dr. Andrew Bondy, a psychologist, and Lori Frost, a speech–language pathologist, helps individuals with ASD and other developmental disabilities acquire communicative skills through the application of a system which uses basic behavioral principles and techniques such as shaping, differential reinforcement, and transfer of stimulus control via delay to teach children functional communication using pictures as the communicative referent (Bogdashina, 2005). The PECS approach has gained widespread use nationally and internationally with children with ASD and is appealing for several reasons (Carpenter, Charlop-Christy, Le, LeBlanc, & Kellet, 2002). First, the system requires minimal complex motor movements on the part of the speaker and does not require the listener to be familiar with additional languages. Second, the PECS system has a relatively low cost and is portable and appropriate for utilization in many settings. Third, case reports indicate that the system can be taught relatively rapidly (Carpenter, Charlop-Christy, Le,

LeBlanc, & Kellet, 2002). "The fact that only a single topographical response (pointing to or giving a picture or object) is required, rather than the multiple and varied responses needed in signing, is also likely to enhance PECS usage" (Charman & Stone, 2006, p. 244). Furthermore, several informational reports have suggested that a large number of children who learn PECS also develop spoken language (Tincani, 2004). One study (Carpenter, Charlop-Christy, Le, LeBlanc, & Kellet, 2002), that was conducted with three children with ASD who were taught to use PECS indicated that all three children not only mastered PECS use within a relatively short time but also displayed more speech gains as delay was incorporated into the PECS training procedure. A second study (Ferreri, Marckel, & Neef, 2006),used PECS to teach two young boys with ASD to improvise by using descriptors to request desired items for which specific pictures were unavailable. The results of a multiple baseline across descriptors showed that training increased the number of improvised requests, and that these skills generalized to novel items as well as across both settings and listeners in the natural environment. The use of PECS may also result in decreases in problem behaviors with improvement in social behavior because it facilitates spoken communication (Carpenter, Charlop-Christy, Le, LeBlanc, & Kellet, 2002). For example, one particular study (Stone & Yoder, 2006), compared the efficacy of Responsive Education and Pre-linguistic Milieu Teaching, (RPMT), and PECS on spoken communication in 36 preschoolers with ASD. Each treatment was delivered to children for a maximum total of twenty-four hours over a six-month period. Spoken communication was then assessed in a meticulous test of generalization at pre-treatment, post-treatment, and six-month follow-up periods. The results showed that PECS was more successful than RPMT in increasing the number of non-imitative spoken communication acts and the number of different non-imitative words used at the post-treatment period. Furthermore, an exploratory analysis showed that the

growth rate of the number of different non-imitative words was faster in the PECS group than in the RPMT group.

Despite the available research concerning both the PECS approach and the TC approach, minimal research has been conducted involving a comparison of the two. Tincani, however, conducted one such study, in 2004. The participants involved in this study were two school-aged children with ASD, enrolled in a self-contained classroom for children with multiple disabilities. Following a baseline acquisition, both participants received sign language and picture exchange training in alternating treatments. Treatments were counterbalanced across days of the week, time of day, order of presentation, and persons delivering the treatment to reduce the likelihood of variables other than the treatments influencing the target behaviors. Results of the study suggested mixed findings for the application of teaching mands (requests) using sign language and PECS training. However, in contrast to the mixed results for mand acquisition, sign language training produced more speech for both participants of the study. The study, which measured the increases in vocal responding by comparing the effects of PECS training and TC training on the development of vocal manding, revealed that, while both systems produced an increase in vocalizations, it was the total communication training that led to more vocal responding than did PECS. In fact, one subject in the study emitted approximately one third more vocalizations in the best-treatment phase of sign language training than in PECS training (Tincani, 2004). Further research investigating the facilitative effects of TC training on vocal responses has identified a sub-set of non-vocal children most likely to benefit from this approach. For example, studies have suggested that TC training may be the most effective for developing and increasing vocal responses by children who already demonstrate some degree of vocal imitation or echolalia (Carbone et al., 2006). Although Tincani's study revealed that total

communication led to more vocalizations, it is important to note that the study reported that for learners without hand-motor imitation skills (the ability to imitate sign, symbol, or gesture through the movement of his or her hands), including many children with ASD, PECS training maybe more appropriate. On the other hand, the study indicated that for learners who have moderate hand-motor imitation skills, sign language training may be equally, if not more; appropriate (Tincani, 2004).

The purpose of this study was to determine the effectiveness of the Picture Exchange Communication System, (PECS), approach and the Total Communication, (TC), approach as well as to examine the literature surrounding the use of both in the goal of generating vocabulary growth in children who have been diagnosed with ASD. It must be noted that both approaches have been used to help generate expressive language and vocabulary growth in children with ASD. However, there has been little research published comparing the two, and only minimal research has been conducted concerning the effectiveness of the total communication approach with children diagnosed with ASD. Furthermore, what research is available has taken place within the last five years. Therefore, it was the purpose of this study to follow the growing trend of research and take an in depth look at the effectiveness of both approaches in increasing the vocabulary of children with ASD.

In addition to examining present research concerning both the TC approach and the PECS approach, it was crucial to this study to consult with experienced speech-language pathologists in order to determine which approach is chosen and administered more. Speech-language pathologists are often among the first professionals to work with children with ASD (Rollins, 1999). Over the past ten years, there have been considerable advances in language and communication intervention models for children with ASD, and a particularly notable change

has been in the role of speech-language pathologists (Dyer, Luce, & Williams, 1991). Therefore, it is important to share with these professionals the growing body of research surrounding both communication approaches and to assess which approach is more frequently administered. This information is also imperative to parents and other professionals working with children with ASD and can aid in helping to select a treatment approach that will be more effective in generating vocabulary growth.

There were two research questions for this study. (1) Is the Total Communication (TC) approach or the Picture Exchange Communication System (PECS) more effective in increasing the vocabulary growth of children who have been diagnosed with Autism Spectrum Disorder (ASD)? (2)Which approach do speech-language pathologists (SLPs) choose to increase the vocabulary growth of children diagnosed with ASD?

