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# PECS and Communication Abilities in Children with ASD

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by

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Bachelor of Art, Butler University, 2009

A Research Paper Submitted in Partial Fulfillment of the Requirements for the Master of Science Degree

> Rehabilitation Institute in the Graduate School Southern Illinois University at Carbondale May 2011

## RESEARCH PAPER APPROVAL

# PECS AND COMMUNICATION ABILITIES IN CHILDREN WITH ASD

Ву

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A Research Paper Submitted in Partial

Fulfillment of the Requirements

for the Degree of

Master of Science

in the field of Communication Disorders and Sciences

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# TABLE OF CONTENTS

Introduction1
Rationale for the Use of PECS2
Parent Implemented Intervention5
Teacher Implemented Intervention6
Functional Communication8
Varying Communication Partners or Settings9
Increased Speech Production13
Evidence-Based Practice16
Clinical Implications
Future Research18
Conclusion
REFERENCES
VITA

Autism Spectrum Disorder (ASD) is a developmental disorder that affects 1 out of every 110 children (Center for Disease Control and Prevention, 2010). Individuals diagnosed as having ASD demonstrate deficits in communication skills as well as social development. The lack of ability to communicate can be very trying for both the child with ASD and the parents (Owens Jr., 2010).

There are a number of interventions available to improve communication skills for individuals with ASD, one of which is The Picture Exchange Communication System (PECS) (Bondy & Frost, 1994). PECS is a picture-based communication system that was designed for use with children diagnosed with ASD and other individuals without a means of functional communication.

Individuals beginning their PECS training learn to exchange a picture of a tangible item, with another person, in order to receive access to the item (Frost & Bondy, 2002). After mastering the exchange of single pictures, complex sentences that can function for a number of communicative intents are taught (Ganz, Parker, & Benson, 2009). While the aim of PECS is to teach children with ASD "functional, spontaneous communication skills" (PECS Outcome: Picture Use and Speech acquisition section, para 1), speech is typically the preferred method of

communication (Bondy & Frost, 1994). The use of PECS can provide an effective means of communication for children with ASD and increase speech production.

## Rationale for the Use of PECS

Landa (2007) reported that children with ASD may demonstrate signs of an interruption in the acquisition of communication skills within the first year of development. Between the ages of two and three, a reduction in the variation and occurrence of communication, including speech and gestures, has been observed in children with ASD (Landa, 2007). During this same time period, a disruption in the ability to initiate communicative acts, which is seen in when making a request, can be observed in children with ASD. Since children with ASD have a limited means of communication, it is difficult for them to effectively communicate with other individuals in their environment (Landa, 2007). While a delay in communication skills is a common characteristic of ASD, Prizant (1996) stated that an estimated 50% of children with ASD do develop speech as a means of communication. For children who do not use speech or have any other ability to express themselves, PECS would be an ideal system for communication.

PECS has been broken down into six different phases, with each phase building on the next (Flippin, Reszka, &

Watson, 2010). Phase I teaches the child to physically exchange a picture of a preferred item with another communication partner. In Phase II, a communication book containing the picture of the desired item is used. Distance between the child and the communication partner is increased, so the child must move towards the communication partner. This phase targets spontaneity and generalization to various contexts and communication partners. Phase III targets discrimination of various picture symbols. First, the child must discriminate between a picture of a highly preferred item and nonpreferred item. Then, the child begins to discriminate between two preferred items. In Phase IV, sentence structure is introduced. The child requests an item by creating a two-picture request with the picture symbol for "I want" and the picture of the preferred item. The pictures are placed on a sentence strip and given to the communication partner. After the communication partner is given the communication strip, the communication partner presents the child with a verbal model of the sentence. A pause is placed between the phrase "I want" and the name of the preferred item. Then, the sentence strip and preferred item are given to the child. Any vocal production by the child is differentially reinforced by the communication partner. Phase V presents

the verbal prompt "What do you want?" used by the communication partner. A time delay is used between the verbal prompt and the use of a gestural prompt towards the "I want" picture. As this phase continues, the child should exchange the sentence strip without the use of a gestural prompt. In Phase VI, the child learns to exchange the sentence strip not only for requesting, but for commenting according to the communication partner's questions.

Questions such as, "What do you see?" or "What do you have?" may be used in contrast with "What do you want?" during this phase (Flippin et al., 2010).