CHAPTER THREE

METHODOLOGY

Participants

Two preschool age participants were chosen for this study due to the increasing population of children that are diagnosed at three years of age. Participant one was five years; nine months old and Participant two was three years; nine months old. Both participants had been previously diagnosed with Autism Spectrum Disorder, (ASD). Each participant was enrolled in a speech therapy program at the University of Mississippi Speech and Hearing Clinic. Neither participant was classified as being non-verbal or as having other medical concerns or accompanying developmental disabilities. No consideration was given for racial or ethnic backgrounds due to the fact that ASD does not discriminate across race or culture. Each participant's legal guardians were given an informed consent form, which was approved by the University of Mississippi Institutional Research Review Board (IRB). The form indicated that (1) the study would involve the implementation of both the Picture Exchange Communication System, (PECS), and the Total Communication, (TC), approach into regularly scheduled therapy sessions in a play format, (2) that participants were not required to participate, and, (3) if their guardians agreed for them to participate, they could withdraw the children from the study at any time without penalty. The consent form also indicated that in order to maintain the confidentiality of the participants, all data collected would be destroyed after the publication of the study. It is important to note that given the size of the sample of participants this was only a pilot study and also given the variation of ASD the results of this study must be carefully interpreted.

In addition to the two preschool age participants that participated in this study, 25 experienced Speech-Language Pathologists (SLPs), who had their Certificate of Clinical Competence (CCC), were selected using the American Speech-Language Hearing Association (ASHA) online directory. These participants were chosen based on their regional location of practice and special consideration was also given to those who were listed as employed at preschools, daycares, or other clinical sites that would allow them to be exposed to children with ASD on a regular basis. The regions from which SLPs were chosen included the West, Southwest, Midwest, South, Mid-Atlantic and New England regions of the United States. Therefore, a total of 180 SLPs were chosen to participate within this study. However, despite the 180 invitations that were sent, only 25 questionnaires were actually submitted for this study.

Instrumentation

The materials used in the procedure for the first research question included the Peabody Picture Vocabulary Test, 4th edition, (PPVT-4) (Pearson Assessments, 2007). This test was chosen in order to assess the current vocabulary level of each participant. In addition, video recorder equipment that was already in place at the University of Mississippi Speech and Hearing Clinic was used for the recording of all therapy sessions. The equipment was set up prior to each session and did not distract from the session. Throughout the therapy sessions, a variety of materials were used. Picture cards were used with each subject in order to reference each vocabulary term with the object and/or action it represented. Moreover, the items referenced by each picture card used throughout the PECS therapy sessions were present in order to elicit needed exchanges. These included toy cars representative to each color term as well as play money representative of each money term that was introduced. Reinforcers were also used with both participants throughout the sessions, and they consisted of a toy barn set, and/or the choice

of playing a game with the clinician. Reinforcers were used during each session after the first ten minutes of word learning and then again after the second ten minutes of word learning; therefore accounting for a total of ten minutes maximum during a 30 minute therapy session. The materials used for this study also included the ten-question questionnaire that was sent to over 180 speech-language pathologists.

Procedure

The following steps were used to address the first research question:

- Step One: Prior to the start of data collection, each participant was video recorded and observed during a typical therapy session at the University of Mississippi Speech and Hearing Center.

- Step Two: Each participant was administered the PPVT-4 and a list of vocabulary terms unknown by each participant was compiled. The list of words for each subject varied due to the age difference between participants and also due to the fact that words chosen for participant two had to be words that could facilitate an exchange. In order to accurately select words that were age appropriate, the results from the PPVT-4 as well as the Mississippi Department of Education Framework Curriculum (MS Language Arts Framework, 2006) word lists for children in both kindergarten and first grade were used. In addition, information gained concerning joint attention abilities and hand-motor imitation skills were compared in order to determine which participant would be administered which approach.

- Step Three: After the observation of both participants' joint attention capabilities and motor imitation skills, the TC approach was chosen for participant one and the PECS approach was chosen for participant two. Each thirty minute therapy session was conducted the same with each participant and the only discrepancies were variations in the words taught, type of reinforcers used, and the type of approach administered.

Each therapy session was held within a classroom at the University of Mississippi Speech and Hearing Clinic. The information involving the process of each session as conducted with each participant is outlined below.

Participant One:

- Participant one was introduced to words one through five using the Total Communication, (TC), approach for ten minutes. Each week, five new words were introduced. Over the course of three weeks, the following words were used for data collection: *vehicle, floating, arrow, catching, river, roof, envelope, vest, picking, house, square, triangle, circle, canoe,* and *flame.*
    - The primary research investigator first probed the participant to see if he was able to identify the term that was referenced within the picture card.
    - Next, the primary research investigator displayed the object, performed the action, or showed a visual for the term being learned.

- The primary research investigator then modeled the correct sign for the object, action, or visual while also vocalizing the term.
- It was then said, "Now, please show me the sign and say it with me."
- If no response was given within three seconds then the primary research investigator hand-over- hand helped the participant to form the correct sign while again vocalizing the term.
- The primary research investigator then praised the participant verbally for participating (e.g. "good job" etc.)

- Next, Participant one was allowed time for reinforcement (e.g., play game, work on a puzzle, option to play with a selected toy) for a maximum of five minutes.
- Participant one was then re- introduced to words one through five using the TC approach for ten more minutes.
    - Data were recorded based on the ability of the participant to use the correct sign with each picture card.
- Participant one was allowed time for reinforcement (play a game, sing fun song, option to play with a selected toy) for a maximum of five minutes.

Participant Two:

- Participant two was introduced to words one through five using the Picture Exchange Communication System, (PECS) for ten minutes. Each week five new terms were introduced. Over the course of three weeks, the following terms were introduced: *yellow, red, purple, orange, blue, brown, pink, green, gray, black, dime, nickel, penny, dollar,* and *quarter.*
    - The primary research investigator first probed the participant to see if he was able to identify the term that was referenced within the picture card.
    - The primary research investigator then displayed the object, performed the action, or showed the participant the visual for the term being learned.
    - Next, the primary research investigator modeled the correct exchange of the picture card and the correct vocalization of the term for obtaining or requesting the object, action, or visual.
    - The participant was then prompted to pick up the correct picture card by pointing to it and allowing the participant to exchange the card.
    - If the participant failed to respond within three seconds, the primary research investigator hand-over-hand showed the

participant how to pick up the correct card and exchange it in order to receive the requested object, action, or visual.

- The primary research investigator then praised the participant verbally for participating (e.g. "good job" etc.)

- Participant Two was allowed time for reinforcement (e.g. Play game, put together a puzzle, or play with a selected toy) for a maximum of five minutes.

- Participant Two was then shown the same set of picture cards using the Picture Exchange Communication System, (PECS) for ten minutes.

  - Data were recorded based on the ability of the participant to use the correct exchange for the correct term.

- Participant Two was allowed time for reinforcement (e.g. Play game, sing fun song, or play with a selected toy) for a maximum time of five minutes.

- Phases I through III of Bondy and Frost's PECS training (as used in the 2004 study by Tincani) were applied throughout the course of the procedure: (Phase I) The primary research investigator taught the participant the unassisted exchange;(Phase II) the investigator increased distance from the speaker to the exchange partner: and (Phase III) the investigator taught the participant to discriminate between picture symbols (Tincani, 2004). Only after the participant was able to exchange a picture card with 80% accuracy across two consecutive sessions did the sessions

move from phase one to phase two. Accuracy was determined via the assessment of data collected by both the primary research investigator and the data recorded from the video equipment.

Ten minutes were allowed for each phase of word learning due to the nature of the process. It also allowed the primary research investigator time for behavior modification if needed. If the participant at any time refused to participate or disrupted the session with physical behaviors, the primary research investigator proceeded to use one and or all of the following behavioral modification techniques:

- The primary research investigator first ignored and proceeded with the therapy session.
- The primary research investigator reminded the participant that after finishing the task he would have the opportunity to choose a game, sing a fun song, or play with a selected toy.
- In situations in which the above methods failed or disruptive behaviors were severe, the primary research investigator asked the parents to intervene or a time out from the session was enacted.

In order to address the second research question for this study, over 180 speech-language pathologists were e-mailed a link to the questionnaire used for this study. Using the internet site Survey Monkey, the responses from each questionnaire were compiled and calculated into percentages that are represented within the figures shown in the results section of this study. Each participant was given a six week time frame in which to complete and return the questionnaire. However, only a total of 25 speech-language pathologists from Oklahoma,

Alabama, Massachusetts, New Jersey, Ohio, Oregon, Maryland, Illinois, Texas, Kentucky, New Hampshire, Iowa, Tennessee, & Georgia completed and submitted the questionnaire within the six weeks time frame allowed for this study.

CHAPTER FOUR

RESULTS

Data Analysis

Two research questions directed this research: (1) Is the Total Communication (TC) approach or the Picture Exchange Communication System (PECS) more effective in increasing the vocabulary growth of children who have been diagnosed with Autism Spectrum Disorder (ASD)? (2)Which approach do speech-language pathologists (SLPs) choose to increase the vocabulary growth of children diagnosed with ASD?

In order to address the first research question, the data from the comparison of the use of both the Total Communication (TC) approach and the Picture Exchange Communication System (PECS) were analyzed using frequency percentages. Prior to the start of the study, the results from the PPVT-4 showed that participant one scored within his proper age equivalency range. Participant one, who was five-years and nine-months-old at the time of testing, had a standard score of 96, and his age equivalent was listed as 5:5. Participant two, who was three-years and nine-months at the time of testing, had a standard score of 107, and his age equivalent was listed as 6:6. However, despite the high standard scores and age equivalency scores, each subject's baseline data collected prior to the start of this study showed much room for improvement. Participant one demonstrated only ten initiated conversation occurrences over two typical therapy sessions prior to the start of the study. Participant two had only four initiated conversation occurrences over two typical therapy sessions prior to the start of the study. Furthermore, Participant two initiated questions within therapy with only a 70% success rate prior to this study and initiated requests with only a 40% success rate prior to this study.

Throughout the course of this study, data were collected from a total of three sessions of therapy involving the use of the TC approach for Participant one and the PECS approach for Participant two. The results of each session can be viewed in Figure 1.1. Overall, the data showed that the TC approach produced more initiated conversations while the PECS approach indicated an increase in initiated requests and questions for Participant two. Both approaches, however, indicated an increased rate of generalization from one session to the next for both participants.

In order to address the second research question for this study, it was necessary to analyze the data collected from the questionnaires that were sent to the speech-language pathologists. The results of the questionnaires can be viewed in Figures 1.3-2.0. These results indicated that of the SLP respondents, more preferred the PECS approach for increasing the vocabulary growth of children with ASD. On the other hand, the results show that the same SLP respondents believed more parents of children with ASD prefer the TC approach.

Results Recorded for Participant One

Participant One: JPW **Age: 5:9**

Peabody Results: Standard Score: 96; Percentile: 39%; Age Equivalent: 5:5
Baseline Data: Initiated Conversation: 10 occurrences over 2 sessions (average of 5 for each session) (see Figure 1)

Session 1: Introduced five vocabulary terms

- Vocalized correct term and used correct sign: 3/5=60%
- Vocalized correct term only:2/5=40%
- Initiated Conversation: 4 occurrences throughout session (see Figure 1)

Session 2: Previously learned terms + Introduction of five new vocabulary terms

- Vocalized correct term and used correct sign: 1/5= 20%
- Vocalized correct term only:3/5=60%
- Incorrect vocal and sign: 1/5=20%

  Introduction of five new terms
- Vocalized correct term and used correct sign: 3/5=60%
- Vocalized correct term only: 2/5=40%
- Initiated Conversation: 10 occurrences throughout session (see Figure 1)

Session 3: Previously learned terms + Introduction of five new vocabulary terms

- Vocalized correct term and used correct sign: 5/10= 50%
- Vocalized correct term only:3/10=30%
- Incorrect vocal and sign: 1/10=10%
- Produced incorrect sign and vocal: 1/10=10%

  Introduction of five new terms
- Vocalized correct term and used correct sign: 2/5=40%
- Vocalized correct term only: 1/5=20%
- Produced correct sign only: 2/5=40%
- Initiated Conversation: 12 occurrences throughout session (see Figure 1)