According to a review of the effectiveness of PECS by Preston and Carter (2009), PECS can be easily learned by children with ASD. In a study by Ganz and Simpson (2004), PECS was introduced to a child with ASD, Gail, whose expressive language consisted of a few two-word phrases, her name, rote counting, and echolalia. Gail participated in two to five sessions a week, with 15 PECS trials in each session until she mastered Phase VI of PECS. She mastered the four phases within 29 sessions. In another study by Liddle (2001), six children with no previous exposure to PECS were taught to use the system as a means of communication. Within the first month, three children out of the six achieved Phase III, one child achieved Phase II,

and one child achieved Phase I. Only one child of the six did not reach Phase I of PECS. For both studies, the protocol outlined in the PECS manual was used (Ganz & Simpson, 2004; Liddle, 2001).

# Parent Implemented Intervention.

Parents of children with ASD using PECS as a means of communication can be taught how to use the system as well. A study by Ben Chaabane, Alber-Morgan, and DeBar (2009) looked at parent-implemented PECS training on improvisation of requesting. Improvisation was defined as using a descriptive picture card (e.g. function, shape, or color) to request the preferred item, when the PECS picture of the preferred item was not present. The mothers were given written and verbal instructions, practice, and feedback on baseline and training protocols. The children in the study Myles, a 6-year old, and Cliff, a five-year old, had both been previously using PECS before the study began. The children were being taught to request for a preferred item using descriptor cards (e.g., blue, round, play). Myles used no correct improvisations during baseline, while Cliff used only one correct improvisation during the "shapes" session. After implementation of the training by the mothers of the children, each child significantly increased the number of correct improvisations when requesting a

preferred item (Ben Chaabane et al., 2009). While the previous studies demonstrate the ease at which parents can be taught to use and implement PECS, teachers of children with ASD can be taught to use the communication system as well.

#### Teacher Implemented Intervention

According to a study by Howlin, Gordon, Pasco, Wade, and Charman (2007) of teachers using PECS in autismspecific schools and units in the United Kingdom (UK), many are not trained or attended only a short workshop. This raises the issue that due to the lack of teacher training, the students are not receiving proper instruction in the use of PECS (Howlin et al., 2007). Also, the teachers may not be making the appropriate modifications to increase the effectiveness of PECS usage. Howlin et al. (2007) wanted to determine the effectiveness of guidance by professionals when using PECS in the classroom. In the current study, 15 classrooms that met criteria were included divided into three groups: (1) Immediate Treatment (five classes), (2) Delayed Treatment (six classes), and (3) No Treatment (six classes). Each treatment classroom was allowed to send six staff members and six parents to a two-day workshop about PECS. Approximately one week after the PECS training, PECS consultants visited the Immediate Treatment classrooms over

the next five months. The consultants monitored the teachers and provided demonstrations and recommendations during the visit. Written feedback was given to the teachers at the end of each visit. The Delayed Treatment group received the same services from the consultants, just at a later date than the Immediate Treatment group. No consultants visited the classrooms in the No Treatment group. The classrooms that received treatment demonstrated a significant increase in both initiations and use of PECS, as opposed to the classroom receiving no treatment (Howlin et al., 2007). The ability to acquire the skills for PECS, by children with ASD, their parents, and teachers, in a quick and effective manner is beneficial in providing a means of communication for children with ASD.

Carr and Felce (2007) carried out a study using PECS in a classroom with a teacher and classroom aides. The control group in the study consisted of 17 children enrolled in special education classrooms or specialized ASD classrooms more than 50 miles away from the researchers' station. These children received no additional treatment aside from what they typically received. The group using PECS consisted of 24 children in classroom similar to the control group within 50 miles of the researchers' station. The protocol outlined in the PECS manual was used during

the intervention, and the children received 15 hours of training until Phase III was reached. Once a child moved onto Phase III, PECS use was moved into the classroom to use with teachers and aides. This study demonstrated an increase in communication attempts with classroom staff from the children who received PECS training. However, with both the researcher and teachers providing PECS instruction, it is unclear whether the researcher's or the teachers' training is solely responsible for the increase in communication. The control group demonstrated an increase in adult initiations, but these communication attempts did not present an increase in responses from the child. This study reinforces the idea that PECS can be used as a functional means of communication with teachers (Carr & Felce, 2007).