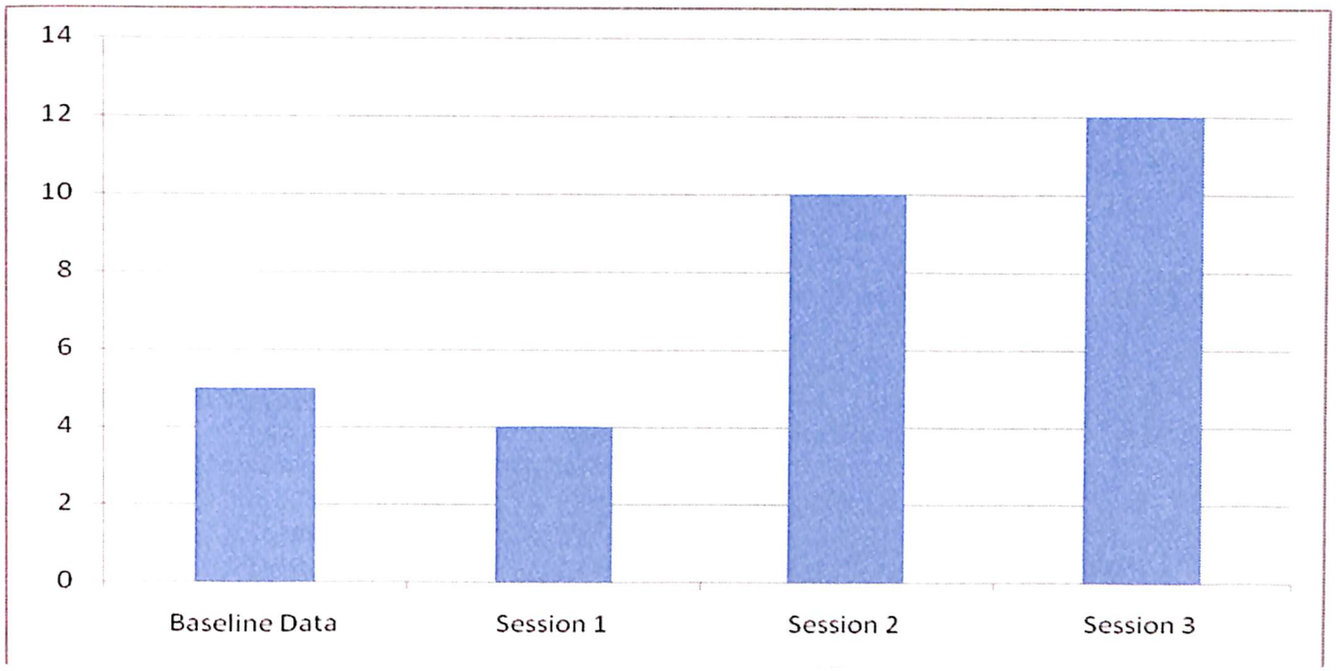

Figure 1. Initiated Conversation Occurrences recorded for Participant One throughout two combined baseline recording data sessions as well as three sessions during implementation of the TC approach

Results Recorded for Participant Two

Participant Two: SL Age: 3:9

Peabody Results: Standard Score: 107; Percentile: 68%; Age Equivalent: 6:6
Baseline Data: Initiated Questions: 70% success rate
Initiated Requests: 40% success rate
Initiated Conversation: 4 occurrences over 2 sessions (average of 2 for each session) (see Figure 2)

Session 1: Introduced five vocabulary terms

- Vocalized correct term and exchanged card for desired item: 4/5=80%
- Vocalized only correct term only: 1/5=20%
- Initiated Questions: 13/17=76% success rate
- Initiated Requests: 3/8=38%
- Initiated Conversation: 2 occurrences throughout session (see Figure 2)

Session 2: Previously learned terms + Introduction of five new vocabulary terms

- Vocalized correct term and exchanged card for desired item: 5/5=100%
  Introduction of five new terms
- Vocalized correct term and exchanged card for desired item: 4/5= 80%
- Correct exchange with incorrect vocalization: 1/5=20%
- Initiated Questions: 15/18=83% success rate
- Initiated Requests: 7/12=58%
- Initiated Conversation: 6 occurrences throughout session (see Figure 2)

Session 3: Previously learned terms + Introduction of five new vocabulary terms

- Vocalized correct term and exchanged card for desired item: 8/10= 80%
  Introduction of five new terms
- Vocalized correct term and exchanged card for desired item:2/5=40%
- Vocalized correct term only: 1/5=20%
- Incorrect vocal and no exchange:2/5=40%
- Initiated questions: 14/16=88%
- Initiated requests: 9/13=69%
- Initiated Conversation: 7 occurrences throughout session (see Figure 2

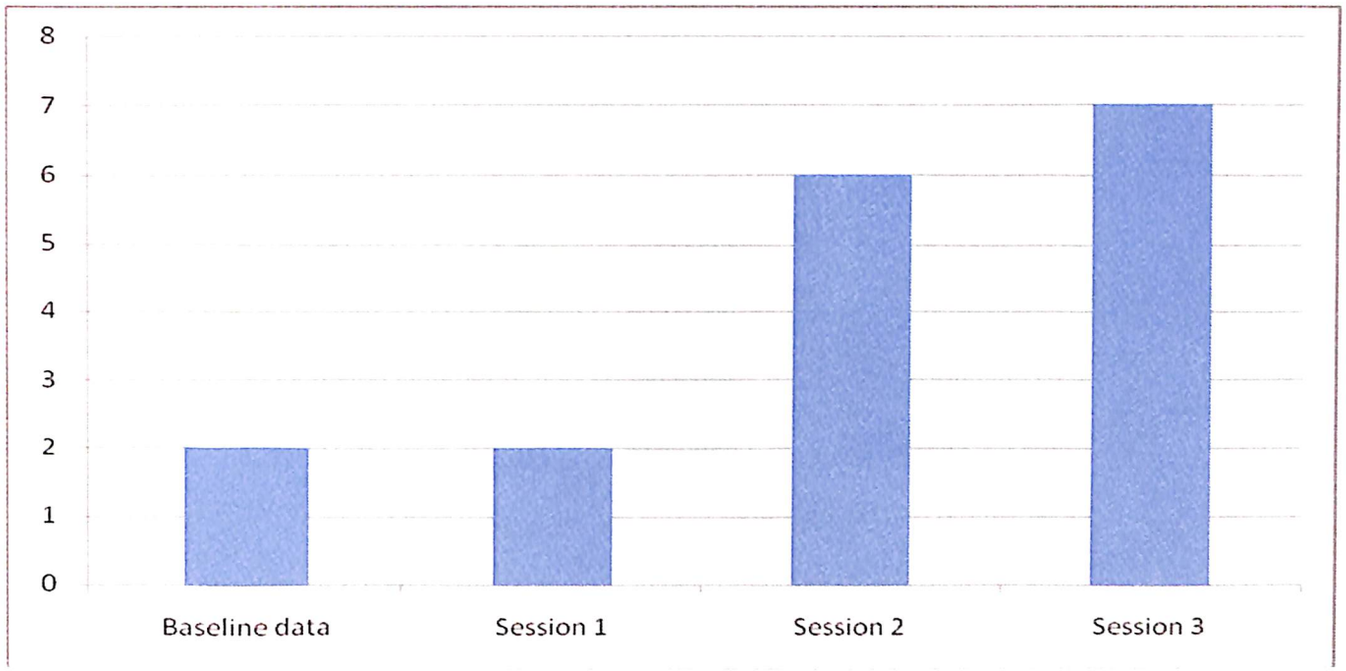

Figure 2. Initiated Conversation Occurrences recorded for Participant One throughout two combined baseline recording data sessions as well as three sessions during implementation of the PECS approach

Results from Questionnaire

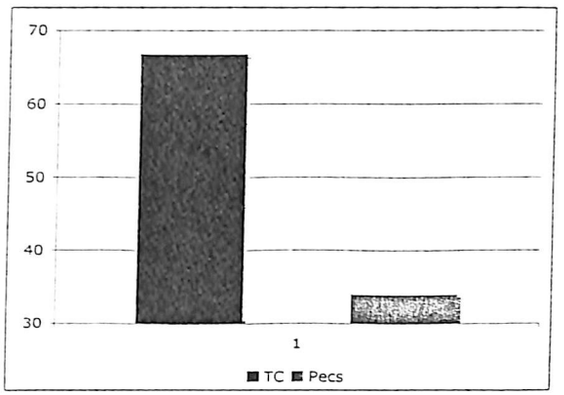

Figure 3. Question One

Question #1: Which approach in your professional opinion is more effective in increasing the vocabulary growth of children with ASD?

- TC 33.3%
- PECS 66.7%

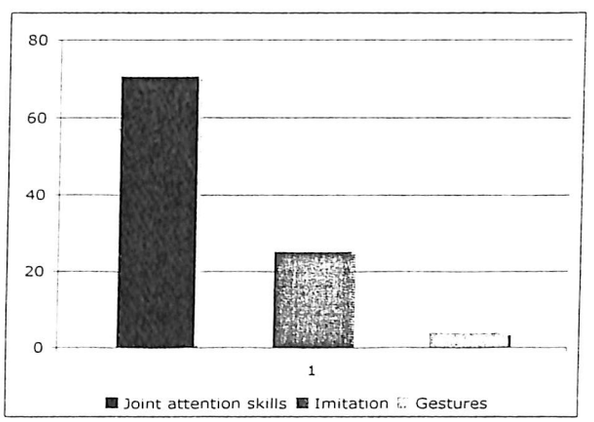

Figure 4. Question Two

Question #2: Which pre-linguistic predictor, in your professional opinion, is most important for working on vocabulary growth with a preschool age child (ages 3-5) with ASD?

- Joint attention skills 70.8%
- Imitation 25%
- Gestures 4.2%

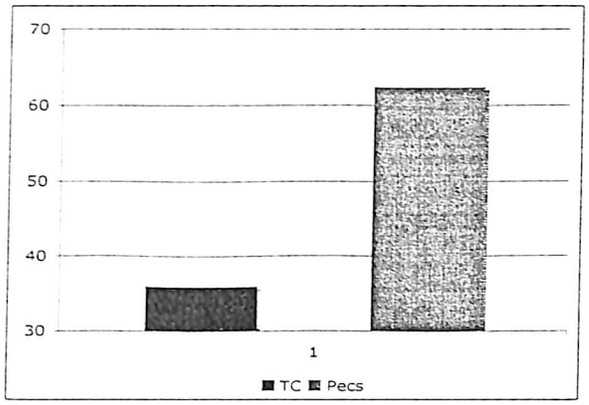

Figure 5. Question Three

Question #3: Which approach are you more familiar with from your professional experience?

- TC 37.5%
- PECS 62.5%

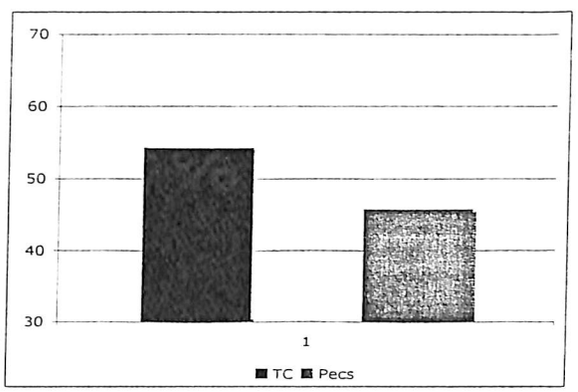

Figure 6. Question Four

Question #4: Which approach, in your professional opinion, should be researched more?

- TC 54.2%
- PECS 45.8%

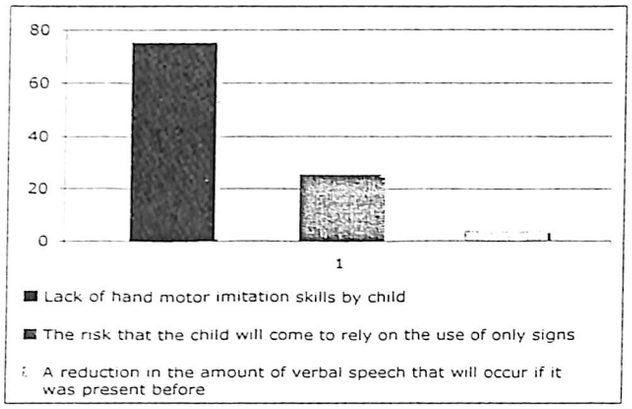

Figure 7. Question Five

Question #5: Which of the following do you believe to be the most common problem associated with the use of the TC approach for increasing the vocabulary growth of children with ASD?