#### Functional Communication

Preston and Carter (2009) also stated that PECS offers individuals with poor speech abilities a method of functional communication. Functional communication is considered to be effective communication occurring in natural environments with natural communication partners.

Ganz and colleagues (2009) examined the effects of PECS on communication three male children, Adrian, Jareck, and Ethan. The participants were taught Phase I of PECS, which

involves exchanging a picture to gain access to an item. The children ranged in age from three to six years with varying communication deficits. The study found these three children were able to present a communication partner with a picture to request a desired item during the study. Several weeks after the study, the three children were still effectively using PECS as a means of communication. Liddle (2001) noted that individuals using PECS not only learn to make simple requests, but they can also be taught to convey particular information such as quantity, color or size. A functional communication system not only provides the children with ASD a means of communication, but it allows them to communicate with people they encounter in their everyday environment.

## Varying Communication Partners or Settings

Many studies have demonstrated use of PECS with parents, teachers, and peers of children with ASD in various settings (Ganz et al., 2009; Kravits et al., 2002; Liddle, 2001; Malandraki & Okalidou, 2007). In the study conducted by Ganz et al. (2009), three children were taught to use PECS Phase I as a means of communication. The study was carried out in both a small office and a classroom. During the probe sessions, one examiner was used as a communication partner. Following the probe sessions, a

generalization session was completed with each participant. An unfamiliar adult served at the communication partner for generalization session. Not only were the participants able to request items effectively with pictures during the study, but they were able to use this skill with a new adult during the generalization phase of the study.

Kravits, Kamps, Kemmerer, and Potucck (2002)introduced PECS to Molly, a six-year old female diagnosed with autism. PECS was used in Molly's home during snack and free time, as well as at school throughout journaling and classroom centers. When at home, Molly's paerents served as the communication partners. Teachers and peers in the classroom used PECS with Molly while at school. Molly's peers received limited PECS training so they would understand how to communicate with her. Following the teaching of PECS, Molly demonstrated an increase in icon use and initiations.

A study by Malandraki and Okalidou (2007) examined the introduction of PECS to a 10-year old male, C.Z., who was diagnosed with bilateral sensorineural profound hearing loss and autism. Greek Sign Language, finger-spelling and written language were all included in the total communication method, which was used to instruct C.Z in school. PECS was then introduced to C.Z. to provide him with a functional means of communication. Phases I-VI of

PECS were taught in the study. Initially, PECS instruction occurred in the therapy room, then was utilized in various places around the boarding school including, common rooms, the bedroom, and classrooms. A speech-language therapy undergaduate and a kindergarten teacher served as the two main trainers for C.Z., with his classroom teacher and his caregivers at the boarding school trained to participate in the later phases of PECS. A final individual was trained to carry out the maintenance portion of the PECS training with C.Z. In terms of communication skills, C.Z. moved toward items to request them, used the Greek sign for "come" without appropriate eyegaze, or scream. PECS training followed the manual developed by Frost and Bondy in 1994. Some modifications were made to the protocol due to C.Z.'s primary diagnosis of bilateral hearing loss. Such modifications included the following: pictures were ventally phased out and written words were used, gentual signs and physical touch were used as praise, and sign language was used to ask questions for which C.Z. was expected to provide a response.

Following the intervention, C.Z. could functionally communicate with others in various social environments. He intiated the use of signs when selecting a picture for the sentence strip (Malandraki & Okalidou, 2007). Interaction

with C.Z.'s peers increased as well with his peers immitating the instructors by presenting him with the written questions. A four-month maintenance period follwed the PECS instruction. C.Z. had full access to his communication binder during this period in any setting.

C.Z. spontaneously requested and commented using PECS of the course of those four months. Six months following intervention, C.Z. was observed for a two-hour period of time at the bording school during which he spontaneously requested using PECS and sign language, comprehended two new comands given in sign language, and responded to two written questions. Not only did C.Z.'s expressive communication improve, but PECS helps to improve his comprehension as well with multiple partners in various environments (Malandraki & Okalidou, 2007).

Liddle (2001) introduced PECS to a classroom of children by the teacher and a speech-language pathologist. PECS instruction also took place during the participants sessions with the speech-language pathologist on a weekly basis. Four of the six initial participants in the study progressed to Phases II and III of PECS, so the study was expanded. Fifteen more children were introduced to PECS, and all but one of the participants learned to use PECS as a method to request desired items. This participant was

excluded from the study. The participants were at varying Phases at the end of the study, ranging from Phase II to Phase VI. Parents of the children in the study stated when using PECS, they had less difficulty communicating with their children and were pleased to have a system their child could easily use to aid them in communicating with others. Not only were these children using PECS in the school with their teacher and speech-language pathologist, PECS was being carried over to the home and being used with their parents (Liddle, 2001). While some individuals may be pleased with PECS as a means of communication, speech is the preferred means of communication for many others.

#### Increased Speech Production

PECS has provided functional communication for many individuals with ASD, and it has increased speech production in individuals with ASD as well (Carr & Felce, 2007; Ganz & Simpson, 2004; Ganz et al., 2009). In a case study with Gail by Ganz and Simpson (2004), the number of intelligible utterances, as well as the presence of non-word vocalizations was observed. Gail progressed from a few, inconsistently used utterances to using three-word phrases to make requests.

In a study by Yoder and Stone (2006), 19 children received PECS instruction at a university clinic for 72 20-

minute sessions by clinicians. Parents were encouraged to view their child's therapy sessions and were provided with the opportunity to receive up to 15 hours of PECS training to accompany what their children were being taught by clinicians in the therapy sessions. The parent training focused on direct teaching, discussion of PECS, and how to incorporate PECS use in the home, at school, and in the community. Following completion of parent training, surveys were completed to determine the following: if topics were sufficiently covered, perceived importance of PECS to child development, and parent use of strategies at the completion of treatment. The ratings were determined on a four-point scale, with a four correlating to a positive outcome. The three ideas examined by the survey were given the following average ratings respectively: 3.7, 3.8, and 3.6. The results of this study indicated that children demonstrated an increase in the frequency of non-imitative spoken communication and the number of varying non-imitative words from the beginning of treatment (Yoder & Stone, 2006).

Ganz and colleagues (2009) documented intelligible words or approximations, corresponding to an item in view, produced by the three children in their study. Two of the three children increased their use of intelligible words over the course of the study and neither had used

intelligible speech for communicative purposes (requesting, social interaction) before intervention. During the probe and maintenance stages of the study, both increased their use of intelligible words for communicative purposes (Ganz et al., 2009).

A study carried out by Carr and Felce (2007) compared the use of spoken words between two groups of children with ASD. Carr and Felce (2007) were interested in the frequency of word productions, not necessarily the variety of word productions from children using PECS. Of the individuals in the PECS group, three children with prior word productions increased their total words after treatment, and two children who did not previously use speech increased their word productions after treatment as well. Four of the 17 individuals in the control group demonstrated a decrease in their word productions. The findings in this study, as well as the studies mentioned above, promote the idea that using PECS as an augmentative and alternative communication (AAC) device may encourage speech use in children with ASD (Carr & Felce, 2007).

In the previously mentioned study by Malandraki and Okalidou (2007), the researchers were not interested in increasing C.Z.'s speech; however, during the generalization portion of the intervention, C.Z. vocalized

what appeared to be an attempt to read the words he was selecting for the sentence strip. Before this point in the treatment, C.Z. had not been observed producing any other vocalizations. Although, C.Z. was not receiving any auditory input due to his hearing loss. His instructors were using sign language in place of any verbal prompting (Malandraki & Okalidou, 2007).

#### Evidence-Based Practice

This compilation of research contributes to the idea of evidence-based practice in the world of speech-language pathology. Evidence-based practice combines clinical knowledge, current evidence from research, and the client's best interests when developing treatment (American Speech-Language-Hearing Association, 2011). SLPs are encouraged to use practices backed by evidence to ensure the most effective services and treatments are being provided to the client. PECS, a non-verbal communication system, has been proven to be an effective mode of communication for children with ASD (Ganz & Simpson, 2004; Preston & Carter, 2009). PECS has not only been used in sessions with a speech-language pathologist (Liddle 2001). PECS has been implemented in the home and at school with parents, teachers, and novel adults (Ganz et al., 2009; Kravits et al., 2002; Liddle, 2001; Malandraki & Okalidou, 2007). The

studies using PECS across settings with various adults demonstrate the possibility of generalization with PECS. Generalization with PECS is imperative because SLPs want their clients to take the skills they are acquiring in treatment and use them in their natural, everyday environment with people they encounter everyday, including novel individuals. This may include the use of PECS in the home, school, or even the community. This generalization of PECS to a child's natural environment allows PECS to be classified as functional communication. Children using PECS have also demonstrated an increase in speech production. The increases noted in the studies are considered minimal (Carr & Felce, 2007; Ganz & Simpson, 2004; Ganz et al., 2009; Malandraki & Okalidou, 2007; Yoder & Stone, 2006). While the use of PECS may promote speech productions, there is no evidence to support the use of PECS solely to increase speech.