- 75% Lack of hand motor imitation skills by child
- 20.8% The risk that the child will come to rely on the use of only signs
- 4.2% A reduction in the amount of verbal speech that will occur if it was present before

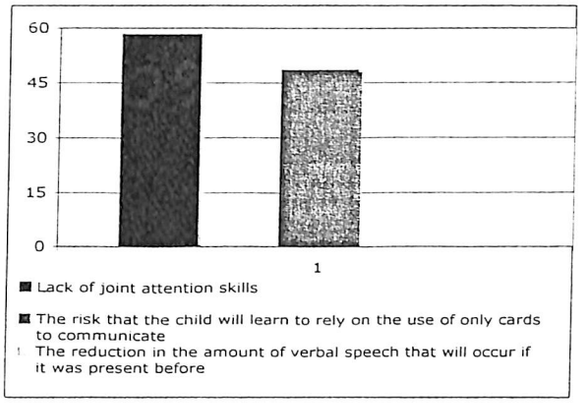

Figure 8. Question Six

Question #6: Which of the following do you believe to be the most common problem associated with the use of the PECS approach for increasing the vocabulary growth of children with ASD?

- 58.3% The lack of joint attention skills
- 41.7% The risk that the child will learn to rely on the use of only cards to communicate
- 0% A reduction in the amount of verbal speech that will occur if it was present before

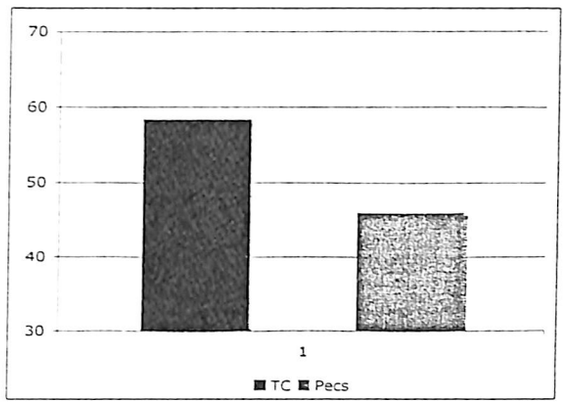

Figure 9. Question Seven

Question #7: Drawing from your professional experience, which approach do you believe the parents of children with ASD prefer?

- TC 58.3%
- PECS 45.8%

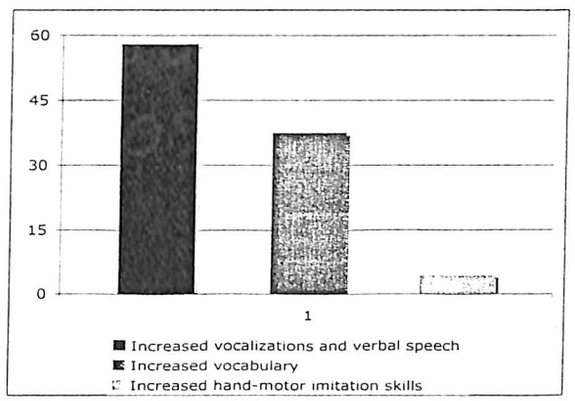

Figure10. Question Eight

Question #8: Which of the following do you believe to be the most positive concept associated with the use of the TC approach for increasing the vocabulary growth of children with ASD?

- 58.3% Increased vocalizations and verbal speech
- 37.5% Increased vocabulary
- 4.2% Increased hand-motor imitation skills

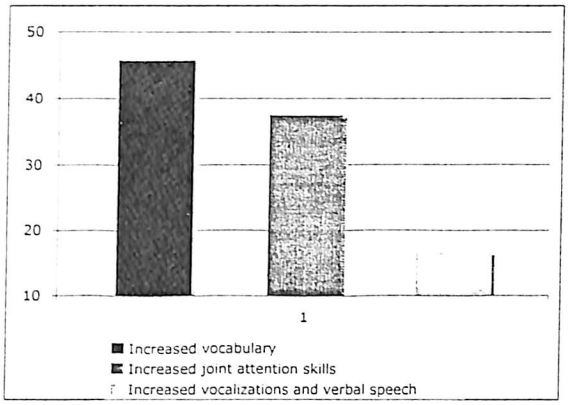

Figure 11. Question Nine

Question #9: Which of the following do you believe to be the most positive concept associated with the use of the PECS approach for increasing the vocabulary growth of children with ASD?

- 45.8% Increased vocabulary
- 37.5% Increased joint attention skills
- 16.7% Increased vocalizations and verbal speech

Question #10: List of states that participated in questionnaire:

- Oklahoma
- Alabama
- Massachusetts
- New Jersey
- Ohio
- Oregon
- Maryland
- Illinois
- Texas
- Kentucky
- New Hampshire
- Iowa
- Georgia
- Tennessee

CHAPTER FIVE

DISCUSSION

There were two research questions for this study, (1) Is the Total Communication (TC) approach or the Picture Exchange Communication System (PECS) more effective in increasing the vocabulary growth of children who have been diagnosed with Autism Spectrum Disorder (ASD)? (2) Which approach do speech-language pathologists (SLPs) choose to increase the vocabulary growth of children diagnosed with ASD?