# Clinical Implications

With the evidence provided by this research, SLPs working with individuals with ASD should familiarize themselves with PECS as mode of communication for their clients. A client without functional means of communication would be an ideal candidate for PECS (Preston & Carter, 2009). SLPs also need to keep in mind that their clients

are individuals. As evidenced by the studies discussed above, PECS may be acquired by different individuals at different rates. Modifications may also need to be made the also PECS to be functional for that particular client. Once the child has a functional communication system in place, the SLP could target speech production along with PECS if the child demonstrates emerging speech abilities. The sample sizes of the studies clinically imply that results of studies using small sample populations may not be a true representation of the general population. However, the results may generalize to individuals within the same age group, and those with comparable characteristics and deficits (Ganz et al., 2009).

#### Future Research

One area of future research on the topic of PECS could focus on larger sample populations. Many studies focus on small samples of children by utilizing single subject designs. This may be due to the fact that it is difficult to gather a group of children with ASD who present with similar characteristics and abilities. Researchers should also consider that PECS is not going to produce the same results for every individual. The idea behind research may be to have commonality within the individuals participating, but with ASD that can be quite difficult.

Commonalities across participants may need to be more general in order to gather a larger sample size. While gathering a larger sample may be a complicated task for a researcher, it could greatly impact the world of research in the area of ASD and PECS.

A second area of future research that could be studied would be to determine if PECS could be used as an effective means of teaching verbal imitation skills in children with ASD. If data confirms that PECS is in fact successful in teaching verbal imitation skills to these children, it would be important to determine which aspects of PECS contribute to the development of the verbal skills (Carr & Felce, 2007). Two other elements worth examining would be the intensity and amount of PECS training the child receives, and how that impacts their speech production, if at all (Ganz et al., 2009). As demonstrated by the current research, not every individual using PECS develops speech, however some children have improved their speech abilities while using the picture-based system. A system, such as PECS, that provides individuals with functional communication and effectively teaches them verbal imitation skills would be supportive in training the optimal method of communication.

A third area to be examined in future research would be PECS acquisition in older individuals with ASD. PECS is typically introduced to younger children while they are still in the stage of language development. However, there are children with ASD much older that the participants in these studies who still have very little communication abilities or no means of functional communication at all. The use of PECS with an older age group of individuals with ASD could open a new area of research for those interested in PECS as ASD.

A fourth area of research to look into for this topic would be how an individual's ability to use PECS impacts their ability to acquire speech. Some individuals rapidly acquire PECS, while others take more time. Individuals who take longer to learn to use PECS to communicate may take longer to produce speech. However, an individual talking longer to master PECS may begin to use speech instead. Along those same lines, future research should examine whether or not speech would have emerged had PECS not been introduced. There could be numerous factors in an individual's environment that could lead them to eventually producing speech. It needs to be determined if PECS is in fact one of those triggers. These relationships are worth

examining to determine what treatment is best for future clients.

#### Conclusion

The current research supports the idea that PECS can provide children with ASD a form of functional communication and may increase speech production in some individuals. It has been demonstrated that PECS can be used with different communication partners in different environments. Parents and teachers may even serve as instructors when first implementing PECS. It should also be noted that when teaching PECS, natural environments may also be used. Providing the child with as many opportunities as possible to use PECS in their every day environment allows it to become part of their routine. The routine use of PECS is ideal in the sense that these are the individuals that will be communicating daily with the child, and may allow them to acquire the use of PECS in a more efficient manner.

It is important to note that not every participant in the studies involving the use of PECS developed speech abilities. Some children may have already developed some speech prior to the study, which only improved their results of speech output with the conclusion of the study. Other participants may have demonstrated emerging speech

abilities due to the intervention that occurred during the study. No two participants in the studies presented with the exact same deficits at the beginning of the study or the same results at the end of the study. Each participant is an individual and their treatment should be approached in the same manner. More research is required to determine what factors contribute to the development of speech abilities for individuals with ASD.

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