In response to question one, the results of this study revealed that the TC approach produced more initiated conversation occurrences while the PECS approach indicated an increase in initiated requests and questions for participant two. Both approaches indicated an increased rate of generalization from one session to the next for both participants. These results proved to be consistent with the 2004 study conducted by Tincani due to the fact that an increase in vocalizations took place within both studies. Furthermore, Tincani's study revealed that it was important to note that although total communication led to more vocalizations, learners without hand-motor imitation skills (the ability to imitate sign, symbol, or gesture through the movement of his or her hands), including many children with ASD might benefit more from PECS training. On the other hand, the study indicated that for learners who had moderate hand-motor imitation skills, sign language training may be equally, if not more; appropriate (Tincani, 2004). These results are comparative to this study because both participants within this study likewise experienced an increase in initiated conversation occurrences and vocalizations. Also, the findings of Tincani's study resemble those of this study in that the findings of both suggest that both TC and PECS could be options for increasing vocalizations in children who have been

diagnosed with ASD. However, it is important to point out that Tincani's study was carried out with a larger number of participants and for a longer duration in relation to this study.

In order to address question two, the results of the completed questionnaires were analyzed. Overall, the results indicated that the SLP respondents believed the PECS approach to be more effective in increasing the vocabulary growth of children with ASD. This was interesting due to the fact that the same respondents believed more parents of children with ASD preferred the TC approach. The respondents also indicated they believed more research needs to be done concerning the use of the TC approach for increasing the vocabulary growth of children with ASD. These results were consistent with the lack of research that exists concerning the use of either PECS or TC with children classified as verbal and diagnosed with ASD. There is widespread research available concerning the use of both with non verbal children with ASD, but the idea of using either approach with verbal children with ASD is a relatively new concept and in need of further researching.

Despite the data collected within this study, it is not possible to declare either approach as better or more effective. It is, however, crucial for both parents of children with ASD and SLPs to consider the option of extending the scope of research to include both TC and PECS as options for children who are verbal and have been diagnosed with ASD as a means of increasing vocalizations and initiated conversation occurrences.

Overall, there were a variety of implications and limitations associated with this study. For example, a limited number of sessions with each participant and a small sample size of SLPs who returned questionnaires served as limitations within this study. Furthermore, this study initially targeted the measuring of vocabulary growth, but as the study progressed it was the increases in vocalizations and initiated conversation occurrences that became the focus of the

study. Although new vocabulary terms were learned by each participant, it was ultimately the increased vocalizations and initiated conversation occurrences recorded within this study that points to the need for more empirical research.

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APPENDICES

APPENDIX A

IRB APPROVAL LETTER

The University of Mississippi
Oxford • Jackson • Tupelo • Southaven

Office of Research and Sponsored Programs
100 Barr Hall
Post Office Box 907
University, MS 38677
(662) 915-7482
Fax: (662) 915-7577

September 4, 2008

Ms. Ruth Ann Cooper
63 CR 420
Corinth, MS 38834

Dr. Carolyn Higdon
Communication Sciences and Disorders
University, MS 38677

IRB Protocol #: ***08-149***
Title of Study: ***Total Communication or PECS? Increasing Vocabulary of Children with ASD***
Approval Date: ***September 19, 2008***
Expiration Date: ***September 18, 2009***

Dear Ms. Cooper and Dr. Higdon:

This is to inform you that your application to conduct research with human participants has been reviewed by the Institutional Review Board (IRB) at The University of Mississippi and approved as Expedited under **45 CFR 46.110, category 6 & 7.**

Research investigators must protect the rights and welfare of human research participants and comply with all applicable provisions of The University of Mississippi's Federalwide Assurance 00008602. Your obligations, by law and by University policy, include:

- Research must be conducted exactly as specified in the protocol that was approved by the IRB.
- Changes to the protocol or its related consent document must be approved by the IRB prior to implementation except where necessary to eliminate apparent immediate hazards to participants.
- ***Only the approved, stamped consent form may be used throughout the duration of this research unless otherwise approved by the IRB.***
- A copy of the IRB-approved informed consent document must be provided to each participant at the time of consent, unless the IRB has specifically waived this requirement.
- Adverse events and/or any other unanticipated problems involving risks to participants or others must be reported promptly to the IRB.
- Signed consent documents and other records related to the research must be retained in a secure location for at least three years after completion of the research.
- If you wish to continue your study beyond the expiration date given above, please request a renewal when submitting the *Progress Report* which we will send to you in approximately nine months.
- Please include the IRB protocol number and the study title in any electronic or written correspondence.

If you have any questions, please feel free to contact me or Diane W. Lindley, IRB Coordinator, at (662) 915-7482.

Sincerely,

Thomas W. Lombardo, Ph.D.
Member, Institutional Review Board
Director, Division of Research Integrity & Compliance

APPENDIX B

APPROVED CONSENT LETTER FOR PARENTS OF PARTICIPANTS

PARENT CONSENT FORM

Consent to Participate in a Research Study
Title: Total Communication or PECS? Increasing Vocabulary of Children with ASD

Primary Investigator
Ruth Ann Cooper
Department of Communication Sciences and Disorders
(662) 915-7652

Advisor
Dr. Carolyn W. Higdon
Department of Communication Sciences and Disorders
(662) 915-7652

Description
This study has two research questions: (1) to determine whether the Total Communication (TC) approach or the Picture Exchange Communication System (PECS) is more effective in increasing the vocabulary growth of children who have been diagnosed with Autism Spectrum Disorder (ASD), and (2) to determine which approach will generalize more effectively in natural communication settings.

Total communication is the most commonly used training procedure to teach sign language to children with ASD, and it is the simultaneous presentation of both a manual sign and an associated spoken word. Although there has been little recent research on sign language intervention for children with ASD, there is evidence that simultaneous communication training in teaching signs and speech produces favorable communication outcomes for children with ASD. The PECS approach is another communication treatment approach that can be selected for children with ASD, and it uses basic principles to teach children functional communication using pictures as the communicative referent. In order to research the questions involved in this study, data involving the use of either TC or PECS will be collected from your son/daughter's therapy sessions. Your child will also be administered the Peabody Picture Vocabulary Test (4th edition) and video recorded within the clinical natural communication settings in order to compare the progress of both TC and PECS use within the therapy sessions.

Risks and Benefits
This study has no associated or perceived risks.

Compensation for Participation
There is no compensation for participation in this study.

Confidentiality
All of the information obtained from this study will be private. Your child's participation within this study will not be shared beyond this study. None of the data collected will at any time contain your child's name. The information obtained from this study will be stored within a locked file and disposed of as soon as the results from the study are published. No information concerning either you or your child will at anytime be given to anyone outside of the principal investigator and research team overseeing this study.

Protected Health Information

Protected health information is any personal health information which identifies you in some way. The data collected in this study includes the data from therapy sessions involving the use of either the PECS approach or the TC approach. A decision to participate in this research means that you agree to the use of your health information for the study described in this form. This information will not be released beyond the purposes of conducting this study. The information collected for this study will be kept until the study is complete. While this study is ongoing you may not have access to the research information, but you may request it after the research is completed.

Right to Withdraw

Although your child's participation within this study would be appreciated, you have the right to refuse for your child to participate. If you do choose to allow your child to participate, you also have the right to withdraw your child from the study at any time. If you have any questions or concerns please notify Ruth Ann Cooper at (662) 415-8613 (racooper@olemiss.edu) or Dr. Higdon at (662) 915-5219 (Carolynwhigdon@aol.com).

IRB Approval

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). The IRB has determined that this study fulfills the human research subject protections obligations required by state and federal law and University policies. If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482.

Statement of Consent

I have read the above information, and I have been given a copy of this form. I have had the opportunity to ask questions and receive answers. My signature on this form means that I give full permission for my child to participate in this study.

_____

Printed Name of Child Date

_____

Signature of Parent/Legal Guardian Date

_____

Signature of Investigator Date

APPENDIX C

LETTER SENT TO SLPs REGARDING QUESTIONNAIRE

Dear Practicing Speech-Language Pathologists,

My name is Ruth Ann Cooper, and I am a senior undergraduate Communication Sciences and Disorders major at the University of Mississippi. I am also a member of the Sally McDonnell Barksdale Honors College at the University of Mississippi. As part of my membership within the Sally McDonnell Barksdale Honors College, I am currently conducting research to determine which approach; the Total Communication Approach (TC) or the Picture Exchange Communication System (PECS), experienced speech-language pathologists (SLPs) choose to increase the vocabulary growth of children diagnosed with Autism Spectrum Disorder (ASD). In order to address this question, I am sending the link to complete an attached questionnaire to SLPs from every geographical region of the United States (West, Southwest, Midwest, South, Mid-Atlantic and New England regions). The questionnaire should take a maximum of ten minutes to complete, and I would appreciate it if you would please follow the link below and complete the questionnaire.

This questionnaire has been approved by the University of Mississippi's Institutional Review Board and has also been accepted for presentation as a poster session at the 2008 American Speech-Language-Hearing Association, (ASHA) Convention. The results from the questionnaire will be presented as part of my poster session at the ASHA Convention and also at my honors thesis defense. Due to the fact that the results will be presented at the ASHA Convention, the questionnaire will only be accessible online from now until Tuesday, November 11th. There will be no personal identifiers associated with the completion of this questionnaire and data that is obtained from this study will be recorded only as information received from a geographical region. If you have any questions regarding this study or the completion of this questionnaire please feel free to notify me at racooper@olemiss.edu, or my research advisor, Dr. Lennette Ivy, at livy@olemiss.edu.

Sincerely,

Ruth Ann Cooper
Undergraduate
University of Mississippi

APPENDIX D

LIST OF ABBREVIATIONS

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ASD	Autism Spectrum Disorder
TC	Total Communication
PECS	Picture Exchange Communication System
PPVT-4	*Peabody Picture Vocabulary Test- 4th Edition*
SLP	Speech-Language Pathologist
PDD-NOS	Pervasive Developmental Disorder-not otherwise specified
CDC	Centers for Disease Control and Prevention
CCC	Certificate of Clinical Competence

APPENDIX E

LIST OF DEFINITIONS

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Autism Spectrum Disorder (ASD)- Disorder which comprises a wide spectrum of cognitive and behavioral disorders including autism, Asperger syndrome and pervasive developmental disorder-not otherwise specified (PDD-NOS). (Center for Spoken Language Research, 2001)

Total Communication (TC) Approach- A communicative treatment approach which involves the simultaneous presentation of both a manual sign and an associated spoken word. (Carbone et al., 2006)

Picture Exchange Communication System (PECS)- A communicative treatment approach developed by Dr. Andrew Bondy, a psychologist, and Lori Frost, a speech-language pathologist, that uses basic behavioral principles and techniques such as shaping, differential reinforcement, and transfer of stimulus control via delay to teach children functional communication using pictures as the communicative referent. (Bogdashina, 2005)

Peabody Picture Vocabulary Test- 4th Edition (PPVT-4)- The PPVT–4 scale is a norm-referenced, wide-range instrument for measuring the receptive (hearing) vocabulary of children and adults. The norm sample matches the current U.S. population along parameters of sex, race/ethnicity, geographic region, socioeconomic status (SES), and clinical diagnosis or special-education placement. The test has also been validated for use with children who have been diagnosed with autism. (Pearson Assessments, 2007)

Joint Attention Skills- Skills of sharing, following, and directing focus between communicative partners (Charman & Stone, 2006)

Visual Joint Attention Skills- The ability to change the direction of the head and eyes in response to a change in the direction of visual stimuli (Charman & Stone, 2006)

Hand-Motor Imitation Skills- The ability of an individual to use his or her hands in a functional manner in which to imitate a desired movement or gesture (Stone and Yoder, 2001)

Initiated Conversation Occurrence- A spontaneous word, question or other meaningful vocal response which initiated a conversation.

VITA

Ruth Ann Cooper is a senior in the Department of Communication Sciences and Disorders at the University of Mississippi. She will receive a Bachelor of Arts degree in Communication Sciences and Disorders from the University of Mississippi in May 2009. Ruth Ann is a member of Phi Kappa Phi, Student Alumni Council, a Taylor Medalist, and serves as the University of Mississippi Senior Class Secretary/Treasurer, Order of Omega Honorary Society President, Omicron Delta Kappa External Secretary, and Co-President of the Ole Miss Hand Band. She was selected to serve as the 2009 Class Marshal for the School of Applied Sciences, and she has been on the Chancellor's Honor Roll every semester at the University of Mississippi. In addition, her work on this thesis was presented in poster format at the 2008 American Speech-Language-Hearing Association (ASHA) Convention in Chicago, Illinois.